Content

Preface

This report describes the revision work carried out regarding the contract ENV.E.4/SER/2000/0045r “Revision of the Commission Decision 1999/178/EC establishing the ecological criteria for the award of the Community eco-label to textile products”.

The contract was awarded to the Danish Environmental Protection Agency (DEPA), and the work was sub-contracted to the Danish Technological Institute (DTI), Clothing and Textile and dk-TEKNIK, with John Hansen, DTI, as project manager.

The revision work was started January 2001, and the work was followed by an ad hoc Working Group (ahWG) consisting of national competent bodies and other interested parties. Three meetings were held during the revision period, all in 2001: February 23 in Copenhagen, May 21 in Brussels and December 4 in Brussels.

At the meetings the current criteria document was discussed along with suggested changes, and draft versions of parts of the present report were presented.

The Regulatory Committee (RC) at a meeting in Brussels on February 20, 2002 finally adopted the revised criteria document.

In Denmark the work was followed by a steering committee, with representatives from DEPA, the industry and trade, the Eco-labelling Council and the Textile Product Panel.

The consultants wish to thank all participating parties for the very valuable contributions to the work.

Summary

The present report describes the work carried out regarding the revision of the criteria document for the award of the Community eco-label to textile products. The current criteria document was to expire February 2002.

The aim of the work has been to evaluate and analyse the success of the product group in order to provide an overview based on which a decision could be taken as to whether the criteria document should be either prolonged, withdrawn or revised.

The product group had actually been one of the most successful ones, and from different fields the interest in enlarging the product group, including also *exterior textiles* has occurred.

At an early stage in the process it was decided to revise the criteria document and to include outdoor clothing as well as textile products with fillings, coatings and membranes. This part of the work is reflected in chapter 2 of the report, dealing with the product group definition.

In chapter 3 each of the existing criteria are reviewed. Some criteria have only briefly been discussed during the revision work, because no questions were raised as to their character and content. Others were heavily debated during the meetings in the ad hoc Working Group and also in between meetings. The report reflects the information gathered, the discussions and the final decision regarding the future wording of the individual criteria.

Chapter 4 brings a description of the criteria developed because of the enlargement of the product group.

As the criteria document has undergone a major edition the numbers of the individual criteria have changed. To provide a quick overview of the changes, a table of such changes is presented in chapter 5.

Other tasks in the revision have been to make a market update, especially with respect to the new products to be included in the product group, to review textile criteria in other eco-labelling schemes and to give ideas to a future marketing and communication strategy. These elements are presented in chapters 6, 7 and 8.

In conclusion, the new criteria document for the award of the Community eco-label to textile products contains 40 specific criteria, divided into *textile fibre, processes and chemicals*, and *fitness for use* criteria.

10 criteria have been adopted unchanged from the old criteria document, although the wording in the *assessment and verification* part has been updated in most cases. The fact that a criterion is unchanged does not necessarily mean that it has not been subject to discussion.

25 criteria have been changed. It is a mix of minor changes in the wording in order to make it more precise, and major changes as tighter (e.g. antimony in polyester) or easier terms (e.g. PAH in mineral oil).

8 criteria are new, either completely new and linked to the extension of the product group, or modifications of old criteria (e.g. the former criterion on detergents which is split in two).

The result of the revision is thus a criteria document, tightening old criteria where possible according to the technological development, and introducing easier terms where necessary based on experience with the former criteria document, thus in some cases making it easier to obtain an eco-label.

The development within textile technology, life cycle assessment as well as assessment of chemicals runs very fast, and it is our hope that for the next revision it will be possible to create even more operational and varied criteria, e.g. in terms of biocides, biostats and flame retardants.

1 Introduction

1.1 Background

On March 23, 1992 the Council adopted a Council Regulation (EEC) No 880/92 on a Community eco-label award scheme.

Textile products was one of the first product groups, for which the establishing of eco-label criteria was started. The Danish Environmental Protection Agency was leading the first work, resulting in the Commission Decision of 22 April 1996 establishing the ecological criteria for the award of the Community eco-label to bed linen and T-shirts. This first criteria document was limited to the mentioned products, and only if they were made of cotton or cotton/polyester.

During 1997-98 this first criteria document was revised by the Deutsches Wollforschungsinstitut (DWI) in co-operation with the Centro Studi Prato Ingegneria (PIN) and the Teppich-Forschungsinstitut (TFI). This revision work resulted in the current criteria document by Commission Decision of 17 February 1999 establishing the ecological criteria for the award of the Community eco-label to textile products. The product group was enlarged to clothing and interior textiles made of all textile fibres.

As the criteria document was valid for three years, the present revision work started in January 2001 in order to present a revised criteria document in due time before the expiration in February 2002.

The revision should look at a possible enlargement of the product group as well as examining the current criteria in order to decide whether the criteria should be prolonged, withdrawn or revised.

1.2 Structure of the report

The present report, which includes the results of the revision work in the form of the new criteria, is structured in the following chapters:

- Product group definition
- Current criteria and suggested changes
- New criteria
- Market update
- Textile criteria in other eco-labelling schemes
- Marketing and communication.

1.2.1 Guidance to the reader

First of all the report presents the extended product group definition, with which it is possible to award an eco-label to a broader selection of textile products.

The chapters on “Current criteria and suggested changes” and “New criteria” primarily reflects the process in establishing a new set of criteria. This means that

the very different level of detail with which the single criteria are presented and discussed should not be taken as an indication of their relative importance, but merely as a mirror of the degree of focus they have attracted during the process.

It should be noted that whenever the report mentions "current criterion", this refers to the criteria document valid until 31 March 2002 (1999/78/EC) and the same prolonged criteria valid until 31 August 2003 (2001/831/EC).

When the report refers to "proposed criterion", this may reflect different proposals during the revision period. For all criteria, however, each section dealing with a criterion ends with the heading "changes to the criterion". Under this heading, the final wording of the newly approved criteria document can be found, together with the methods for their assessment and verification.

For some criteria, the revision work identified a possibility for harmonising the criteria with upcoming EU legislation and directives (e.g. regarding azo dyes and biocides), or new developments in technology (e.g. regarding the use of alternatives to antimony catalysts in polyester production). The possibilities were in some cases judged to be too premature to give a sound basis for a revised criterion, and in these cases an additional section regarding "future revisions" has been added.

During the revision of the criteria it became necessary to change the numbering of the criteria in order to maintain the division into three subgroups (related to fibres, processes and chemicals, and fitness for use). This may cause some confusion if one compares the old and new criteria documents. The following table gives an overview of the headings and numbers of the old and new criteria and how they correspond. The table also provides an overview as to whether the criteria have been changed as a result of the process or if a criterion is new.

Table **Error! Unknown switch argument.**. Overview of criteria titles and numbers in the old and revised criteria document.

Old Title	Old No.	New Title	New No.	Changed	Unchanged	New
Fibre Criteria						
Acrylic	1a, b	Acrylic	1a, b		x	
Cotton	2	Cotton	2	X		
Elastane	3	Elastane	3	X		
Flax and other bast fibres ….	4	Flax and other bast fibres ….	4		x	
Greasy wool …	5a, b, c	Greasy wool …	5a, b, c, d	X		x
Man-made cellulose fibres …	6a, b, c, d	Man-made cellulose fibres …	6a, b, c, d	X		
Polyamide	7	Polyamide	7	X		
Polyester	8a, b	Polyester	8a, b	X		
Polypropylene	9	Polypropylene	9		x	
Processes and chemical related criteria						
Carding and spinning oils …	10a, b	Auxiliaries and finishing agents …	10a, b, c	X		
TCP and PCP	11	Biocidal or biostatic products	11a, b	X		x
Stripping or depigmentation	12	Stripping or depigmentation	12		x	
Weighting	13	Weighting	13		x	
Detergents, fabric softeners …	14a, b	Auxiliary chemicals	14	X		
		Detergents, fabric softeners, …	15	X		x (formerly 14b)
Bleaching agents	15	Bleaching agents	16	X		
Impurities in dyes	16	Impurities in dyes	17	X		

Old Title	Old No.	New Title	New No.	Changed	Unchanged	New
Impurities in pigments	17	Impurities in pigments	18	X		
Chrome mordant dyeing	18	Chrome mordant dyeing	19	X		
Metal complex dyes	19	Metal complex dyes	20	X		
Azo dyes	20	Azo dyes	21		x	
Dyes that are carcinogenic …	21	Dyes that are carcinogenic	22	X		
Potentially sensitising dyes	22a, b	Potentially sensitising dyes	23a, b	X		
Halogenated carriers	23	Halogenated carriers	24		x	
Printing	24a, b	Printing	25a, b		x	
Formaldehyde	25	Formaldehyde	26	X		
Waste water discharges …	26	Waste water discharges …	27	X		
Flame retardants	27	Flame retardants	28	X		
Shrink resistant finishes	28	Shrink resistant finishes	29		x	
		Finishes	30			x
		Fillings	31			x
		Coatings, laminates and membranes	32			x
		Energy and water use	33			x
Fitness for use						
Dimensional changes …	29	Dimensional changes	34	X		
Colour fastness to washing	30	Colour fastness to washing	35	X		
Colour fastness to perspiration	31	Colour fastness to perspiration	36	X		
Colour fastness to wet rubbing	32	Colour fastness to wet rubbing	37	X		
Colour fastness to dry rubbing	33	Colour fastness to dry rubbing	38		x	
Colour fastness to light	34	Colour fastness to light	39	X		
		Information appearing on the label	40			x

If one compares the old and the new criteria, it becomes obvious that some changes are very minor (e.g. a single word has been added or deleted in order to clarify an issue), while others may have larger consequences for applicants (e.g. a certain process has been allowed or banned in the revised criteria document). In most criteria the part “assessment and verification” has been changed, but this fact is not reflected in the above table.

A revised version of the User’s Manual for applicants has been established in order to guide old and new applicants through the procedure, and the discussions in the present document may be seen as an additional help, because the User’s Manual does not always include this type of clarifying text.

The other chapters give an update of the market situation for textiles and an overview of textile criteria in other eco-labelling schemes. Finally, the report presents national experiences regarding marketing and communication of eco-labelled textiles, the needs and wishes of some producers and retailers and a catalogue of ideas for a future strategy on the national and EU level.

2 Product Group Definition

The ad hoc Working Group (ahWG) has at the first meeting been discussing an extension of the product group definition to cover more products than the current definition.

The motivation for this extension is to broaden the product group as far as possible in order to make the eco-label attractive for potential applicants as well as giving the consumer or purchaser the possibility of choosing eco-labelled products for various types of textiles. The current definition of textiles is as follows:

> Textile clothing: clothing consisting of at least 90% by weight of textile fibres.
>
> Interior textiles: textile products for indoor use, consisting of at least 90% by weight of textile fibres, and excluding floor-coverings.
>
> Yarn and fabric for use in textile clothing or interior textiles.

Looking at different types of textiles, which are at the moment not included in the product group definition, they can be categorised as in the following table:

Table 2: Textiles not covered by the current definition in 1999/178/EC

	Indoor	Outdoor
Clothing		Clothing where textile fibres constitute less than 90% by weight*)
Non-clothing	Textile with fillings or coatings**) Textile accessories***)	Products where textile fibres constitute a small part of the product by weight****) Textile accessories
Technical textiles	E.g. aerospace, industrial, marine, medical, military, safety, transport textiles, geotextiles	

*) e.g. rainwear, special work wear, leisurewear
**) e.g. duvets, pillows, draw sheets, bed pads, oilcloth.
***) e.g. scarves, bags, shopping bags, back packs, belts
****) e.g. awnings, tarpaulins, tents, pavilions, umbrellas, garden parasols, garden furniture and cushions.

The only category fully enclosed in the existing product group definition is the indoor clothing category

For the other categories the following comments should be entailed:

Clothing, outdoor: Such products could be rainwear special workwear, special leisure outerwear etc.

All kinds of textile fibre could be used in such products. The production of the textile materials is similar to that of other textiles, but they are more likely to be subjected to a number of functional finishes, such as water proof, rain proof, soil release or UV stabilising finishes. Further some products may be coated or laminated, using polyurethane (PUR), polyvinyl chloride (PVC) or different wax

emulsions, and they may include permeable membranes made of e.g. polytetrafluoroethylene (PTFE).

The existing criteria are relevant for these products; possible criteria concerning the functional finishes and coatings as well as for the membranes should be assessed.

Non-clothing indoor textiles: Examples from this product group are duvets, pillows, draw sheets, bed pads, oilcloth.

The characteristics of these products are that they are either filled products or products with some kind of coating.

Products like duvets, pillows, draw sheets and bed pads are often called bedding materials.

For those products with filling, the filling is covered by a ticking. The ticking is mostly made of 100% cotton or polyester/cotton blends. In some exclusive products silk may be used. A very important characteristic of ticking materials is their down proof properties, which are secured by the construction and a mechanical calendering. Apart from that, the ticking materials are produced in the same way as other woven fabrics. The existing eco-label criteria could undoubtedly be used for ticking materials

The filling in duvets and pillows are normally down and feathers from hens, ducks or geese, synthetic fibres (most often polyester) especially made for this purpose, or even in some cases different natural fibres.

Down and feathers are washed before being filled into the ticking. Synthetic fibres are normally used as they are, directly from the fibre producer.

Criteria for down and feathers could include pesticides, PCP and other preservation chemicals, formaldehyde and detergents used for washing. A further examination in order to find the most relevant criteria for the fillings is needed.

Also coated materials like oilcloth and draw sheets should be examined for inclusion in the product group definition. Such inclusion will further contribute to broaden the indoor non-clothing category, furthermore these products could be of interest for public purchasers. As for outdoor clothing possible criteria concerning the functional finishes and coatings as well as for the membranes should be assessed.

Including bedding materials and coated products like oilcloth in the product group would give a more holistic approach to the sub group indoor textiles or home textiles. Furthermore, the existing criteria will already to some extent cover the fillings. It could therefore be considered to include these products in the extended product group.

Yet another sub category of products, which is not included in the current definition, is accessories made of textile. These products could be scarves, bags, shopping bags, backpacks, belts etc. Like outdoor clothing these products could be made of all kind of textile fibres and could as well be coated or have membranes included.

Non-clothing outdoor textiles: Examples from this product group are awnings, tarpaulins, tents and pavilions, umbrellas, garden parasols, garden furniture and garden cushions. These products are containing a certain amount of textiles, but

also large amounts of other materials such as metal, wood, leather, plastic and fillings like foam made of polyether or polyurethane. Therefore these products do not fall under the current product group definition, where 90 % of the product should be textile fibres. For these products the textile part could constitute a very low percentage of the product group.

For most of the products the weather fastness (outdoor light fastness) would be more relevant than the currently used light fastness, which only reflects the impact from indoor light.

At the first ahWG meeting it was proposed to label only the textile part of a product, for instance to label the cover of garden cushions or the textile part of a tent.

Labelling a material in a product would contribute to make the label more visible to the consumer or end-user. However, it should be considered whether labelling of the material and not the whole product will create confusion among the consumers/end-users.

Garden cushions could in this context be regarded separately. Their composition is very similar to bed mattresses, for which criteria already exist. Inclusion of this type of products could therefore be considered in either of the product groups including the relevant criteria for the product from the other criteria document.

For other products like e.g. tents awnings and parasols the products will include metal, plastics, wood and other materials. To include these in the textile product group would call for a life cycle analysis and criteria setting for these materials, which is not part of this study. Alternatively a separate product group for these products could be considered.

Technical textiles: The technical textiles constitute an inhomogeneous group of textiles.

Technical textiles are defined as “textile materials and products manufactured primarily for their technical performance and functional properties rather than their aesthetic or decorative characteristics” (Textile Terms and Definitions, The Textile Institute, 10^{th} ed.).

A non-exhaustive list of end-uses is: aerospace, industrial, marine, medical, military, safety and transport textiles, and geotextiles. Geotextiles in turn are defined as “any permeable textile material used for filtration, drainage, separation, reinforcement and stabilisation purposes as an integral part of civil engineering structures of earth, rock or other constructional materials”.

Because of the inhomogeneity of this sub group of textile products, examination of market volume, environmental impact as well as potential for environmental improvements is needed. This is not a part of the current study. Further technical textiles are not to a large extent consumer products. For the time being the sub group technical textiles is not included in the extension of the product group. However, this could be considered as a possible extension for the next revision.

2.1 Proposal for product group definition

To get a more holistic approach to the textile product group a new product group definition is proposed which will include the following subgroups of textiles:

Table 3: Product groups

	Indoor	Outdoor
Clothing	yes (is already included)	yes (is partly included now)
Non-clothing	yes (is partly included now)	no (because of non-textile parts)
Textile accessories	Yes	
Technical textiles	No	

During the ahWG meetings and through the comments received most competent bodies and interested parties have been in favour of the following proposal for a new product group definition:

> *"Textile clothing and accessories:* Clothing and accessories (such as handkerchiefs, scarves, bags, shopping bags, rucksacks, belts etc.) consisting of at least 90% by weight of textile fibres;
>
> *Interior textiles:* Textile products for interior use consisting of at least 90% by weight of textile fibres. Wall and floor coverings are excluded;
>
> *Fibres, yarn and fabric:* intended for use in textile clothing and accessories or interior textiles.
>
> For 'textile clothing and accessories' and for 'interior textiles': Down, feathers, membranes and coatings need not be taken into account in the calculation of the percentage of textile fibres."

3 Current criteria and suggested changes

3.1 Acrylic

3.1.1 Current criterion

The criterion on acrylic fibres is currently divided into two sub-criteria:

"a) The residual acrylonitrile content in raw white fibres leaving the fibre production plant shall be less than 1.5 mg/kg.

Test method: extraction with boiling water and quantification by capillary gas-liquid chromatography. Test report required on application.

b) The emissions to air of acrylonitrile (during polymerisation and up to the solution ready for spinning), expressed as an annual average, shall be less than 1g/kg of fibre produced."

3.1.2 Changes to the criterion

The criterion has not been challenged or questioned during the revision, apart from a suggestion to delete the word "white". However, as for some other criteria, a more precise description of test methods, assessment and verification has been added, resulting in the following wording:

"(a) The residual acrylonitrile content in raw fibres leaving the fibre production plant shall be less than 1.5 mg/kg.

Assessment and verification: The applicant shall provide a test report, using the following test method: extraction with boiling water and quantification by capillary gas-liquid chromatography.

(b) The emissions to air of acrylonitrile (during polymerisation and up to the solution ready for spinning), expressed as an annual average, shall be less than 1g/kg of fibre produced.

Assessment and verification: The applicant shall provide detailed documentation and/or test reports showing compliance with this criterion, together with a declaration of compliance."

This wording was approved by the ahWG meeting in May 2001.

3.2 Cotton

3.2.1 Current criterion

The current criterion for cotton is formulated as follows:

"Cotton fibres shall not contain more than 0.05 ppm (sensibility of the test method permitting) of each of 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.

Test methods: As appropriate, US EPA 8081 A (organo-chlorine pesticides, with ultrasonic or Soxhlet extraction and apolar solvents (iso-octane or hexane)), 8151 A (chlorinated herbicides, using methanol), 8141 A (organophosphorus compounds), or 8270 C (semi-volatile organic compounds). Test report required on application.

This requirement does not apply where more than 50% of the cotton content is organic, that is to say certified by an independent organisation to have been produced in conformity with the production and inspection requirements laid down in Council Regulation (EEC) No 2092/91[1].

This requirement does not apply if documentary evidence can be presented that establishes the identity of the farmers producing at least 75% of the cotton used in the final product, together with a declaration from these farmers that the substances listed above have not been applied to the fields or cotton plants producing the cotton in question, or to the cotton itself.

Where more than 95% of the cotton is organic, that is to say certified by an independent organisation to have been produced in conformity with the production and inspection requirements laid down in Council Regulation (EEC) No 2092/91[2], the applicant may place the mention "organic cotton" next to the eco-label."

3.2.2 Changes to the criterion

Documentation for the cotton criterion thus falls in three parts:

1. Testing for a defined number of pesticides on the raw cotton.
2. Documentation for at least 50% of the cotton used is certified organic cotton
3. Documentary evidence that establishes the identity of the farmers producing at least 75% of the cotton used

3.2.2.1 Testing for pesticides on the raw cotton

On the first ad hoc Working Group meeting the Danish EPA proposed to extend the list of pesticides to include all the relevant pesticides adopted on the list of hazardous chemicals under the PIC Procedure. This procedure has been accepted by about 70-80 member nations of UNEP and FAO. The chemicals included on the PIC list can be found in Annex 1.

[1] OJ No L 198, 22.7.1991, p1.
[2] OJ No L 198, 22.7.1991, p1.

PIC procedure: Prior Informed Consent

The PIC procedure helps participating countries learn more about the characteristics of potentially hazardous chemicals that may be shipped to them, initiates a decision-making process on the future import of these chemicals by the importing countries themselves, facilitates the dissemination of this decision to other countries, and encourages exporting countries to take measures to ensure that unwanted exports do not occur. (http://irptc.unep.ch/pic/volpic/h2.html)

The PIC procedure is voluntary - it has been unanimously accepted by member countries of FAO and UNEP and is supported by the leading chemical industry associations and a variety of non-governmental organisations.

The PIC procedure was adopted at the Rotterdam Convention in 1998. 80 countries signed the convention, and by august 2001 16 of these countries have ratified the convention.

Pesticides, industrial and consumer chemicals that have been banned or severely restricted for health or environmental reasons by the participating governments can be included in the procedure. In addition acutely toxic pesticide formulations, which present a hazard under the conditions of use in developing countries may also be included.

The existing criterion (see 3.2.1) for cotton includes 14 of the 26 pesticides listed on the PIC-list. Hexachlorocyclohexane (total isomers) in the criterion covers both HCH (mixed isomers) and Lindane on the PIC list. The remaining 12 pesticides are:

binapacryl, 1,2-dibromoethane (EDB), ethylene dichloride, ethylene oxide, fluoroacetamid, mercury compounds[3], pentachlorphenol, toxaphene, methamidophos[4], methylparathion[5], parathion[6], phosphamidon[7]

The experience from the questionnaire to the Competent Bodies shows that the license holders either choose to test for pesticides or choose organic certified cotton. Including more pesticides in the cotton criterion should therefore take this circumstance into consideration.

Of the 12 pesticides not included in the current criterion four are used mainly for warehouse fumigation. These are 1,2-dibromoethane (EDB), ethylene dichloride, ethylene oxide and fluoroacetamid, although soil treatment with 1,2-dibromoethane and ethylene dichloride is also seen (Peter Esbjerg (2001)). For warehouse fumigation, the use of these substances is often a part of a deferring procedure and

[3] Including inorganic mercury compounds, alkyl mercury compounds and alkyloxylalkyl and aryl mercury compounds

[4] soluble liquid formulations of the substance that exceed 600 g active ingredient/l

[5] emulsifiable concentrates (EC) with 19,5%, 40%, 50%, 60% active ingredient and dust containing 1.5%, 2% and 3% active ingredient

[6] all formulations – aerosols, dustable powder (DP), emulsifiable concentrates (EC), granules (GR), and wettable powders (WP) – of this substance are included, except capsule suspensions (CS)

[7] soluble liquid formulations of the substances that exceed 1000 g active ingredient/l

seems difficult to substitute. For this reason these four substances should be excluded from the criterion.

Mercury compounds are normally used for seed treatment. However, some mercury compounds have also been used for aerial spraying against aphids and cotton mites. (The Merck Index) (Hayes (1982)). The references to the use for aerial spraying are however very old, and there is no indication of current use for this purpose. Furthermore, a separate test method is necessary for mercury and its compounds. The cost of performing relevant tests is about 60 EURO for the test with an additional expense of 90 EURO and upwards for the preparation of the test material (Fransesc Nadales, pers. comm. 9/10-01). For these reasons mercury and its compounds are excluded from the criterion, but it was suggested at the ahWG-meeting in December 2001 to repeat the analysis of the use of mercury compounds.

Although some formulations of methamidophos, methyl-parathion, parathion and phosphamidon are allowed, it will not be possible to distinguish between these and the ones not allowed by testing. Two alternative routes of documentation are in theory available; either to put the substances on the list of tested pesticides, and hereby including all formulations of the substances, or to trace back to the farmer and get documentation for which substances have been used and in which formulation. It should be noted that the US EPA has received a request from the producers of methyl and ethyl parathion to immediately cancel their registrations for the manufacturing of products containing ethyl parathion and to cancel all of their ethyl parathion end-use products effective as of December 31, 2002 (U.S. Federal Register, 2001). Methyl parathion is an active ingredient in all end-use products being cancelled. Finally, it was suggested to add the four substances to the list of regulated pesticides in the criterion, irrespective of their formulations.

The cost of extending the tests to include the proposed substances has been estimated to about 250-300 EURO (in Italy) and about 600 EURO (in Spain). This should be seen in relation to the cost for testing of the current list of pesticides, which is about 800-875 EURO. The Finnish Competent Body has informed that the price for testing of the suggested list of pesticides will be about 1200 EURO. No applicable method for testing of binapacryl has been identified and this pesticide is therefore excluded from the criterion. This is furthermore justified by the fact that binapacryl has not been produced or sold for about 25 years.

At the first ahWG meeting the pesticide endosulphane was also mentioned, even though not on the PIC-list. Endosulphane is a very broad action insecticide and acaricide, which has been introduced rather early to diminish the risk of outbreaks of red spider mites known to occur with use of the somewhat related DDT. Endosulphane has a high persistence although not as high as DDT. On the other hand the toxicity of endosulphane is, compared to DDT, quite high having an LD_{50} as low as 70 mg/kg. For these reasons endosulphane must be considered as belonging to the environmentally unacceptable substances and therefore be a part of the listed substances for testing. Substitution should form no problem as sufficient alternatives exist (Peter Esbjerg, 2001).

Finally it was mentioned at the ahWG meeting that some pyrethroids have shown to be problematic. In brief this “family” of insecticides appeared during the 1970’s and gradually replaced the majority of organophosphorous (OP’s) insecticides before the end of the 1980’s. Many of the pyrethroids are in terms of target action better than their OP predecessors, but it is not always the case. It should also be noticed that uncritical use of pyrethroids is known to cause problems with secondary pest outbreaks in many crops due to strong reduction of populations of

beneficials. E.g. this was the background for withdrawing synthetic pyrethroids in Zimbabwean cotton growing already in the mid 1980's (Bretell, 1986).

Despite the above the pyrethroids have a major role to play in cotton if used with care and based on pest monitoring and hence removing many treatments when pest populations are below control thresholds or even virtually absent. On this basis it should be considered for the moment not to include the synthetic pyrethroids in the list of pesticides for which tests are to be conducted.

The National Cotton Council (NCC) in the United States comments to the draft September 2001 criteria (Philip Wakelyn, NCC) that methyl parathion and methamidophos should not be included on the list of pesticides for which testing is required. The main arguments of NCC are that the two pesticides are registered for use by the US EPA and that for any pesticide added there should be sound science risk assessment documentation. Besides, as the pesticides are applied before boll opening and are short residual, they would not be found on US cotton fibres. The American Textile Manufacturers Institute (ATMI) also points out that any pesticide added to the list should be based on sound documentation.

Marks and Spencer (e-mail Oct. 5, 2001) questions whether the pesticides included on the testing list are truly representative of the pesticides that are actually widely used around the globe for production of cotton and points to a list of 14 pesticides published by the organisation Sustainable Cotton.

The Agricultural Statistics Board in the United States has published statistics on the use of cotton pesticides in the US (USDA, 2001). The list includes about 90 pesticides and chemicals, and states that methyl parathion is used in amounts of 815.000 lbs and methamidophos in amounts of 84.000 lbs. Other pesticides are used in larger quantities, e.g. malathion accounting for 31,923,000 lbs, glyphosate for 9,529,000 lbs and trifluralin for 4,399,000 lbs.

The Central Cotton Research Institute (CCRI) in Pakistan publishes a list of 43 pesticides that are recommended for cotton pests control under different situations (CCRI, 2001).

It has not been possible to collect and present the extensive documentation of the toxicological and ecotoxicological properties of all pesticides possibly in use in cotton production. It is, however, clear that some of the pesticides not included in the testing list are of equal concern as those included. Future revisions of the PIC-list will probably include additional potentially hazardous pesticides still in use, and it was therefore suggested at the third ahWG meeting to use the PIC-list as the basis for selection of pesticides to be tested for, with the following exceptions:

- The four pesticides used for warehouse fumigation mentioned above (1,2-dibromoethane (EDB), ethylene dichloride, ethylene oxide and fluoroacetamid)
- Binapacryl for which there is no standard testing method. Furthermore, binapacryl has not been produced or traded since 1977.
- Mercury and its compounds that today are used for seed dressing, whereas they earlier (more than 20 years ago) also have been used against aphids and mites. Inclusion would cost an additional 150 EURO for testing.

Proposal for a new criterion
The new criterion regarding testing for chemicals on the raw cotton is suggested to be as follows:

"Cotton and other natural cellulosic seed fibres (hereinafter referred to as cotton) shall not contain more than 0.05 ppm (sensibility of the test method permitting) of each of the following substances: aldrin, captafol, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, hexachlorocyclohexane (total isomers), 2,4,5-T, chlordimeform, chlorobenzilate, dinoseb and its salts, monocrotophos, pentachlorophenol, toxaphene, methamidophos, methylparathion, parathion, phosphamidon.

The applicant shall either provide proof of organic certification or documentation relating to the non-use by the farmers or a test report, using the following test methods: As appropriate, US EPA 8081 A (organo-chlorine pesticides, with ultrasonic or Soxhlet extraction and apolar solvents (iso-octane or hexane)), 8151 A (chlorinated herbicides, using methanol), 8141 A (organophosphorus compounds), or 8270 C (semi-volatile organic compounds)."

The ahWG had no comments to the proposed list at the meeting on December 3, 2001.

3.2.2.2 Documentation for at least 50% of the cotton used is certified organic cotton

Under the current criterion applicants can be exempted from testing for pesticides on the cotton used if at least 50% of the cotton is certified organic.

At the first ahWG meeting it was proposed to include transitional cotton in line with organically grown cotton. Transitional cotton is cotton grown in the period of conversion from conventional farming to organic farming. IFOAM[8] permits certification bodies/standardising organisations to allow plant products to be sold as 'produce of organic agriculture in process of conversion' or a similar description, when the standard requirements for organic farming have been met for at least twelve months (IFOAM). A number of certifying bodies operate with transitional crops or crops under conversion.

Allowing transitional cotton in line with certified organic cotton could give an incentive to the farmers to convert from conventional cotton to organic cotton. An operational way could be to include transitional cotton, which is accepted by the certifying body with some kind of certificate.

Proposal for a new criterion

The suggestion for the new criterion regarding documentation for the amount of organic cotton is as follows:

"This requirement does not apply where more than 50% of the cotton content is organically grown cotton or transitional cotton, that is to say certified by an independent organisation to have been produced in conformity with the production and inspection requirements laid down in Council Regulation (EEC) No 2092/91[9]."

3.2.2.3 Documentary evidence that establishes the identity of the farmers producing at least 75% of the cotton used

This part of the criterion has not been questioned, therefore no changes are proposed and the criterion remains as follows:

"This requirement does not apply if documentary evidence can be presented that establishes the identity of the farmers producing at least 75% of the cotton used in

8 *I*nternational *F*ederation of *O*rganic *A*griculture *M*ovements

9 OJ No L 198, 22.7.1991, p1.

the final product, together with a declaration from these farmers that the substances listed above have not been applied to the fields or cotton plants producing the cotton in question, or to the cotton itself."

3.2.2.4 Mention of "organic cotton" on the eco-label
The German RAL-institute pointed during the final revisions out that it might be misleading for the customer to place the wording "organic cotton" on a product, if only 95% actually is organic. Therefore the wording regarding mentioning of organic cotton was changed to the following in the final suggestion for criteria:

"Where 100% of the cotton is organic, that is to say certified by an independent organisation to have been produced in conformity with the production and inspection requirements laid down in Council Regulation (EEC) No 2092/91 of 24 June 1991 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs[10], the applicant may place the mention "organic cotton" next to the eco-label."

3.2.3 Future revisions

For future updates of the criteria document, the PIC-list should be seen as the minimum list with respect to testing requirements. It should be considered, if there is a need also to include pesticides that at present are not on the PIC-list, e.g. endosulphan and other pesticides that are classified in the U.S. in Toxicity Category 1 or by WHO as "Extremely Hazardous".

Further the possible use of mercury and mercury compounds as pesticides should be followed, and the use of pyrethroids would also need a review. Alternatively, it could be considered to allow only organic or transitional cotton. This would increase the credibility of the eco-label, but would at the same time significantly reduce the amount of cotton that is eligible for the label.

3.3 Elastane

3.3.1 Current criterion

The current criterion is formulated as follows:

"a) The content of zinc shall not exceed 1000 ppm.

Test method: direct determination by Atomic Absorbtion Spectrometry. Test report required on application

b) The emissions to air of aromatic diisocyanates during polymerisation and spinning, expressed as an annual average, shall be less than 5mg/kg of fibre produced."

3.3.2 Changes to the criterion

According to information received from CIRFS (Comite International de la Rayonne et des Fibres Synthetiques) (e-mail 16/3/01) zinc compounds are seldom used as catalysts today. Tributyl tin has been mentioned as a possible catalyst in the background report from the latest revision of the criteria document. Toluen diisocyanates have furthermore been mentioned, but are already covered by the

[10] OJ L 198, 22.7.1991, p. 1.

current criterion. CIRFS would inform further if anything showed up, but no such information has been received.

Based on the information from CIRFS, it was suggested to focus the first sub-criterion on organotin rather than zinc compounds. The second criterion regarding emissions of isocyanates has not been questioned at the meetings in the ahWG.

Proposal for a new criterion
The revised criterion is proposed as follows:

"(a) Organotin compounds shall not be used

Assessment and verification: The applicant shall provide a declaration of non-use.

(b) The emissions to air of aromatic diisocyanates during polymerisation and spinning, expressed as an annual average, shall be less than 5 mg/kg of fibre produced.

Assessment and verification: The applicant shall provide detailed documentation and/or test reports showing compliance with this criterion, together with a declaration of compliance."

3.4 Flax and other bast fibres (including hemp, jute, and ramie)

3.4.1 Current criterion

The current criterion is formulated as follows:

"Flax and other bast fibres shall not be obtained by water retting, unless the wastewater from the water retting is treated so as to reduce the COD or TOC by at least 75% for hemp fibres and by at least 95% for linen and the other bast fibres.

Test method: ISO 6060 (COD). Test report required on application if water retting used."

3.4.2 Changes to the criterion

The criterion has not been questioned during the revision process and is therefore unchanged, apart from replacing the word 'linen' by the more correct term 'flax'. A small change with respect to assessment and verification is introduced, resulting in the following wording of the criterion:

"Flax and other bast fibres shall not be obtained by water retting, unless the wastewater from the water retting is treated so as to reduce the COD or TOC by at least 75% for hemp fibres and by at least 95% for flax and the other bast fibres.

Assessment and verification: If water retting is used, the applicant shall provide a test report, using the following test method: ISO 6060 (COD)."

3.5 Greasy wool and other keratin fibres (including wool from sheep, camel, alpaca, goat)

3.5.1 Current criterion

The current criterion is divided into four parts, three of which concern the use of pesticides, while the last concerns emissions from the scouring process:

"a) The sum total content of the following substances shall not exceed 0.5 ppm: α-hexachlorocyclohexane, β-hexachlorocyclohexane, lindane (γ-hexachlorocyclohexane), δ-hexachlorocyclohexane, aldrin, dieldrin, endrin, p,p'-DDT, p,p'-DDD.

b) The sum total content of the following substances shall not exceed 2 ppm: propetamphos, diazinon, dichlofenthion, fenchlorphos, chlorfenvinphos

c) The sum total content of the following substances shall not exceed 3 ppm: cyhalothrin, cypermethrin, deltamethrin, fenvalerate.

These requirements (as detailed in a), b) and c) and taken separately) do not apply if documentary evidence can be presented that establishes the identity of the farmers producing at least 75% of the wool or keratin fibres in question, together with a declaration from these farmers that the substances listed above have not been applied to the fields or animals concerned.

Test method for a), b) and c): Serial non-polar/polar solvent extraction, clean up with gel permeation chromatography and determination with capillary gas-liquid chromatography with electron capture detection. Test report required on application.

d) For scouring effluent discharged to sewer, the COD discharged to sewer shall not exceed 60 g/kg greasy wool, and the effluent shall be treated off-site so as to achieve at least a further 75 % reduction of COD content.

For scouring effluent treated on site and discharged to surface waters, the COD discharged to surface waters shall not exceed 5 g COD/kg greasy wool. The pH of the effluent discharged to surface waters shall be between 6 and 9 (unless the pH of the receiving waters is outside this range), and the temperature shall be below 40°C (unless the temperature of the receiving water is above this value).

Test method for d): ISO 6060. Test report and appropriate data required on application."

3.5.2 Changes to the criterion

3.5.2.1 Criterion 5a-c regarding pesticides

Different substances are used in sheep farming to protect sheep from ectoparasites such as lice, mites, blowfly, etc. that in the worst case can kill sheep in a matter of days. The substances used as veterinary medicines to protect sheep are a group of pesticides called ectoparasiticides. These pesticides may be organophosphates, synthetic pyrethroids or insect growth regulators.

Also organochlorines have previously been used but all major grower countries have banned the use of organochlorine pesticides for sheep treatment today. However, there is evidence that wool from some former Soviet Union States, the

Middle East and South America contains organochlorine pesticides, in particular lindane, at detectable concentrations.

The ad hoc Working Group has been in favour of reviewing the criterion for wool pesticides to decide, whether new pesticides should be included or the current levels for the different groups of pesticides should be revised. Especially regarding the threshold for the synthetic pyrethroids it has been questioned, whether the level is right.

The use and toxicology of pesticides
The table below gives an overview of the pesticides known to be present in the raw wool according to the IPPC note, and the pesticides regulated by the existing ecolabel criterion.

Table 4: Substances used as ectoparasiticides according to the IPPC note and substances covered by the EU ecolabel

	Substances present in raw wool according to IPPC	Substances covered by the EU ecolabel
Organochlorines (OC)	γ-hexachlorocyclohexane (lindane)	γ-hexachlorocyclohexane (lindane) α-hexachlorocyclohexane β-hexachlorocyclohexane δ-hexachlorocyclohexane Aldrin
	Dieldrin	Dieldrin Endrin
	DDT	p,p'-DDT p,p'-DDD
Organophosphates (OP)	Diazinon Propetamphos Chlorfenvinphos Dichlorfenthion Chlorpyriphos	Diazinon, Propetamphos Chlorfenvinphos Dichlorfenthion Fenchlorphos
Synthetic pyrethroides (SP)	Cypermethrin Deltamethrin Fenvalerate Cyhalothrin Flumethrin	Cypermethrin Deltamethrin Fenvalerate Cyhalothrin
Insect growth regulators (IGR)	Cyromazine Dicyclanil Diflubenzuron Triflumuron	

Worldwide the most common ectoparasiticides used for treating sheep are diazinon (OP), propetamphos (OP), cypermethrin (SP) and cyromazine (fly-specific IGR) for control of blowfly. Insect growth regulators such as dicyclanil, diflubenzuron and triflumuron are registered only in Australia and New Zealand. Organochlorine pesticides (in particular, lindane) are still found on wool coming from particular countries and areas.

The organochlorines are hazardous due to their persistence and bioaccumulability. They are thus likely to have long-range effects. Lindane is the most toxic and also the most active as pesticide of the hexachlorocyclohexane isomers. Lindane and DDT compounds are well-studied substances with demonstrated endocrine disrupting capacity.

Organophosphates are less persistent than organochlorines. Besides their tendency to bioaccumulate is low. However they figure in many cause-for-concern priority lists due to their toxicity especially to the aquatic environment (PAN, 1999).

According to the Australian Textile Institute CSIRO (CSIRO, 2001) the synthetic pyrethroids also show high aquatic toxicity. In general the toxicity of the pyrethroids is considered as more severe than the aquatic toxicity of organophosphates. For instance the Environmental Quality Standard set by UK is for diazinon (OP) 30 ng/l of scouring effluent and for cypermethrin (SP) as low as 0.1 ng/l showing that cypermethrin is assessed to be more toxic than diazinon (International Wool Textile Organisation, IWTO, 2000).

For the insect growth regulators a distinction should be made between the hydrophilic compounds cyromazine and dicyclanil and the more hydrophobic compounds like diflubenzuron and triflumuron. The first mentioned is considered as benign according to a risk assessment conducted by CSIRO. On the other hand the toxicity of diflubenzuron and triflumuron is considered to have an aquatic toxicity similar to that of the organophosphates.

Test method

According to CSIRO the test method for testing the pesticides listed in the current criterion may give reliable results under suitable conditions, but does not include a requirement on satisfactory participation in interlaboratory comparisons. Instead an IWTO draft test method could be recommended (Draft Test Method 59). The test method has two main principles, i.e. that laboratories maintain adequate performance in an IWTO-approved interlaboratory testing program, and that laboratories are accredited to ISO Standard 17025 for the analysis. The two principles are linked in practice, because the ISO 17025 accreditation is very difficult without the independent interlaboratory validation. The Draft Test Method IWTO 59 includes the following pesticides, some of which are not included in the eco-label criterion:

Table 5. Substances included in the IWTO 59 Draft Test Method. Substances with a "#" are specifically mentioned in the method

Substance group	Substance	Limits of reporting (mg/kg)
Organophosphates		
	Propethamphos	n.d. (< 0.1) #
	Diazinon	n.d. (< 0.1) #
	Dichlofenthion	n.d. (< 0.1)
	Chlorfenvinphos	n.d. (< 0.1) #
	Chlorpyriphos	n.d. (< 0.1) #
	Coumaphos	n.d. (< 0.1) #
	Fenchlorphos	n.d. (< 0.1)
Synthetic pyrethroids		
	Cypermethrin	n.d. (< 0.1) #
	Cyhalothrin	n.d. (< 0.1) #
	Deltamethrin	n.d. (< 0.1) #
	Fenvalerate	n.d. (< 0.1)
Insect Growth Regulators		
	Diflubenzuron	n.d. (< 1) #
	Triflumuron	n.d. (< 1) #
	Cyromazine	n.d. (< 1) #
	Dicyclanil	n.d. (< 1) #
Organochlorine		
	Aldrin	n.d. (< 0.1) #
	alpha-BHC	n.d. (< 0.05) #
	beta-BHC	n.d. (< 0.05) #
	delta-BHC	n.d. (< 0.05) #
	gamma-BHC (lindane)	n.d. (< 0.05) #
	DDD	n.d. (< 0.05) #
	DDE	n.d. (< 0.05) #
	DDT	n.d. (< 0.05) #
	Dieldrin	n.d. (< 0.05) #
	alpha-endosulphan	n.d. (< 0.05)

Substance group	Substance	Limits of reporting (mg/kg)
	beta-endosulphan	n.d. (< 0.05)
	Endosulphan sulphate	n.d. (< 0.05)
	Endrin	n.d. (< 0.05)
	Heptachlor	n.d. (< 0.05)
	HCB	n.d. (< 0.1) #

No actual analytical procedure is specified and this allows application of state of the art and lowest cost methods. According to CSIRO, a specified method (such as the previous GPC/ecd recommendation) tends to lock older and less adequate technologies into place.

The IWTO Draft Test Method 59 is relatively cheap, about 40 EURO. There is, however, a need to extend the method in order to include all analytes required by the eco-label criteria, and the first step in this procedure is the establishing of a review mechanism to ensure that analytes in the method reflects current usage. Fenchlorphos and fenvalerate are suggested for immediate inclusion in the test method while the inclusion of flumethrin (an IGR) will depend on its registration for use on sheep. CSIRO reported in December 2001 that according to the producer, Bayer, flumethrin is registrered for use on sheep in the United Kingdom, although it has not been found in effluents. CSIRO will therefore include the substance in the IWTO Draft Test Method 59, which will be suggested for adoption as a full test method at the next major IWTO conference in Barcelona in May, 2002.

Proposal for a new criterion
The list of substances for which test has to be carried out is proposed to be a total sum list of ectoparasiticides found according to the IPPC note or covered by the current eco-labelling criteria. This will include insect growth regulators, which have a high aquatic toxicity. As an exception the insect growth regulators cyromazine and dicyclanil will not be included as these have shown to be benign according to CSIRO's risk assessment, based on the Australian NRA discussion document (NRA, 1998).

Furthermore the threshold values for the different groups of substances is reconsidered as synthetic pyrethroids are considered to be more toxic to the aquatic environment than the organophosphates. This is reflected by the suggested changes in the sum total content for synthetic pyrethroids from 3 ppm to 0.5 ppm. The sum total content for insect growth regulators is proposed at 2 ppm in the revised criterion. The current and proposed values are summarised in Table 6.

Table 6. : Thresholds for different groups of ectoparasiticides, current values and proposed values

	Current criterion: Sum total content of the substances shall not exceed	Proposed criterion: Sum total content of the substances shall not exceed
(a) Organochlorine insecticides (OC)	0.5 ppm	0.5 ppm
(b)Organophosphorous insecticides (OP)	2 ppm	2 ppm
(c) Synthetic pyrethroids insecticides (SP)	3 ppm	0.5 ppm
(d) Insect growth regulators (IGR)	No limitation	2 ppm

The new criterion 5 a-d is proposed as follows:

"(a) The sum total content of the following substances shall not exceed 0.5 ppm: γ-hexachlorocyclohexane (lindane), α-hexachlorocyclohexane, β-

hexachlorocyclohexane, δ-hexachlorocyclohexane, aldrin, dieldrin, endrin, p,p'-DDT, p,p'-DDD.

(b) The sum total content of the following substances shall not exceed 2 ppm: diazinon, propetamphos, chlorfenvinphos, dichlorfenthion, chlorpyriphos, fenchlorphos.

(c) The sum total content of the following substances shall not exceed 0.5 ppm: cypermethrin, deltamethrin, fenvalerate, cyhalothrin, flumethrin.

(d) The sum total content of the following substances shall not exceed 2 ppm: diflubenzuron, triflumuron.

These requirements (as detailed in (a), (b), (c) and (d) and taken separately) do not apply if documentary evidence can be presented that establishes the identity of the farmers producing at least 75% of the wool or keratin fibres in question, together with a declaration from these farmers that the substances listed above have not been applied to the fields or animals concerned.

Assessment and verification for (a), (b), (c) and (d): The applicant shall either provide the documentation indicated above or provide a test report, using the following test method: IWTO Draft Test Method 59."

3.5.2.2 Criterion 5 d (now 5e) wastewater

In the ahWG the issue has been raised if the value for COD discharge from wool scouring mills with discharge to external effluent treatment plant could be lowered.

The criterion for discharge of COD in the scouring effluent is in the current criteria document divided in two parts, one for discharge to sewer and one for discharge to surface water. The level for discharge of COD is 60 g/kg greasy wool to sewer and 5 g/kg greasy wool to surface water, respectively. A further demand on indirect discharge is an additional 75% reduction in the sewer.

In the IPPC note (IPPC, 2001) an industry survey from 1997/98 on raw wool scouring enterprises in the European Union is reported. The survey represents scouring mills with different on site treatment of the wastewater. Some of the mills are discharging directly to surface water, some discharging to external treatment plants. For the mills discharging to an external treatment plant the following figures were found:

Table 7. Overview of effluent treatment processes and associated output of COD (IPPC, 2001)

	Mill	Scour system	COD after on site treatment
Indirect discharge	1	Al/polymeric flocculation Hydrocyclone	73 g COD/kg[11]
	2	Acid/polymeric flocculation Decanter centrifuge	60 g COD/kg
	3	Fe/lime/polymeric flocculation Decanter centrifuge	33 g COD/kg
	4	Acid cracking Filter press	42 g COD/kg
	5	Aeration (4 - 5 days)	25 g COD/kg
	6	Evaporator	1.3 g COD/kg

[11] calculated as follows: COD content of fine wool 556 kg/tonne of which 95 % occurs in untreated wastewater; water usage is assumed to 15 l/kg greasy wool

The figure for mill no.1 is a calculated figure, while the figures for mill no. 2-6 are measured on the mills. Discharges from the mills vary widely, from zero to 73 kg COD/tonne of greasy wool processed, reflecting differences in the on-site treatments applied. In Australia, most scours in urban centres are in the process of installing on-site acid flocculation and decanter centrifugation, which according to table 3 produce a discharge at 60 g COD/kg of wool. These effluents are then treated in municipal sewage treatment systems. In Australia, this is regarded as 'best practice', especially because in the largest scouring centre in South Western Melbourne, the municipal sewage treatment is to full tertiary standards (Ian Russell, CSIRO (e-mail 6/11-01)). As the figures in the table furthermore are averages, compliance with 60 g COD/kg can only be expected about 50% of the time, without possibility for prediction of the behaviour of a specific batch. With this in mind, it was suggested at the third ahWG meeting to keep the COD-limit at its present value, 60 g/kg, and the working group was in favour of this decision.

The criterion is thus unchanged in the proposal for new criteria, except that it has been renamed to 5 e):

"For scouring effluent discharged to sewer, the COD discharged to sewer shall not exceed 60 g/kg greasy wool, and the effluent shall be treated off-site so as to achieve at least a further 75% reduction of COD content, expressed as an annual average.

For scouring effluent treated on site and discharged to surface waters, the COD discharged to surface waters shall not exceed 5 g/kg greasy wool. The pH of the effluent discharged to surface waters shall be between 6 and 9 (unless the pH of the receiving waters is outside this range), and the temperature shall be below 40°C (unless the temperature of the receiving water is above this value).

Assessment and verification: The applicant shall provide relevant data and test report, using the following test method: ISO 6060."

With respect to testing, it may be difficult to obtain a representative sample for determination of COD, because the wool fat often will be floating on top of the effluent. The New Zealand eco-label criteria suggests the following sampling procedure: "Sampling shall consist of five daily samples (taken on five successive working days) each consisting of at least three days per sample taken at a minimum of one hour intervals. All samples (minimum fifteen) shall be combined and duplicate analyses shall be performed on the resulting composite sample." Although this sampling procedure still gives the possibility of obtaining samples with an unrealistically low COD-value, it will minimise the risk that a specific batch with a high content of wool grease will cause a larger part of the production to be rejected.

3.5.3 Future revisions

Australian Wool Innovations is currently starting a monitoring programme to seek any new evidence for adverse effects from occupational exposure of shearers to organophosphates. If the study shows any evidence for concern at the relatively high level of exposure, the organophosphates will probably be withdrawn. Similar considerations are being made in the United Kingdom. The results of these surveys and risk assessments should be used, when revising the criterion regarding the use of pesticides on sheep.

For future revisions it is also worth noting that in the New Zealand eco-label programme "Environmental Choice", the requirements for emissions of wool

grease in production of wool-pile carpets (EC-04-98) is 40 kg/tonne of greasy wool scoured, and that the level of COD in dye-house effluent shall not exceed 35 kg/tonne. These levels have been reached by at least one licensee and indicate that some producers may be able to comply with the tightened criterion (40 kg COD/tonne) suggested at the onset of the revision of the criteria. State-of-the-art of especially Australian wastewater treatment from wool scouring should therefore be investigated, when the criteria undergo the next revision.

On the first ahWG meeting Italy raised the issue of documentation on COD in wastewater from cashmere and mohair scouring. The fibres are often processed in small quantities by small farmers in China and Mongolia. The scouring process is often taking place without following wastewater treatment because of the small quantities. It was discussed whether missing documentation could be accepted in such cases. EEB told that a Mongolian association of such small farmers was initiated. Possibilities of having an alternative solution on the COD were discussed. No common opinion was reached at this or subsequent meetings. It is suggested that the issue is discussed again at the next revision of the criteria, where more information may be available.

3.6 Man-made cellulose fibres (including viscose, lyocell, acetate, cupro, triacetate)

3.6.1 Current criterion

The current criterion is formulated as follows:

"a) The level of AOX in the fibres shall not exceed 250 ppm

Test method: ISO 11480.97 (controlled combustion and microcoulometry). Test report required on application.

b) For viscose fibres, the sulphur content of the emissions of sulphur compounds to air from the processing during fibre production, expressed as an annual average, shall not exceed 160 g/kg filament fibre produced and 30 g/kg staple fibre produced. Where both types of fibre are produced on a given site, the overall emissions must not exceed the corresponding weighted average.

c) For viscose fibres, the emission to water of zinc from the production site, expressed as an annual average, shall not exceed 1g/kg.

d) For cupro fibres, the copper content of the effluent water leaving the site, expressed as an annual average, shall not exceed 0.1 ppm."

3.6.2 Changes to the criterion

At the first ahWG meeting it was suggested to look for BAT notes for viscose fibre production, but no such notes have been identified. No other information has been identified.

Regenerated cellulose fibres are mainly based on wood cellulose. The raw material is normally dissolved by a sulphite process, which can cause extensive emissions of oxygen demanding substances to water. The pulp can be bleached using chlorine-based chemicals. The viscose processes can cause extensive emissions of oxygen demanding substances and zinc impurities to water, as well as sulphur pollution to the air.

3.6.2.1 Criterion 6a - AOX

The criterion has not been challenged or questioned during the revision. Apart from a reformulation of the assessment and verification part, the criterion is unchanged:

"The level of AOX in the fibres shall not exceed 250 ppm.

Assessment and verification: The applicant shall provide a test report, using the following test method: ISO 11480.97 (controlled combustion and microcoulometry)."

3.6.2.2 Criterion 6b – Sulphur emission

The sulphur emission could be put in line with the Nordic Swan Label, which has 15 kg sulphur/tonne regenerated cellulose.

According to CIRFS (e-mail 20/7/01) a criterion for both filament and staple fibres for a sulphur emission level of 15 g/kg is 'impossible to be reached for staple fibres and would ignore the existence of viscose filament yarns'.

In addition, according to an Austrian manufacturer of cellulose fibres (e-mail from Mr. M.Buechele 05/07/01), 'sulphur emissions of 15 g/kg is not feasible with current technology, if all emissions are adequately calculated'.

Based on Boustead, 1997 ("Ecoprofiles of selected man-made fibres", "A report for CIRFS by I. Boustead", table 35 p. 43) the following calculations for process related air emissions of sulphur can be made:

Emissions of process related sulphur compounds in the production of 1 kg of viscose fibres (when all operations are traced back to the extraction of raw materials from the earth):

68,000 mg CS_2 (carbon disulphide): Approx.	57.3 g S.
6,200 mg H_2S (hydrogen sulphide): Approx.	5.8 g S.
310 mg SO_x: Approx.	0.2 g S. (assuming 100% SO_2).

Total sulphur: Approximately 63 g S per kg of fibre.

Assuming that CS_2 and H_2S are mainly emitted during the production of the fibres at the production sites, the result of the calculation indicates that a general limit of 15 g/kg is too strict.

In an e-mail dated 03/10/01 CIRFS suggests 'to keep the splitting for staple and filament with an emission target of 30 g/kg for staple and 120 g/kg for filament'. These limits have been supported by Competent Bodies in Finland (staple) and Italy (filament).

At the ahWG on December 3 these limits were accepted, and the formulation of the criterion is as follows:

"For viscose fibres, the sulphur content of the emissions of sulphur compounds to air from the processing during fibre production, expressed as an annual average, shall not exceed 120 g/kg filament fibre produced and 30 g/kg staple fibre produced. Where both types of fibre are produced on a given site, the overall emissions must not exceed the corresponding weighted average.

Assessment and verification: The applicant shall provide detailed documentation and/or test reports showing compliance with this criterion, together with a declaration of compliance."

3.6.2.3 Criterion 6c - Zinc emission

It has been mentioned that the limit in this criterion is relatively high, and it has been confirmed from the Danish Competent Body that applicants normally report a zinc emission which is about ten times lower than the present limit.

CIRFS (e-mail 03/10/01) suggested a limit of 0.3 g/kg, which was discussed in the ahWG, and a compromise, which should be realistic, was found to be a reduction of the limit for zinc emission from 1 to 0.2 g/kg.

At the ahWG on December 3 this limit was discussed. The Italian Competent Body stated that this limit was impossible to comply with, whereas CIRFS confirmed that a majority of the fibre producers were able to meet the limit.

The criterion was formulated as follows:

"For viscose fibres, the emission to water of zinc from the production site, expressed as an annual average, shall not exceed 0.3 g/kg.

Assessment and verification: The applicant shall provide detailed documentation and/or test reports showing compliance with this criterion, together with a declaration of compliance."

3.6.2.4 Criterion 6d – Copper in cupro fibres

The criterion has not been challenged or questioned during the revision. Apart from a reformulation of the assessment and verification part, the criterion is unchanged:

"For cupro fibres, the copper content of the effluent water leaving the site, expressed as an annual average, shall not exceed 0.1 ppm.

Assessment and verification: The applicant shall provide detailed documentation and/or test reports showing compliance with this criterion, together with a declaration of compliance."

3.7 Polyamide

3.7.1 Current criterion

The current criterion is formulated as follows:

"The emissions to air of N_2O during monomer production, expressed as an annual average, shall not exceed 1g/kg fibre produced."

3.7.2 Changes to the criterion

At the first ahWG meeting it was suggested to look for BAT notes for polyamide fibre production, but no such notes have been identified.

The Nordic Swan Label has the same criterion.

CIRFS (e-mail 27/3/01) considers 1 g N_2O per kg of fibre totally unrealistic and claims that the present criterion is based on an administrative error.

Recent information seems to indicate that it is reasonable to differentiate between polyamide 6.6 and 6 in the criterion.

3.7.2.1 Polyamide 6.6

According to Boustead, 1997 ("Ecoprofiles of selected man-made fibres", "A report for CIRFS by I. Boustead", table 27 p. 39): "Gross air emissions in mg associated with the production of 1 kg of nylon 6.6 fibre: 9,100 mg N_2O/kg of fibre, when all production sequences are traced back to the extraction of raw materials from the earth". In addition it is stated that: "All producers have in place programmes to reduce N_2O emissions to values less than 10% of present emission levels by the beginning of 1998. Already installed plant and pilot plant studies suggest that the actual improvements may be even greater with a decrease to 5% or less of present levels." In other words according to Boustead, 1997, it is technically possible to get below 1 g/kg even if all production sequences are traced from the fibre and back to the extraction of raw materials from the earth.

According to APME - Association of Plastic Manufacturers in Europe, 1999 ("I. Boustead: Ecoprofiles of plastics and related intermediates", table 6, p.8) the process related air emissions of N_2O from the production of 1 kg of nylon 6.6 polymer are 730 mg/kg. These data should include all process emissions from the production of Nylon 6.6 polymer back to the extraction of raw materials from the earth (i.e. including the monomer-production).

CIRFS (e-mail 03/10/01) reports that 3 different factories in Europe emit 50, 50 and 196 g/kg and further suggests a limit of 50 g/kg. This limit was discussed at the ahWG meeting on December 3, 2001, and the meeting was predominantly in favour of this limit.

3.7.2.2 Polyamide 6

According to Boustead, 2000 (Eco-profiles, Nylon 6, "A report for The European Center for Plastics in the Environment", table 11, p. 25) the "process" air emissions of N_2O in the production of Nylon 6 polymer is calculated to 8.6 g / kg polymer ("when all production sequences are traced back to the extraction of raw materials from the earth").

According to CIRFS (personal communication with Mr. Josef Spijkers and e-mail 20/08/01) air emissions of N_2O occur during the production of the reactants hydroxylamine and nitric acid. These chemicals are used for the conversion of cyclohexanon into caprolactam, the monomer (Beckmann reaction). According to CIRFS the typical value of 8.6 g/kg polymer has been confirmed by some of the producers of caprolactam. However, at present no information is available to indicate how far activities are feasible to reach lower limits.

According to CIRFS it may be difficult because typically the producers of the fibres are not involved in the production of the reactants. At the ahWG meeting December 3 the Italian Competent Body suggested a limit of 10 g/kg, and the meeting was predominantly in favour of this limit.

3.7.2.3 Proposal for a new criterion

The new criterion is formulated as follows:

" The emissions to air of N_2O during monomer production, expressed as an annual average, shall not exceed 10 g/kg polyamide 6 fibre produced and 50 g/kg polyamide 6.6 produced.

Assessment and verification: The applicant shall provide detailed documentation and/or test reports showing compliance with this criterion, together with a declaration of compliance."

3.8 Polyester

3.8.1 Current criterion

The current criterion for polyester is formulated as follows:

"(a) The amount of antimony in the polyester fibres shall not exceed 300 ppm.

Test method: Direct determination by Atomic Absorbtion Spectrometry. Test report required on application.

(b) The emissions of VOCs during polymerisation of polyester, expressed as an annual average, shall not exceed 1.2 g/kg of produced polyester resin. (VOCs are any organic compound having at 293.15 K a vapour pressure of 0.01 kPa or more, or having a corresponding volatility under the particular conditions of use)."

3.8.2 Changes to the criterion

3.8.2.1 Criterion 8a – Antimony
Antimony is typically present in textiles for two main reasons:

- Antimony compounds are used as a catalyst in polyester manufacturing
- Antimony compounds are sometimes used as a flame retardant synergist in textiles (combined with a halide)

Using antimony compounds as a flame retardant in textiles requires antimony in concentrations between 2-10% by weight. These amounts of antimony are far beyond the level needed, when antimony is used as catalyst (IPCS (1997)).

The following is therefore only applicable for polyester fibres, which are not rendered flame retardant with antimony compounds.

Demand for catalysts
The demand for polyester – and therefore also for polyester catalysts has increased dramatically since the commercial introduction of polyester, and the increase in demand is not expected to stop in the coming years.

Several metal compounds can be used as a polycondensation catalyst in the polyester manufacturing, but out of economic reasons almost only antimony compounds (primarily antimony trioxide and antimony triacetate) have been used since the early seventies (Partridge (2001); Acordis (2001)). Today it is expected that more than 90% of the PET manufactured on a global scale is produced with antimony-based catalysts (Thier-Grebe (2001)).

Different sources indicate that the limit for antimony can be lowered. On a global scale the antimony based polyester plants are estimated to use 180-240 ppm antimony in the polyester production. However, around 25% of the plants are using as low as 160-180 ppm. Much of the antimony is emitted in the wet processing steps giving a lower antimony content of the final textiles than of the fibres. This indicates that it is necessary to specify at which stage of the life cycle the test for antimony residues have to be measured (Zimmer (2001); Acordis (2001)).

An analysis of the elements in PET-bottles supports the above findings regarding residual antimony. Twelve different PET-bottles were analysed with respect to their content of antimony and other elements from the periodical system. Of the twelve bottles, seven had residues between 157 and 200 ppm while the remaining five had residues between 200 and 253 ppm (Braungart et al. (1998)).

The main polyester fibre producer in France, Tergal, has provided almost similar figures for bottles, i.e. 29% have residues below 200 ppm, 66% have residues between 200 and 250 ppm, and 5% above 250 ppm (e-mail from AFNOR, 23/11-01). They argue that the antimony content in PET for bottles is lower than for fibres because the production technology is more recent and present the following figures for polyester fibres from all over the world:

- 15% below 150 ppm, including Sb free fibre
- 28% between 150 and 200 ppm
- 25% between 200 and 250 ppm
- 31% above 250 ppm (with 22% of all samples being above 300 ppm).

On the second ahWG meeting it was further mentioned that using recycled PET bottles for fibre production could cause a problem, if the limit for antimony was lowered. However, the criteria document takes care of this problem as a general exception is made for fibres of recycled origin. Recycled fibres do not need to meet the fibre specific criteria.

Toxicology
Antimony is a heavy metal, and several related health problems are known from antimony and its compounds. For example antimony trioxide (which is one of the most widespread PET catalysts) is on the Danish list of Unwanted Substances and on the European Community list of dangerous substances (Council Directive 67/548EEC Annex 1) due to its potential to cause cancer (Carc 3).

Environmental and health problems are not expected to occur from the use of polyester textiles, but it has, however, been shown that antimony can be dissolved out of fabrics also at relatively low temperatures with liquids such as sweat, saliva and synthetic blood (Acordis, 2001). Furthermore, the use of antimony catalysts for PET bottle manufacturing has been banned in Japan, as it has been shown that the compounds leached.

When the raw polyester fabrics are in different wet processing steps, emission of antimony to the process water occurs leading to antimony-polluted wastewater. Dyeing is by far the most important process emitting antimony due to the high temperature and long process time, but also washing processes are susceptible of emitting antimony (Acordis (2001)). When the polluted wastewater is treated, most of the antimony will precipitate into the sludge, which then becomes problematic to dispose of. Also when disposing of the textiles at the end of their useful life, antimony will be emitted to the environment.

Alternatives
The use of the most suitable alternatives have previously been limited due to the following reasons:

- Germanium compounds (dioxide, tetraalkooxide, or glycol oxide) have good catalytic properties, are non-toxic, and yields very white polymers. However, germanium is a scarce resource and thus very expensive (Kirk-Othmer (1996)).

Due to national environmental regulations it is, however, used in Japan instead of antimony compounds.

- Titanium alkooxides are much more active than the antimony alternatives, but unattractive because of yellowing of the fibres, probably due to reaction with vinyl ends (Kirk-Othmer (1996)).

Recent research has, however, demonstrated that new generation titanium catalysts can be used in PET manufacture for fibre end use with no important variation in polymer or fibre properties (compared to antimony catalysed polyesters) (Fibre Innovation Group (2001)). This means that titanium catalysts can be used as an alternative to the existing antimony based catalysts and thereby produce antimony free fibre products. Antimony free does not necessarily mean heavy metal free, as heavy metal components are sometimes used, when the yellow colour has to be "covered", e.g. cobalt acetate (Streng (2001)).

It should be added that also the antimony catalyst causes problems with the textile properties even though it is very robust. It is susceptible to reduction to metallic antimony that can cause a greyish blue colour in the polymer (Partridge (2001)).

For the new generation of titanium-based catalysts the problems about yellowing of the fibres have been reduced dramatically, and due to a lower metal content in the final fibres the tensile strength can be increased. The research continuously leads to more and more suitable alternatives and as all major polyester companies research in this subject, it is expected that major improvements to the existing alternatives will be introduced in a very near future (Partridge (2001)).

The new catalyst has only just been introduced to the market but is expected to revolutionise the market within a relatively short period of time, as there are more than 'just' the environmental benefits. Titanium based catalysts can be introduced at existing plants without further capital investments (Thier-Grebe (2001); Partridge (2001)), and also very important is that compared to the antimony catalysts the new titanium based catalysts are able to increase the capacity of a polyester polymerisation plant by up to 15%, due to a more efficient catalyst (Partridge (2001)).

Other environmental benefits are that the polyester manufactured with Ti-catalysts can be dyed with less dye, at lower temperature or with shorter dyeing times, compared to antimony-manufactured polyester (Acordis (2001)).

Besides the development of the new efficient titanium catalyst, effort is also put into research in other alternatives, which are very efficient, do not cause yellowing of fibres, and have good environmental properties (Streng (2001)).

Discussions in the ahWG
In the current eco-label criterion the highest allowed content of antimony in the polyester fibres is set to 300ppm.

The development of fully compatible and more environmentally friendly catalysts, even with quality and efficiency benefits, suggests that the use of antimony-free catalysts are required in the future to apply for an eco-label on polyester textile products. However, 90% of the polyester produced today is antimony based. Alternatives are available, but it is assessed that conversion to these alternatives is a little premature.

Information collected during the project indicates that the limit for antimony could be lowered from the current level of 300 ppm. As much as 25% of the polyester plants on a global scale are estimated to have an average of 160-180 ppm antimony in the fibre produced. As much of the antimony is emitted in the wet processing steps, it is crucial to specify at which step in the life cycle the test must be conducted.

In the draft criteria document distributed prior to the third ahWG meeting in December 2001 it was therefore suggested that the amount of antimony in the polyester fibres shall not exceed 200 ppm.

A large number of comments regarding the possibility of reaching the 200 ppm level suggested in the revised criterion were received before the third ahWG meeting. The Finnish and Italian Competent Bodies advised in their comments (e-mail Sept. 7, 2001, respectively Oct. 29, 2001) to leave the limit as it is in the current criteria, i.e. 300 ppm. The French textile industry stated in their comments that 200 ppm of antimony is completely incompatible with the structure of quite all the polyester fibre and yarn processes existing at the moment (letter from AFNOR, August 10, 2001) and CIRFS also recommended to maintain the level at 300 ppm in their comments of Oct. 3, 2001. EURATEX (European Apparel and Textile Organisation) stated in their comments of October 16, 2001 that the level of 200 ppm is not so easy to maintain, and this view was also shared by ATMI (American Textile Manufacturers Institute). UEAPME (European Association of Craft, Small and Medium-Sized Enterprises) found the reduction to 200 ppm of antimony excessive and suggested a maximum level between 250 and 270 ppm.

At the third ahWG meeting on December 3, CIRFS (represented by Mr. Spijkers) acknowledged that 250 ppm of antimony could be reached by using Best Available Technology, while the Italian Competent Body told that potential applicants could fulfil a criterion at 260 ppm. At the same time it was discussed that Sb-free catalysts may play an important role in the future polyester production, but that the technology was still too new to be implemented at most production facilities. A compromise of 260 ppm was agreed upon, and the final criteria document will be revised according to this. Future revisions of the criteria should emphasise that Sb-free catalysts are preferable from an environmental point of view. Meanwhile, it was suggested by Simon Goss (EU Commission) that an additional label/sentence could be added to the Flower-label, stating that the polyester was “antimony-free polyester”.

Proposal for a new criterion
The final proposal for criterion 8 a) regarding content of antimony is therefore formulated as follows:

“The amount of antimony in the polyester fibres shall not exceed 260 ppm. Where no antimony is used, the applicant may place the mention “antimony free” (or equivalent text) next to the eco-label.

Assessment and verification: The applicant shall either provide a declaration of non-use or a test report using the following test method: Direct determination by Atomic Absorption Spectrometry. The test shall be carried out on the raw fibre prior to any wet processing. “

Testing
EURATEX pointed out at the ahWG meeting that ICP-AES (Inductively Coupled Plasma Atomic Emission Spectrometry) is equally suited for determination of the antimony content. As stated in the framework of the criteria document, Competent

Bodies are free to accept other methods than those suggested in the criteria, if their results are equally applicable. The determination by ICP is therefore an option that most probably will be accepted without being mentioned specifically in the criteria document.

3.8.2.2 Criterion 8b Emission of VOC
This criterion has not been challenged and remains unchanged, except for assessment and verification, with the following wording:

"The emissions of VOCs during polymerisation of polyester, expressed as an annual average, shall not exceed 1.2 g/kg of produced polyester resin. (VOCs are any organic compound having at 293.15 K a vapour pressure of 0.01 kPa or more, or having a corresponding volatility under the particular conditions of use).

Assessment and verification: The applicant shall provide detailed documentation and/or test reports showing compliance with this criterion, together with a declaration of compliance."

3.8.3 Future revisions

Future revisions concerning the amount of antimony used in polyester production can take two directions. The development in alternative catalyst technology may be implemented to a large extent already during the period of existence of the new criteria (until May, 2007). In this case, a ban on the use of antimony should be considered, provided that the alternatives can be documented to have less impacts on human health and the environment. If adequate catalysts are not available, or if they are of environmental concern, the allowed content should be reduced as far as possible, e.g. to levels of 160-200 ppm or perhaps even lower.

3.9 Polypropylene

3.9.1 Current criterion

The present criterion is formulated as follows:

"Lead based pigments shall not be used."

3.9.2 Changes to the criterion

The criterion has not been challenged or subject to other suggestions. It therefore remains unchanged, except for assessment and verification, with the following wording:

"Lead based pigments shall not be used.

Assessment and verification: The applicant shall provide a declaration of non-use."

3.10 Carding and spinning oils, waxes, finishes, lubricants and sizing applied to fibres or yarns

3.10.1 Current criterion

The present criterion is divided into two sub-criteria. Criterion a) sets requirements for the biodegradability of the substances constituting the products used during the mechanical processes from fibre production to woven or knitted fabric. Criterion b) sets requirements to the content of aromatic compounds in mineral oils, where these constitute a part of the products used. The two criteria are formulated as follows:

"a) At each given manufacturing step where carding and spinning oils, waxes, finishes, or lubricants are applied to fibres or yarns, the substances applied individually or at least 90% (by dry weight) of the component substances of the preparations applied shall be sufficiently biodegradable or eliminable in waste water treatment plants.

At least 95% (by dry weight) of the component substances of any sizeing preparation applied to fibres or yarns shall be sufficiently biodegradable or eliminable in waste water treatment plants, or else shall be recycled.

In this context, a substance is considered as sufficiently biodegradable or eliminable:

- if when tested with one of the methods OECD 301 A, OECD 301 E, ISO 7827, OECD 302 A, ISO 9887, OECD 302 B, or ISO 9888 it shows a percentage degradation of at least 70% within 28 days,

- or if when tested with one of the methods OECD 301 B, ISO 9439, OECD 301 C, OECD 302 C, OECD 301 D, ISO 10707, OECD 301 F, ISO 9408, ISO 10708 or ISO 14593 it shows a percentage degradation of at least 60% within 28 days,

- or if when tested with one of the methods OECD 303 or ISO 11733 it shows a percentage degradation of at least 80% within 28 days,

- or, for substances for which these test methods are inapplicable, if evidence of an equivalent level of biodegradation or elimination is presented.

This requirement does not apply to inorganic substances or silicone oils.

Test methods and thresholds as above. Test report required on application if appropriate (notably if sufficient information on the biodegradability or eliminability of the substances used is not available).

b) Mineral oils used shall not contain more than 1ppm of aromatic compounds."

3.10.2 Changes to the criterion

Based on the considerations in the following paragraphs, the first overall change suggested to the current criterion is a new heading, "Auxiliaries and finishing agents for fibres and yarns", which covers the substances more broadly. Secondly, the current criterion 10a on biodegradability has been divided into two criteria, one for sizes (10a) and one for spinning solution additives, spinning additives and

preparation agents for primary spinning (10b). The present criterion 10 b) is accordingly renumbered to 10 c), reflecting the division of criterion 10 a) into two criteria.

The substances addressed by the criterion are washed out in the pre-treatment prior to dyeing and contribute in some cases hereby to a significant proportion of the emission to water at the wet processing plant. Environmental requirements to these substances are therefore relevant.

However, experiences from some of the Competent Bodies show that the criterion for many applicants is one of the main obstacles for applying for the eco-label. The responses from questionnaires and interviews with the Competent Bodies reflect difficulties in getting appropriate documentation from the chemical suppliers, and for the biodegradability of the substances that the required OECD test methods are costly and time consuming.

Furthermore, for products that contain mineral oils, the criterion on biodegradability is not appropriate, as mineral oils are hardly biodegradable and for some applications no alternatives to mineral oils exist.

Finally, it is difficult/impossible to refine mineral oils to a degree, where the content of aromatic compounds is less than 1 ppm as required. This also makes an obstacle, where no alternatives are available.

However, experiences also show that the criterion actually *is* moving the applicants to use sizes and lubricants that are more easily biodegradable in applications, where different alternatives exist. It is from an environmental point of view therefore important not to eliminate this criterion.

In order to straighten out the above-mentioned problems, the criterion is reorganised. In the following, the products are structured considering the TEGEWA nomenclature and the systematic used in the IPPC note (IPPC (2001)) as well as the actual content of the products.

The TEGEWA/IPPC systematic
The products used in the mechanical processes can be divided in five main categories:

1. Sizes
2. Spinning solution additives, spinning additives and spinning bath additives
3. Preparation agents for primary spinning
4. Preparation agents for secondary spinning,
5. Coning oils, warping and twisting oils, knitting oils and silicone oils.

Category 1 - Sizes
According to the draft IPPC reference document from February 2001(IPPC (Draft February 2001)) sizes are typically based on one of the following chemical groups:

- starch
- starch derivatives
- cellulose derivatives (carboxymethylcellulose, CMC)
- galactomannan derivatives
- polyvinyl alcohol (PVA)
- polymethacrylates
- polyesters.

The type and amount of size applied to the yarn depends on the fibre in question. The amount varies from 0 to 200 g/kg of yarn, giving a potential high contribution to the environmental load of the wastewater.

The biodegradability of the sizes differ, starch being completely biodegradable, starch derivatives being more difficult to biodegrade, while PVA and polyesters are hardly biodegradable, but show a grade of bioelimination.

Category 2 – Spinning solution additives, spinning additives and spinning bath additives
Within this group the so-called modifiers are most relevant. They are applied for special viscose qualities in loads about 5 mg/kg fibres. They mainly consist of polyethylene glycol ethers with molecular weights about 1500. During pre-treatment, more than 90% of these substances are washed off.

Category 3 – Preparation agents for primary spinning
Preparation agents are applied during the manufacture of chemical fibres, directly after the spinning process. They enable subsequent processes such as drawing, twisting, warping, texturising and further (secondary) spinning.

The preparation agents can be further divided into five main classes, i.e.

- lubricants (slippery agents)
- emulsifiers
- wetting agents
- antistatic agents
- additives (e.g. biocides and antioxidants).

Typical applied lubricants used in the process from fibre to yarn manufacturing are as follows:

– highly refined mineral oils, so-called white oils (mixture of hydrocarbons with $C_{12} – C_{50}$ chain length, having a range of boiling points between 220ºC and 450ºC); their use is strongly declining
– fatty acid triglycerides (refined natural oils)
– ester oils (e.g. butyl stearate, tridecyl stearate)
– EO/PO-adducts (Ethylene Oxide/Propylene Oxide (group of copolymers)
– silicones.

Mineral oils are hardly biodegradable, but easily removed by absorption. Due to their low cost, they are still widely used as lubricants.

Ester oils are used as lubricants as an alternative to mineral oils. They are increasingly substituting mineral oils in primary spinning while, in secondary spinning, mineral oils still have the highest market share. Ester oils are usually esters of fatty acids (lauryl, stearyl acid) with fatty alcohols or polyhydroxylic alcohols. Compared to mineral oils, ester oils are more thermally stable, biodegradable and easy to emulsify.

EO/PO copolymers are used as lubricants for texturised chemical fibres because they do not interfere with the process as mineral oils do. The high molecular EO/PO-adducts (sum of EO and PO units more than 15 moles) are non- or hardly biodegradable.

Silicones are used as lubricants for elastomeric fibre (elastan). They show the highest level of COD of all lubricants and they are hardly biodegradable. An additional disadvantage is that they are difficult to emulsify and to remove from the fibre. APEO are usually used to remove them but a quite high percentage (approximately 40 %) still remains on the fibre after washing, giving rise to air emissions in the subsequent high-temperature treatments.

Emulsifiers can be anionic and non-ionic surfactants. Wetting agents are usually short-chain alkyl phosphates. Mono- and diesters of phosphorous pentoxides are in use as anti-electrostatic agents as well as amphoteric surfactants. "Additives" cover a wide range of substances, with biocides being of most interest. They are handled separately in the criterion on biocides.

Category 4 – Preparation agents for secondary spinning
For these agents there is no clear definition. IPPC suggests a division into "conditioning agents" as a term for preparation agents for secondary spinning of synthetic fibres, the composition being similar to that of the preparation agents used for primary spinning of staple fibres and with a load of 1-5 g/kg fibres.

"Spinning lubricants" is suggested as a term for preparation agents for wool. Here, many recipes are in use, mostly containing white oils and ester oils (30-40%) and non-ionic surfactants. Oil-free systems are also available.

Category 5 – Coning, warping, twisting and knitting oils
Oils for coning, twisting and warping consist of 70-95% white oils and 5-30% non-ionic surfactants, especially fatty alcohols and fatty acid ethoxylates. The load of coning oils varies for polyester from 5-30 g/kg, for common polyamide the load is about 5 g/kg. It is reported that imported fabric can have loads of coning oils above 50 g/kg.

Knitting oils consist of highly refined mineral oils with additives. Due to machine losses, up to 5 g/kg of these oils remain on the knitted fabric.

Two of the Competent Bodies reported difficulties in showing compliance for knitting oil and oils in general with the current criterion 10b on aromatic compounds in mineral oils. For knitting oils, alternatives based on animal or vegetable oils had been sought for and tested, but the results have not been sufficiently good in technical terms.

The criterion requires that the content of aromatic compounds must not exceed 1 ppm or 1 mg/kg. According to the IPPC-note the mineral oils for these purposes are highly refined oils (white oils). The IPPC does not give any information on the content of aromatic compounds in these mineral oils.

Comparing with the Nordic Swan label a similar criterion could be found for spinning and knitting oils. However, this criterion restricts the content of polycyclic aromatic hydrocarbons (PAH, which constitute a part of the aromatic compounds) only. The content of PAH in spinning and knitting oils must be less than 1%. This limit seems to be in accordance with the limits experienced from the applications as obtainable. Furthermore information from a manufacturer of knitting oils reports that the normal content of PAH in mineral oils is between 1-3% but closest to the 1% (Vickers (2000)).

Based on the above information it is proposed to combine category 2 and 3 substances and establish a criterion regarding their biodegradability. Category 4 substances (preparation agents for secondary spinning) are thus exempted from the

requirements. Finally, requirements regarding category 5 substances focus on the content of PAH in mineral oils.

3.10.2.1 Criterion 10 a. Sizes
The new criterion 10a is formulated as follows:

"Size: At least 95% (by dry weight) of the component substances of any sizeing preparation applied to yarns shall be sufficiently biodegradable or eliminable in wastewater treatment plants, or else shall be recycled.

Assessment and verification: In this context, a substance is considered as "sufficiently biodegradable or eliminable":

- *if when tested with one of the methods OECD 301 A, OECD 301 E, ISO 7827, OECD 302 A, ISO 9887, OECD 302 B, or ISO 9888 it shows a percentage degradation of at least 70% within 28 days,*
- *or if when tested with one of the methods OECD 301 B, ISO 9439, OECD 301 C, OECD 302 C, OECD 301 D, ISO 10707, OECD 301 F, ISO 9408, ISO 10708 or ISO 14593 it shows a percentage degradation of at least 60% within 28 days,*
- *or if when tested with one of the methods OECD 303 or ISO 11733 it shows a percentage degradation of at least 80% within 28 days,*
- *or, for substances for which these test methods are inapplicable, if evidence of an equivalent level of biodegradation or elimination is presented.*

The applicant shall provide appropriate documentation, safety data sheets, test reports and/or declarations, indicating the test methods and results as above, and showing compliance with this criterion for all sizeing preparations used."

3.10.2.2 Criterion 10 b. Spinning solution additives, spinning additives and preparation agents for primary spinning
The new criterion 10b is formulated as follows:

"Spinning solution additives, spinning additives and preparation agents for primary spinning (including carding oils, spin finishes and lubricants): At least 90% (by dry weight) of the component substances shall be sufficiently biodegradable or eliminable in waste water treatment plants.

This requirement does not apply to preparation agents for secondary spinning (spinning lubricants, conditioning agents), coning oils, warping and twisting, waxes, knitting oils, silicone oils and inorganic substances.

Assessment and verification: "sufficiently biodegradable or eliminable" is as defined above in part (a). The applicant shall provide appropriate documentation, safety data sheets, test reports and/or declarations, indicating the test methods and results as above, and showing compliance with this criterion for all such additives or preparation agents used."

The main difference between the current and the suggested criterion is thus the clear division into different types of auxiliaries and finishing agents. Furthermore,

the requirements to testing are more precisely defined, thereby helping the Competent Bodies and their applicants through the application procedure.

3.10.2.3 Criterion 10c. Mineral oils

On the basis of the information above the following criterion 10c is proposed:

"The content of polycyclic aromatic hydrocarbons (PAH) in the mineral oil proportion of a product shall be less than 1.0% by weight.

Assessment and verification: The applicant shall provide appropriate documentation, safety date sheets, product information sheets or declarations, indicating either the content of polycyclic aromatic hydrocarbons or the non-use of products containing mineral oils."

The new criteria 10a to 10c were presented at the third ahWG meeting in December 2001. The ahWG had no comments to the revised criteria.

3.10.3 Future revisions

No issues to be discussed in a future revision of the textile criteria were identified during the project. If non-mineral oil based lubricants, e.g. knitting oils, come on the market, a criterion supporting such products could be considered.

3.11 TCP and PCP ("Biocidal and biostatic products")

3.11.1 Current criterion

The current criterion is formulated as follows:

"Tetrachlorophenol and pentachlorophenol (their salts and esters) shall not be used.

Test method for purposes of verification on yarn, fabric or final product: Extraction as appropriate, derivatisation with acetic anhydride, determination by capillary Gas-liquid Chromatography with Electron Capture Detection, limit value 0.05 ppm."

3.11.2 Changes to the criterion

It is suggested to change this criterion to a general biocide criterion, irrespective of the biocides being applied for transportation or storage purposes, which is normally the case for TCP and PCP, or they are applied to limit or avoid bacterial growth during use. The first change is thus the title, i.e. a change from "TCP and PCP" to "Biocidal or biostatic products". In the criterion there will, however, still be distinguished between the purpose of the biocides applied.

3.11.2.1 Biocides for transportation and storage
The use of biocides in this phase seems limited to imported textiles from countries with humid and warm climate like subtropical and tropical areas. It is especially textiles from Eastern Asia that can contain small amounts of biocides. The biocides are applied to preserve the textiles during transport and storage (Lassen *et al.*, 2001). Biocides used during transportation and storage are mainly used on natural fibres. Chlorinated phenols are examples of biocides used for this purpose (Lassen *et al.* (2001)).

The current criterion 11 restricts the use of TCP (tetrachlorophenol) and PCP (pentachlorophenol), which are used as biocides during storage and transportation. At the ahWG meetings it has been discussed to widen this criterion to cover all chlorophenols as these are belonging to the same group of chemicals with similar toxicology. Furthermore the content of TBT (Tributyl tin) in products as sportswear and diapers has led the focus on the possibility of using TBT as anti-microbial agent in textiles. For this reason TBT was also proposed banned as a biocide.

In the Nordic Swan label all chlorophenols are banned together with polychlorinated biphenyls (PCB) and organotin compounds as these also can be used during transportation and storage.

At the third ahWG meeting it was therefore suggested to include the above mentioned compounds in the revised criteria with the following wording:

"Chlorophenols (their salts and esters), PCB and organotin compounds shall not be used during transportation or storage of products and semi-manufactured products.

Assessment and verification: The applicant shall provide a declaration of non-use of these substances or compounds on the yarn, fabric and final product. Should this declaration be subject to verification the following test method and threshold shall be used: Extraction as appropriate, derivatisation with acetic anhydride, determination by capillary Gas-liquid Chromatography with Electron Capture Detection, limit value 0.05 ppm."

No comments to the suggestion have been received from the ahWG.

3.11.2.2 Biocides applied to be active during the user phase

During the revision of the textile product group in 1997-98 the question about the use of biocides in textiles was raised. From experts in the ahWG it was stated that up to 50 percent of textiles on the market today contain biocides. However, only very little documentation could be found on the issue and decision on inclusion in the textile criteria was postponed to the current revision.

Under the current revision some research has been carried out on the use of biocides in textiles. In general very little information and documentation about the subject can be found. It seems that the best place to seek information for the moment is the Internet; however the information is still very diffuse and isolated. In the following sections, some of the technical and environmental aspects regarding the use of biocides in textiles during the user phase are discussed.

Definitions

A biocide is generally speaking a means to influence life, either by killing living organisms or by preventing the growth or proliferation of living organisms, but not necessarily prevent metabolism. The latter are often referred to as biostatics. In the following no distinction will be made between biocides and biostatics.

No clear dividing line can be drawn between pesticides and biocides, but in the EEC regulation pesticides are similar to crop-protecting agents and biocides indicate agents that are killing living organisms in other products. Biocides are also known as non-agricultural pesticides.

Function
Biocides used for textiles are normally supplied in order to prevent the proliferation of micro-organisms such as micro-fungi, bacteria, actinomycetes (filamentous bacteria) and algae.

Biocides can thus also be added to some textiles in order to give them anti-bacterial or anti-microbial properties during the use phase. This relates in particular to synthetic or regenerated fibres (Stevanato (1998); Hamlyn (1990)).

The variation of purposes for which biocides can be added is large. Examples are:

- to prevent odour producing microbial growth
- to prevent micro-organisms to cause visual spoilage, disfiguring stains etc. to the textiles
- to prevent mildew and rot on outdoor textiles
- to prevent house dust-mites.

Application methods
Three different ways of application of biocides are identified.

- polymer modification
- spun-in additives
- post-treatment.

Polymer modification
Biocides can be incorporated in the fibres during the polymerisation process. This is called a polymer modification. A polymer modification can give fibre inherent antibacterial characteristics. The polymer modification is known for synthetic fibres as acrylics, as well as polyethylene and polypropylene fibres. Examples of biocides used for polymer modification are cationic amines or quaternary ammonium salts (Stevanato (1998); Studer, (1998)).

Spun-in additives
In this application a biocide is incorporated into the yarn during the spinning operation, which makes the agent an integrated and permanent part of the yarn.

Like polymer modifications, spun-in additives are used for man-made fibres e.g. acetates and acrylics. No literature has been found on the use of spun-in additives for natural fibres. Examples of biocides used as a spun-in additive are triclosan, chlorinated biphenyls and natural terpenes (Silfresh (1998); Stevanato (1998)).

Post-treatment
Post treatment biocides can be applied on the fibre after fibre production or in the finishing process of the fabrics, where biocides are added together with antistatics, water repellents, dyes, etc. For natural fibres, biocides can be added at different phases of the life cycle e.g. on the fibre, after spinning, on the fabric etc. The biocides are added in order to prevent proliferation of rot and mildew when transported or stored under warm and humid conditions.

But also for man-made fibres as polyesters, acrylic and viscose products biocides can be added as post treatment to the fibres. These biocides can be metal complexes of copper or zinc. Other post-treatment biocides can be quaternary ammonium compounds, polysiloxanes, sulphur compounds, and organic salts of metals like copper, zinc, silver and mercury (Silfresh (1998); Stevanato (1998)).

Organic and inorganic biocides
Another way of dividing biocides is by differentiating between organic and inorganic biocides.

When used in synthetic fibres, organic biocides are generally based on small molecules that may contain a metal ion. They are incompatible with the polymer matrix and therefore diffuse to the surface, where they interact with micro-organisms present. Equilibrium is reached between the additive present at the surface and that in the body of the polymer. Further additive will only diffuse out of the polymer when the surface is wiped or washed. Triclosan is probably the best known of these biocides, but other systems, including zinc pyrithione and N-butyl-1,2-benzisothiazolin-3-one, are currently under investigation (Ciba (2000)).

Inorganic systems are mostly based on metal ions, stabilized in some way so that they are unreactive until released in association with another agent such as moisture. Metal ions interact with many aspects of microbe cellular activity, primarily through interference with enzymatic action. The metal ions as the antimicrobial agent remain stored in the polymer, only being released gradually to the surface. The most common metal ions used are silver, copper and zinc, often in a soluble glass matrix (Ciba (2000)).

Two other kinds of inorganic biocides are zeolites and ceramic substrate. Zeolites are inorganic substances with crystal structures. They have a negative molecular charge, which attracts bacteria, which in turn will eliminate the unwelcome odours. Zeolites have an unusual longevity, which is a result of millions of tiny micro-pores that give the material a great absorbent surface (Stevanato (1998)). Apparently, zeolites and ceramic substrate have various advantages compared to the organic biocides. They are thermally stable, resistant to solvents and detergents, less toxic for skin and the necessary amount of the additive can be small in function of metal concentration.

Toxic evaluation
It is well known that during the last decades the massive and increasing use of anti-microbials in human, animals, fish and agriculture has created a problem with resistance in microbes responsible for different infectious diseases. The use of anti-microbials for any infection, real or feared, in any dose and over any time period, forces microbes to adapt or die ("selective pressure"). The microbes which survive are those that carry genes for resistance to anti-microbial agents (WHO (1998)).

No literature has been found on the use of anti-microbials in textiles and their possible influence on proliferation of microbial resistance to these agents. However, the American Medical Association (AMA) has in a report summarised available data on the effectiveness of anti-microbial ingredients in consumer products such as hand lotions and soaps, and discusses the implications of such use on anti-microbial resistance.

The conclusions of the report are: *'Despite their recent proliferation in consumer products, the use of anti-microbial agents such as triclosan in consumer products has not been studied extensively. No data exist to support their efficacy when used in such products or any need for them, but increasing data now suggest growing acquired resistance to these commonly used anti-microbial agents. Studies also suggest that acquired resistance to these anti-microbials in bacteria may also predispose these organisms to resistance against therapeutic antibiotics, but further research is needed. In light of these findings, there is little evidence to support the use of anti-microbials in consumer products such as topical hand lotions and soaps. However, there is also little evidence to link the use of these*

agents in consumer products to the general problem of increased resistance to therapeutic antibiotics. Considering the available data and the critical nature of the antibiotic resistance problem, it may be prudent to avoid the use of anti-microbial agents in consumer products. Ultimately, antibiotic resistance is a major public health concern that has to be controlled through judicious use of antibiotics by health care practitioner' (AMA (2000)).

It is outside the scope of this study to give a comprehensive toxicological and ecotoxicological assessment of all biocides that potentially can be used in textiles. Besides the general problem with creation of resistance, some biocides may have inherent toxicological and ecotoxicological properties that are detrimental for human health or the environment. This is for example the case for organotin compounds that have strong bioaccumulating and ecotoxic properties. Some quaternary ammonium compounds have allergenic properties, are toxic to the aquatic environment, and act as strong complexing agents, while others are without significant impacts. Silver-zinc-glass complexes shall according to the safety data sheets not be classified or labelled with respect to effects on human health and do probably not have any significant ecotoxicological impacts either.

Quantities of biocides used in Europe
Sparse and conflicting information has been found on the amounts of biocides used in the textile production chain. However, no information has been found supporting the statement that up to 50% of all textiles on the market contain biocides.

Information from CIRFS indicates that the total volume of man-made modified fibres does not exceed a few thousand tonnes per year in Europe (Spijkers (2001)). Further information indicates that some of the applications are for technical and/or outdoor textiles as filter cloth, surgery textiles, awnings, tarpaulins, tents etc. (Spijkers (2001); (van Parys (2000)), which for different reasons at the moment are excluded from the product group definition.

Some information on the amount of biocides applied to fibres has been found. The information shows a variety depending on the biocide, the type of fibre and the end use.

Table 8: Existing data for the amount of biocides used

Biocide/method	Concentration	Unit	Textile/fibre	Source
Formaldehyde-containing	50	mg/kg	Fibre	IPPC, 2001
Heterocyclic compounds	2	mg/kg	Fibre	IPPC, 2001
Copper fungicides (e.g. copper naphthalenate) and other organometal compounds.	0.25 – 1	% Weight	Textile	van der Poel, 1999 in INFU, 2000
Permethrin	0.02	% Weight	Textile/fibre	Worthing and Hance, 1991 in INFU, 2000
Carbendazim	0.03-0.2	% Weight	Textile/fibre	Worthing and Hance, 1991 in INFU, 2000
Organometallics	1-5	% Weight	Textile/fibre	Board et al, 1987 in INFU, 2000
Silver-Zinc-Glass	0.3-1.5	% Weight	Fibre (PP, PA, PET)	Ciba MSDS
Triclosan	0.5-3	% Weight	Fibre (PP, PET)	Ciba MSDS
TBTO, Tributyltin oxide	0.05	% Weight	Textile/fibre	Board et al, 1987 in INFU, 2000

Legislation
The directive 98/8/EC of the European Parliament and of the Council of 16 February 1998 is concerning the placing of biocidal products on the market. Biocides used for textiles are categorised in main group 2: Preservatives, under product type 9, which concerns fibre, leather, rubber and polymerised materials preservatives (98/8/EC). The directive will in the future include a positive list of substances allowed. This list is under preparation.

According to the European Chemical Bureau (ECB) the work with collecting information about the use of biocides in textiles is just started. At the moment market surveys are conducted, and afterwards it should be considered which of these substances should be included in the directive (Rasmussen (2001)).

Proposal for a criterion
Due to the scarce information on the use, the amount, and the influence on microbial resistance to biocides the consultants proposed to exercise the precautionary principle and ban the use of biocides, which are applied in order to give the textile inherent anti-microbial properties during the user phase. The second part of the criterion regarding biocides and biostats is therefore formulated as follows:

"Biocidal or biostatic products shall not be applied to products so as to be active during the use phase.

Assessment and verification: The applicant shall provide a declaration of non-use."

Discussions in the ad hoc Working Group
The proposed ban on biocides and biostats was supported during the discussion on the second ahWG meeting and therefore included in the suggestion for the revised criteria distributed before the third ahWG meeting.

In the period until the ahWG meeting responses from industry and the French Competent Body were received. Especially the synthetic fibres industry represented by CIRFS and BISFA (Bureau International pour la Standardisation de la Rayonne et des Fibres Synthetiques) pointed out that bioactive fibres are a major innovation activity of the fibre industry. The fibre producing industry has established a working group to develop and market such fibres, taking into consideration the application risks and for example the rules given in the biocide Directive. The industry fears that a negative consumer image will be spread by a principal ban in the ecolabel criteria.

The view of CIRFS/BISFA was to some extent shared by the French competent body that claimed that biocides are often used in the form of sprays by consumers and that there is no objective reason to exclude them. They therefore suggested to establish a negative list and that a reference is made to the biocide Directive.

Unfortunately, the biocide Directive is still under development, and it is not yet possible to identify, which substances will be on a positive list. Without a broad European legal framework it is extremely difficult to establish either a positive or a negative list of biocides in the current context. At the same time, inclusion of biocides in the eco-labelling criteria may decrease the confidence in the scheme, especially if they are not included in the envisoned positive list in the upcoming biocide Directive.

The consultants therefore proposed at the third ahWG meeting to keep the criterion as suggested in the first phase of the project. The ahWG was predominantly in favour of this wording.

3.11.3 Future revisions

It is suggested by the consultants to reiterate on the subject during the next revision of the criteria. At this point of time, the biocide Directive should have become effective, and a framework for toxicological and ecotoxicological assessment of possible biocides be available, perhaps in addition to positive or negative lists.

3.12 Stripping or depigmentation

3.12.1 Current criterion

The present criterion is formulated as follows:

"Heavy metal salts (except of iron) or formaldehyde shall not be used for stripping or depigmentation."

3.12.2 Changes to the criterion

At none of the meetings and hearings this criterion has been subjected to comments. Therefore no changes have been proposed, apart from a formulation on assessment and verification. The following wording was approved by the ahWG in May 2001:

"Heavy metal salts (except of iron) or formaldehyde shall not be used for stripping or depigmentation."

Assessment and verification: The applicant shall provide a declaration of non-use."

3.13 Weighting

3.13.1 Current criterion

The present criterion is formulated as follows:

"Compounds of cerium shall not be used in the weighting of yarn or fabrics."

3.13.2 Changes to the criterion

As weighting is only relevant for silk it could be placed as a fibre criteria. Other weighting chemicals are tin chloride and various polymers (EnviroTex).

At none of the meetings and hearings this criterion has been subjected to comments. Therefore no changes have been proposed, apart from a formulation on assessment and verification. The following wording was approved by the ahWG in May 2001:

"Compounds of cerium shall not be used in the weighting of yarn or fabrics.

Assessment and verification: The applicant shall provide a declaration of non-use."

3.14 Detergents, fabric softeners and complexing agents

3.14.1 Current criterion

The current criterion is formulated as follows:

"a) Alkylphenolethoxylates (APEOs), bis(hydrogenated tallow alkyl) dimethyl ammonium chloride (DTDMAC), distearyl dimethyl ammonium chloride (DSDMAC), di(hardened tallow) dimethyl ammonium chloride (DHTDMAC) and ethylene diamine tetra acetate (EDTA) shall not be used and shall not be part of any preparations or formulations used.

b) At each wet-processing site, more than 95% by weight of the detergents, fabric softeners and complexing agents used shall be sufficiently degradable or eliminable in waste water treatment plants (as defined above in the criterion related to carding and spinning oils, waxes, finishes, lubricants and sizeing).

Test methods and thresholds as defined in the criterion above related to carding and spinning oils, waxes, finishes, lubricants and sizeing. Test report required on application if appropriate (notably if sufficient information on the biodegradability or eliminability of the substances used is not available)."

3.14.2 Changes to the criterion

Experiences from the Danish Competent Body show that the applicants often misinterpret this criterion, as the heading of the criterion mislead the applicant to believe that only detergents, fabric softeners and complexing agents are covered by this criterion. However the substances listed in 14 a '*…shall not be used and shall not be part of any preparations or formulations used*' according to the criterion. Furthermore, in the preface of the section (under the heading 'A2 Processes and Chemicals' before criterion 10) it is stated that '*…the criteria in this section apply, where appropriate, to all stages of production of the product…*' . In order not to create confusion it is therefore suggested to split criterion 14 into two criteria with separate headings.

3.14.2.1 Criterion 14 Auxiliary chemicals

The first criterion is proposed to consist of a list of dangerous, hazardous and toxic components, which are not allowed for the production of textiles. In the current criterion 14a the following substances are listed: Alkylphenolethoxylates (APEOs), bis(hydrogenated tallow alkyl) dimethyl ammonium chloride (DTDMAC), distearyl dimethyl ammonium chloride (DSDMAC), di(hardened tallow) dimethyl ammonium chloride (DHTDMAC) and ethylene diamine tetra acetate (EDTA). During the first period of the project it was investigated, whether this list needs to include substances that are of equal concern in different phases of textile production, more specifically DTPA (diethylenetriamine pentaacetate), phosphonates, NTA (nitrilo triacetate) and LAS (Linear Alkylbenzene Sulfonates).

Toxicological and ecotoxicological properties of selected substances

The draft IPPC reference document (IPPC (2001)) points to DTPA (diethylenetriamine pentaacetate) as being of equal concern as EDTA. Both compounds form very stable complexes with metals. They are poorly eliminable

and may pass undegraded through common wastewater treatment systems and subsequently release the metals into the receiving effluent.

For phosphonate products, numerous studies have shown that little, if any, primary or ultimate biodegradation occurs in standard biodegradation tests such as the OECD screening test, BOD_{20} test, sapromat test and closed bottle test. As expected for highly water-soluble substances, the log K_{ow} values for phosphonates are low. The potential for bioaccumulation of phosphonates in aquatic organisms is therefore expected to be low as well. The aquatic toxicity of phosphonates to algae is complex to determine in bioassays, as the alga medium contains a precise level of micronutrients, which are held in solution by a another chelator, EDTA. Generally, the acute EC/LC_{50} values for phosphonates towards fish and invertebrates are well above 100 mg/l. One exception is the Eastern oyster for which acute LC50 values below 100 mg/l are found. The aquatic toxicity data obtained in long-term studies with fish are not markedly different from the data from short-term studies (96 hours). This indicates that phosphonates do not accumulate and that the maximum toxicity is obtained in short term tests. Phosphonates show a low oral and dermal toxicity and have not been shown to have carcinogenic, mutagenic or teratogenic properties (Madsen *et al.* (2001)).

The strong complexing capacity of NTA is expected to have adverse effects upon heavy metal removal during sewage treatment and upon mobilisation of metals from sediments in receiving waters. Several investigations have shown that the presence of NTA in water/sediment systems increases the concentration of heavy metals in the water phase. NTA is known to be aerobically biodegradable by acclimated microorganisms. Biodegradability tests with NTA have been inconsistent; 90% degradation has been reported after 9 and 13 days in tests with activated sludge, while degradation attained only 20% in a CO_2 evolution test after 28 days and did not occur in shake flask and BOD tests. Following a period of acclimatisation, almost complete biodegradation has been reported for the activated sludge process when operated under optimum conditions. The toxicity of NTA towards algae, crustaceans and fish is low with EC/LC_{50} values well above 100 mg/l. The acute toxicity of NTA and its salts in animals is also relatively low. However, The International Agency for Research on Cancer (IARC) has evaluated that there is sufficient evidence for the carcinogenicity of NTA and its sodium salts in experimental animals, and the overall evaluation is that nitriloacetic acid and its salt are possibly carcinogenic to humans. IARC has placed NTA in Group 2B (Madsen *et al.* (2001)).

Linear alkylbenzene sulfonates (LAS) have not yet been documented to biodegrade ultimatively under anoxic conditions, and the known mechanisms that precede the aerobic mineralisation require molecular oxygen. LAS can, however, be attacked and transformed by bacteria in the absence of molecular oxygen, which implies that LAS is not totally persistent in anoxic environments. Since LAS are generally not degraded under anoxic conditions, levels of LAS in the g/kg range can be found in sludge, which is applied to agricultural soil. The LAS in the sludge will normally biodegrade rapidly in well-aerated and aerobic soils. Aquatic sediments may contain LAS at mg/kg levels as shown by Danish monitoring of contaminants in coastal marine sediments.. Most LAS have a low to moderate bioaccumulation potential with exception of the C_{13}-2LAS that has a bioconcentration factor of more than 100.

In general, the homologues with the highest number of carbons in the alkyl chain are more toxic than those with shorter alkyl chains. LC_{50}-values have been found in the range of 1-10 mg/l when *Daphnia Magna* were exposed to LAS homologues between C_{10} and C_{13}. The same picture is seen for toxicity to fish, where LC_{50}-

values below 1 mg/l have been found for $C_{11.9}$, C_{13} and C_{14} in a study with rainbow trout. The toxicity of LAS bound in sediment is relatively low compared to LAS in solution. NOEC and LOEC values as high as 993 mg LAS/kg have been found, with a corresponding NOEC for LAS in solution being as low as 2.4 mg/kg.

The LD_{50}-values found for oral and dermal administration have in general been higher than 400 mg/kg body weight, i.e. a relatively low toxicity to mammals, although rats appear to be more sensitive to LAS than mice. LAS have been classified as irritating to skin and eyes at concentrations above 20% and 5%, respectively.

No sub-chronic or long-term toxic effects have been reported. LAS was not mutagenic in Ames' test and studies show no evidence of carcinogenicity, teratogenic and embryotoxic effects. LAS are classified as Irritant (Xi) with the risk phrases R38 (Irritating to skin) and R41 (Risk of serious damage to eyes). LAS are not included in Annex I of the list of dangerous substances of Council Directive 67/548/EEC.

Discussions in the ad hoc Working Group
With the above findings it was suggested at the third ahWG meeting in December 2001 to include DTPA, NTA and LAS in the list of substances that shall not be used and not be part of any preparations or formulations used. The main argument for including DTPA was the lack of biodegradability. For NTA its toxic properties towards human beings and its potential to mobilise metals in the aquatic environment are the main concerns. For LAS, the lacking degradation under anoxic conditions and the ecotoxic potential are the main concerns.

The discussion regarding this criterion at the ahWG meeting focused on NTA that was seen by the industry as a much needed chemical, where no relevant substitutes were available. This is especially the case for cellulose bleaching. ETAD remarked that no human exposure could be expected as the chemical would be emitted with the wastewater and undergo a fast biodegradation. The Danish EPA was concerned about the chemicals' ability to mobilise heavy metals, and the Swedish Competent Body mentioned that a Swedish certificate holder actually is processing today without the use of NTA, and that the problem is closely related to the hardness of the water.

Following the meeting, ETAD as well as TEGEWA underlined in their written comments to the proposal that a ban on especially NTA was problematic for some activities (dyeing of wool and/or polyamide fibres) as it cannot be replaced on short notice. The German Competent Body supported this view, a main argument being that the German Umwelt Bundesamt has recommended substituting EDTA by NTA for several years. TEGEWA further stated in their comments that LAS is readily biodegradable and do not show ecotoxicological properties that are different from other surfactants.

Proposal for a new criterion
Based on the discussions in the ahWG and the comments received following the third meeting in the group, it was suggested to leave out the ban on NTA in the final suggestion for criteria. The proposed criterion is therefore formulated as follows:

"Alkylphenolethoxylates (APEOs), linear alkylbenzene sulfonates (LAS), bis(hydrogenated tallow alkyl) dimethyl ammonium chloride (DTDMAC), distearyl dimethyl ammonium chloride (DSDMAC), di(hardened tallow) dimethyl ammonium chloride (DHTDMAC) and ethylene diamine tetra acetate (EDTA) and

diethylene triamine penta acetate (DTPA) shall not be used and shall not be part of any preparations or formulations used.

Assessment and verification: The applicant shall provide a declaration of non-use."

3.14.2.2 Criterion 15 Detergents, fabric softeners and complexing agents
The second criterion is proposed to deal with the biodegradability of detergents, fabric softeners and complexing agents. From the experiences gathered from the competent bodies it is known that many applicants - similar to criterion 10a - find this criterion difficult to comply with.

Proposal for a new criterion
In order to specify the requirements more precisely, the following formulation was suggested at the third ahWG meeting in December 2001, along with a revised description of assessment and verification:

"Criterion 15. At each wet-processing site, at least 95% by weight of the detergents, at least 95% by weight of the fabric softeners and at least 95% by weight of the complexing agents used shall be sufficiently degradable or eliminable in wastewater treatment plants.

Assessment and verification: "sufficiently biodegradable or eliminable" is as defined above in the criterion related to auxiliaries and finishing agents for fibres and yarns. The applicant shall provide appropriate documentation, safety data sheets, test reports and/or declarations, indicating the test methods and results as above, and showing compliance with this criterion for all detergents, fabric softeners and complexing agents used."

The working group did not have any comments to the proposed wording of the criterion.

3.14.3 Future revisions

As described above, the work in the ahWG was much focused on formulating a criterion regarding auxiliary chemicals that could be accepted by all stakeholders. Future directions were not discussed, but it is obvious from the many comments that there is a need to make an in-depth assessment of the use of NTA. This is currently being done in relation to the eco-label criteria for household detergents, and it is suggested that the knowledge and experiences from this work are utilised in a future revision.

3.15 Bleaching agents

3.15.1 Current criterion

The current criterion is formulated as follows:

"In general, AOX emissions in the mixed bleaching effluent shall be less than 40 mg Cl/kg. In the following cases, the level shall be less than 100 mgCl/kg:

- wool before printing,
- linen and other bast fibres,
- cotton which has a degree of polymerisation below 1800 and which is intended for white end products.

This requirement does not apply to the production of man-made cellulose fibres.

Test method: ISO 9562 or prEN 1485. Test report required on application only if chlorinated bleaching agents are used."

3.15.2 Changes to the criterion

PARCOM 97/1 has a discharge reference value for AOX at 100 mg Cl/kg for companies doing either pre-treatment or dyeing, and at 150 mg Cl/kg for companies doing both. There are indications that this in fact makes bleaching with chlorine based chemicals impossible. PARCOM 94/5 states that peroxide should be preferred for chlorine bleaching, but has the following exceptions: Products to remain white, products to be printed, products with low strength, certain synthetic products (mainly nylon), which cannot be bleached with peroxide. It thus seems like the eco-label criterion is stricter than PARCOM.

This was presented at the ahWG meeting in May 2001, which was predominantly in favour of not changing the criterion for the moment.

At a late stage it was suggested to delete the word 'mixed' in the criterion to make the text a bit more clear. Information on how samples should be taken etc. will be explained in the User's Manual.

A comment received from EURATEX suggested to delete the exception regarding 'wool before printing', even though the background report from the previous revision refers to INTERLAINE criteria where chlorine bleaching is mentioned in cases where required by law for certain end-uses – in this case wool before printing. INTERLAINE and EURATEX have, however, persisted in their view that 'wool before printing' should be deleted, and so the new criterion is formulated as follows:

"In general, AOX emissions in the bleaching effluent shall be less than 40 mg Cl/kg. In the following cases, the level shall be less than 100 mg Cl/kg:

– linen and other bast fibres,

– cotton, which has a degree of polymerisation below 1800, and which is intended for white end products.

This requirement does not apply to the production of man-made cellulose fibres.

The applicant shall either provide a declaration of non-use of chlorinated bleaching agents or provide a test report using the following test method: ISO 9562 or prEN 1485."

3.16 Impurities in dyes

3.16.1 Current criterion

The current criterion is formulated as follows:

"The levels of ionic impurities for dyes used shall not exceed the following: As 50 ppm; Cd 20 ppm; Cr 100 ppm; Cu 250 ppm; Hg 4 ppm; Ni 200 ppm; Pb 100 ppm; Sb 50 ppm; Sn 250 ppm; Zn 1500 ppm."

3.16.2 Changes to the criterion

ETAD (Ecological and Toxicological Association of Dyes and Organic Pigments Manufacturers) (e-mail 19/3/01) has the same recommended limits, and has further metals: Barium (100), cobalt (500), iron (2500), manganese (1000), selenium (20), silver (100). Note, however, that the list does not count for metal complex dyes! PARCOM 97/1 has both amount and concentration. Same limits, but more metals.

It has been argued that the criterion should also be met for metal complex dyes. There is, however, a difficulty in terms of analysis as it is impossible or difficult to distinguish impurities from complex bound metal. A solution could be that if a metal complex dye is analysed for impurities, the results for the metal contained in the dyestuff molecule should not count. E.g. for a copper metal complex dye, the copper result should not be reported.

This difficulty has been overcome through the following formulation:

"The levels of ionic impurities in the dyes used shall not exceed the following: Ag 100 ppm; As 50 ppm; Ba 100 ppm; Cd 20 ppm; Co 500 ppm; Cr 100 ppm; Cu 250 ppm; Fe 2500 ppm; Hg 4 ppm; Mn 1000 ppm; Ni 200 ppm; Pb 100 ppm; Se 20 ppm; Sb 50 ppm; Sn 250 ppm; Zn 1500 ppm.

Any metal that is included as an integral part of the dye molecule (e.g. metal complex dyes, certain reactive dyes, etc.) shall not be considered when assessing compliance with these values, which only relate to impurities.

The applicant shall provide a declaration of compliance."

This formulation was not questioned at the last ahWG meeting in December 2001.

3.17 Impurities in pigments

3.17.1 Current criterion

The current criterion is formulated as follows:

" The levels of ionic impurities for pigments used shall not exceed the following: As 50 ppm; Cd 50 ppm; Cr 100 ppm; Hg 25 ppm; Pb 100 ppm; Sb 250 ppm; Zn 1000 ppm."

3.17.2 Changes to the criterion

ETAD (e-mail 19/3/01) has the same recommended limits, and has further metals: Barium (100), selenium (100). PARCOM 97/1 has both amount and concentration. Same limits, but more metals.

Therefore a criterion has been suggested, including the two extra metals, as follows:

"The levels of ionic impurities for pigments used shall not exceed the following: As 50 ppm; Ba 100 ppm, Cd 50 ppm; Cr 100 ppm; Hg 25 ppm; Pb 100 ppm; Se 100 ppm Sb 250 ppm; Zn 1000 ppm.

The applicant shall provide a declaration of compliance."

This formulation was not questioned at the last ahWG meeting in December 2001.

3.18 Chrome mordant dyeing

3.18.1 Current criterion

The current criterion is formulated as follows:

”Chrome mordant dyeing shall only be used for wools and other keratin fibres, and only if low-chrome dyeing is applied, as follows:

a) no more than 1.8% of potassium dichromate nor more than 1.5% of sodium dichromate (oww) to be used for chroming blacks, no more than 1% of these substances for chroming other shades,

b) the exhausted chroming bath must not contain more than 5 mg/l Cr III or 0.5 mg/l Cr VI.

Test method: Atomic Absorbtion Spectrometry. Test report required on application only if chrome mordant dyeing is used.”

3.18.2 Changes to the criterion

PARCOM 97/1 has the following discharge reference values for total chromium: 50 mg/kg and 0.5 mg/l and for chromium VI: 10 mg/kg and 0.1 mg/l. OSPAR 99 mentions that chrome mordant dyeing is no longer used in production of floor coverings (GuT-members), and that new black reactive dyes are on the market.

Metal complex dyes would be to recommend in stead of chrome mordant dyeing, and the consultants would recommend a ban due to the toxicity of chromium.

This point was discussed during the ahWG meeting in May 2001. It was claimed that the process was still in use, but the use was decreasing. No certification experience exist as no wool products have been certified. The ahWG was in favour of banning the use of chrome mordant dyeing.

In principle the following alternatives to chrome mordant dyeing on wool exist:

- metal complex dyes
- acid dyes
- reactive dyes.

They all have various advantages and disadvantages, but from an environmental point of view the reactive dyes are probably the best alternatives in most cases. The reactive dyes for wool, particularly in the dark black and blue shades, are normally metal free. On the other hand reactive dyes may require more rinsing to get rid of surplus dyes after dyeing, resulting in increased water and energy costs. It is also claimed that the same fastness levels cannot be reached with reactive dyes, and that reactive dyes for wool are more difficult to work with than chrome mordant dyes, thus resulting in poorer reproducibility.

After the ahWG meeting in May a number of comments and suggestions appeared.

EURATEX and INTERLAINE stated that at present there were no acceptable alternatives to chrome mordant dyeing for some applications.

The Italian Competent Body also raised the issue at the ahWG meeting in December 2001. They presented a draft revised criterion:

"Chrome mordant dyeing shall only be used for wool and other keratin fibres, and only if low-chrome dyeing is applied as follows:

(a) only the stoichiometric quantities of chrome salts must be used;

(b) a reducing treatment must be performed at the end of the chroming process to minimise the content of Cr VI;

the exhausted chroming bath must not contain more than 5 mg/l Cr III and no more than 0.5 mg/l Cr VI."

The Italian Competent Body further stated that for the next revision they might be ready to accept a ban. It was mentioned, however, that the same arguments were made during the former revision and that nothing had happened in the meantime.

From the Danish Competent Body it was mentioned that a number of Scandinavian certificate holders neither use chrome mordant dyeing nor metal complex dyes and still meet the criteria as well as even stricter quality levels.

The German Competent Body mentioned that in Germany wastewater containing chromium could not be discharged.

Marks & Spencer informed that they request from their suppliers metal free dyeing where possible and claimed that even better qualities were achieved. Further a problem was that free chromium could be detected on fabrics when dyed with chrome mordant dyes, with a possible risk of allergenic effects.

At the end of the meeting it was concluded that the meeting was predominantly in favour of banning chrome mordant dyeing. The revised criterion is formulated as follows:

"Chrome mordant dyeing is not allowed.

The applicant shall provide a declaration of non-use."

3.18.3 Future revisions of the criterion

Following the detailed discussions of the subject in the ahWG it would be obvious to investigate the implications of this criterion during the next revision.

3.19 Metal complex dyes

3.19.1 Current criterion

The current criterion is formulated as follows:

" If metal complex dyes based on copper, chromium or nickel are used:

a) Where the metal complex dye constitutes more than 20% of the dye components, less than **7**% of the dyestuff applied (input to the process) shall be discharged to waste water treatment (whether on-site or off-site).

b) The emissions to water after treatment shall not exceed: Cu 75 mg/kg-(staple, yarn or fabric); Cr 50 mg/kg; Ni 75 mg/kg.

Test method: ISO 8288 for Cu, Ni; ISO 9174 or prEN 1233 for Cr. Test report required on application if the corresponding metal complex dyes are used."

3.19.2 Changes to the criterion

It is the experience of e.g. the Danish Competent Body that the formulation of 19a is impractical.

The wording could be: "Where metal complex dyes are part of the dye recipe, less than 7% of each of those metal complex dyes applied (input to the process) shall be discharged to waste water treatment (whether on-site or off-site)".

An alternative formulation could be: "Where metal complex dyes are part of the dye recipe, each of those metal complex dyes must have a degree of fixation (or better overall degree of utilisation) better 93%".

PARCOM 97/1 has same discharge values, but also concentrations (0.5 mg/l for all 3 metals). Further metals are mentioned (Sb, As, Cd, Co, Pb, Sn and Zn), many of which are probably not relevant here, but regulated under criterion 16.

The ahWG meeting in May 2001 adopted the former version. After the meeting it was argued from ETAD and other parties that such a criterion could not be met in the case of metallised reactive dyes used for dyeing cellulose, and it was therefore proposed to split the criterion in two, one for cellulose dyeing, one for all other cases.

The new criterion is therefore formulated as follows:

"If metal complex dyes based on copper, chromium or nickel are used:

(a) In case of cellulose dyeing, where metal complex dyes are part of the dye recipe, less than 20% of each of those metal complex dyes applied (input to the process) shall be discharged to wastewater treatment (whether on-site or off-site).

In case of all other dyeing processes, where metal complex dyes are part of the dye recipe, less than 7% of each of those metal complex dyes applied (input to the process) shall be discharged to wastewater treatment (whether on-site or off-site).

The applicant shall either provide a declaration of non-use or documentation and test reports using the following test methods: ISO 8288 for Cu, Ni; ISO 9174 or prEN 1233 for Cr.

(b) The emissions to water after treatment shall not exceed: Cu 75 mg/kg (fibre**,** yarn or fabric); Cr 50 mg/kg; Ni 75 mg/kg.

The applicant shall either provide a declaration of non-use or documentation and test reports using the following test methods: ISO 8288 for Cu, Ni; ISO 9174 or prEN 1233 for Cr."

3.20.1 Current criterion

The current criterion is formulated as follows:

"Azo dyes shall not be used that may cleave to any one of the following aromatic amines:

4-aminodiphenyl (92-67-1)
benzidine (92-87-5)
4-chloro-o-toluidine (95-69-2)
2-naphthylamine (91-59-8)
o-amino-azotoluene (97-56-3)
2-amino-4-nitrotoluene (99-55-8)
p-chloroaniline (106-47-8)
2,4-diaminoanisol (615-05-4)
4,4'-diaminodiphenylmethane (101-77-9)
3,3'-dichlorobenzidine (91-94-1) 4
3,3'-dimethoxybenzidine (119-90-4)
3,3'-dimethylbenzidine (119-93-7)
3,3'-dimethyl-4,4'-diaminodiphenylmethane (838-88-0)
p-cresidine (120-71-8)
4,4'-methylene-bis-(2-chloraniline) (101-14-4)
4,4'-oxydianiline (101-80-4)
4,4'-thiodianiline (139-65-1)
o-toluidine (95-53-4)
2,4-diaminotoluene (95-80-7)
2,4,5-trimethylaniline (137-17-7)
4-aminoazobenzene (60-09-3)
o-anisidine (90-04-0)

*Test method if required for verification: German method B-82.02 or French method XP G 08-014, 30 ppm threshold. (Note: false positives may be possible with respect to the presence of 4-aminoazobenzene, and confirm*ation is therefore recommended)".

3.20.2 Changes to the criterion

From the beginning of the revision of the criteria document the intention was to put the list of banned azo dyes in line with the coming EU directive. The directive was, however, not finished before the final criteria were developed, and it was not possible to receive a copy of the draft directive. It was therefore proposed to keep the current criterion as it is, apart from a reformulation of the assessment and verification part:

"Assessment and verification: The applicant shall provide a declaration of non-use of these dyes. Should this declaration be subject to verification the following test method and threshold shall be used: German method B-82.02 or French method XP G 08-014, 30 ppm threshold. (Note: false positives may be possible with respect to the presence of 4-aminoazobenzene, and confirmation is therefore recommended)."

3.20.3 Future revisions of the criterion

The upcoming directive should be used in the next revision of the criterion; i.e. the list of banned substances should correspond to the directive.

3.21 Dyes that are carcinogenic, mutagenic or toxic to reproduction

3.21.1 Current criteria

The current criterion is formulated as follows:

"The following dyes shall not be used:

(a) C.I. Solvent Yellow 1
C.I. Solvent Yellow 2
C.I. Solvent Yellow 3
C.I. Basic Red 9
C.I. Disperse Blue 1
C.I. Acid Red 26

b) Any dye or dye preparation that is assigned or may be assigned any of the risk phrases R45 (may cause cancer), R46 (may cause heritable genetic damage), R60 (may impair fertility) or R61 (may cause harm to the unborn child), as defined in Council Directive 67/548/EEC[1], as last amended by Commission Directive 98/73/EEC[2]."

3.21.2 Changes to the criterion

3.21.2.1 Excluded dyestuffs
The current criteria document contains a list of banned dyes. It is, however, questionable to include carcinogenic solvent dyes as these are not used for textile dyeing, and they are therefore not included in the new proposal.

On the other hand ETAD has suggested that some additional substances be included in this criterion, based on assessments performed by IARC (International Agency for Research on Cancer) and in the U.S. National Toxicology Programme (NTP).

Proposal for a new criterion
The proposed list of excluded dyestuffs is therefore as follows:

"(a) The following dyes shall not be used:

C.I. Basic Red 9
C.I. Disperse Blue 1
C.I. Acid Red 26
C.I. Basic Violet 14
C.I. Disperse Orange 11
C. I. Direct Black 38
C. I. Direct Blue 6
C. I. Direct Red 28
C. I. Disperse Yellow 3

[1] OJ No 196, 16.8.1967, p.1.
[2] OJ No L 305, 16.11.1998, p.1.

Assessment and verification: The applicant shall provide a declaration of non-use of such dyes."

It can be noted that compared to the requirements in Oeko-Tex 100, C.I. Basic Violet 14 and C.I. Disperse Orange 11 are not included in the present Oeko-Tex criteria. It can also be noted that C.I. Disperse Yellow 3 and C.I. Disperse Blue 1 will also be excluded from use because of their sensitising properties (the present criterion No. 23).

3.21.2.2 Dyestuffs classified according to Council Directive 67/548/EEC[1]
The present criterion covers dyes which have a carcinogenic, mutagenic or reprotoxic effect as evidenced by their potential assignment of risk phrases (R45 (may cause cancer), R46 (may cause heritable genetic damage), R60 (may impair fertility) or R61 (may cause harm to the unborn child)).

In the Nordic Swan there is no list of specific dyes, which are excluded because of known carcinogenic, mutagenic or reprotoxic effect. There is, however, a general criterion excluding all chemical products which are subject to a health risk classification according to regulations in the Nordic countries including the Council Directive 67/548/EEC[1,] last amended by Commission Directive 2000/33/EC[2].

According to this Directive such substances can be categorised in three categories in accordance with the evidence for the actual effect (carcinogenic: Carc1, Carc2, Carc3 , mutagenic: Mut1, Mut2, Mut3 or toxic to reproduction: Rep1, Rep2, Rep3). In the Directive, the definition of carcinogenic substances is as follows:

Carcinogenic substances:
For the purpose of classification and labelling, and having regard to the current state of knowledge, such substances are divided into three categories:

Category 1: Substances known to be carcinogenic to man. There is sufficient evidence to establish a causal association between human exposure to a substance and the development of cancer.

Category 2: Substances which should be regarded as if they are carcinogenic to man. There is sufficient evidence to provide a strong presumption that human exposure to a substance may result in the development of cancer, generally on the basis of:

- *appropriate long-term animal studies,*
- *other relevant information.*

Category 3: Substances which cause concern for man owing to possible carcinogenic effects but in respect of which the available information is not adequate for making a satisfactory assessment. There is some evidence from appropriate animal studies, but this is insufficient to place the substance in Category 2.

[1] OJ No 196, 16.8.1967, p.1.
[1] OJ No 196, 16.8.1967, p.1.
[2] OJ No L136, 08.8-2000, p.90 .

Similar definitions are found for mutagenic substances and substances that are toxic to the reproduction.

The current criteria document covers dyes classified in either of the categories carcinogenic (carc 1 or carc 2), mutagenic (mut 1 or mut 2) or toxic to reproduction (rep 1 or rep 2) (equal to CMR 1 and CMR 2 substances).

On the first ahWG meeting it was discussed whether to include CMR 3 substances as well. The argument favouring the inclusion was to safeguard the consumer, while the argument against is that the evidence for CMR 3 substances is weak. ETAD pointed out that only a few dyestuffs would be excluded because of the extended criterion. Furthermore, there may be differences between the EU Classification rules and national rules, leading potentially to a debate on trade restrictions.

In comparison, the Nordic Swan exclude all chemical products which are subject to a health risk classification according to the Council Directive 67/548/EEC[1,] last amended by Commission Directive 2000/33/EC2. This means products, which either are CMR 1, CMR 2 or CMR 3 classified.

Proposal for a new criterion
In the proposal for a revised criterion, the CMR 3 substances are included by adding the relevant R-sentences: R40 (Limited evidence of a carcinogenic effect), R68 (Possible risk of irreversible effects), R62 (Possible risk of impaired fertility) or R63 (Possible risk of harm to the unborn child). The criterion suggested at the third ahWG meeting in December 2001 had the following wording:

"No use is allowed of dye substances or dye preparations containing more than 0.1% by weight of substances that are assigned or may be assigned at the time of application any of the following risk phrases (or combinations thereof):

R40 (limited evidence of a carcinogenic effect),
R45 (may cause cancer),
R46 (may cause heritable genetic damage),
R49 (may cause cancer by inhalation),
R60 (may impair fertility),
R61 (may cause harm to the unborn child),
R62 (possible risk of impaired fertility),
R63 (possible risk of harm to the unborn child),
R68 (possible risk of irreversible effects),

as laid down in Council Directive 67/548/EEC of 27 June1967 on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances[12], and its subsequent amendments.

Assessment and verification: The applicant shall provide a declaration of non-use of such dyes."

At the meeting the only comment was from ETAD, restating that they were not in favour of tightening the criterion to include CMR 3 substances.

[1] OJ No 196, 16.8.1967, p.1.
[2] OJ No L136, 08.8-2000, p.90 .
[12] OJ No 196, 16.8.1967, p.1.

3.22 Potentially sensitising dyes

3.22.1 Current criterion

The current criterion is formulated as follows:

"The following potentially sensitising dyes shall only be used if the fastness to perspiration (acid and alkaline) of the dyed yarn or fabric is at least 4:

C.I. Disperse Blue 3
C.I. Disperse Blue 35
C.I. Disperse Blue 106
C.I. Disperse Blue 124
C.I. Disperse Yellow 3
C.I. Disperse Orange 3
C.I. Disperse Orange 37/76
C.I. Disperse Red 1

Test method for colour fastness: ISO 105-E04. Test report required on application only if one or more of these dyes are used."

3.22.2 Changes to the criterion

At the first ahWG meeting it was discussed whether to include general phrases in order to exclude dyes, which are potentially sensitising. A simple way of doing this is to exclude all dyes that should be classified with the sentence R43 (can cause sensitisation by skin contact).

In the Nordic Swan Label there is a general criterion excluding all chemical products which are subject to a health risk classification according to regulations in the Nordic countries including the Council Directive 67/548/EEC[1], last amended by Commission Directive 2000/33/EC[2]. There is no specific list on sensitising dyes in these criteria.

The existing negative list is according to ETAD ahead of the legislation, as some of the dyestuffs mentioned are not assessed by the EU legislation to be sensitising. ETAD are engaged in a world-wide project assessing the risk of consumer sensitisation from textiles and the dyestuffs possibly involved. Information evolving from this project should be included, if available.

Proposal for a new criterion
The following list of dyestuffs that are or should be classified as allergeneous was suggested. The list is similar to the list specified in the Oeko-Tex 100 criteria and was presented at the third ahWG meeting in December 2001:

"The following dyes shall only be used if the fastness to perspiration (acid and alkaline) of the dyed fibres, yarn or fabric is at least 4:

C.I. Disperse Blue 3	C.I. 61 505
C.I. Disperse Blue 7	C.I. 62 500

[1] OJ No 196, 16.8.1967, p.1.
[2] OJ No L136, 08.8-2000, p.90 .

C.I. Disperse Blue 26	C.I. 63 305
C.I. Disperse Blue 35	
C.I. Disperse Blue 102	
C.I. Disperse Blue 106	
C.I. Disperse Blue 124	
C.I. Disperse Orange 1	C.I. 11 080
C.I. Disperse Orange 3	C.I. 11 005
C.I. Disperse Orange 37	
C.I. Disperse Orange 76 (previously designated Orange 37)	
C.I. Disperse Red 1	C.I. 11 110
C.I. Disperse Red 11	C.I. 62 015
C.I. Disperse Red 17	C.I. 11 210
C.I. Disperse Yellow 1	C.I. 10 345
C.I. Disperse Yellow 9	C.I. 10 375
C.I. Disperse Yellow 39	
C.I. Disperse Yellow 49	

Assessment and verification: The applicant shall either provide a declaration of non-use of these dyes or a test report using the following test method for colour fastness: ISO 105-E04 (acid and alkaline, comparison with multi-fibre fabric).”

Discussions in the ad hoc Working Group
At the third ahWG meeting ETAD repeated its written comments of October 16, that many of the disperse dyes were probably classified as allergenic based on false-positive reactions. The on-going study referred to earlier in the section had so far only been able to confirm the allergenic properties of ten of these dyes, with disperse blue 106 and 102 being the dyes most frequently reported. Mr. Motschi from ETAD emphasised that the substrate for the dye probably was a very important factor in the cases where sensibilisation has been reported. Another determining factor could be that exposure to high concentrations of the dyes (following overdyeing) could induce skin reactions in atopic individuals, but not necessarily as an allergic reaction.

3.22.3 Future revisions of the criterion

The ETAD study will be completed in 2002 and is intended for publication in reports as well as medical journals. It is suggested that the next revision of the criteria should take these publications into consideration. When published in a journal with scientific peer review, the results will have a broad scientific acceptance and can be used to increase the credibility of the EU eco-label. Until then, however, it is suggested to use the proposed list as the benefit of doubt is given to the textile customer.

3.23 Halogenated carriers

3.23.1 Current criterion

The current criterion is formulated as follows:

“Halogenated carriers shall not be used”

3.23.2 Changes to the criterion

The criterion has not been challenged or subject to alternative proposals, but the heading is changed making it clear that the criterion applies to polyester. In the proposal for a new criterion, the following assessment and verification procedure has been added for clarification:

"Assessment and verification: The applicant shall provide a declaration of non-use."

3.24 Printing

3.24.1 Current criterion

The current criterion is formulated as follows:

"a) Printing pastes used shall not contain more than 5% volatile organic compounds (VOCs: any organic compound having at 293.15 K a vapour pressure of 0.01 kPa or more, or having a corresponding volatility under the particular conditions of use).

b) Plastisol-based printing is not allowed."

3.24.2 Changes to the criterion

The definition of a Plastisol has been discussed during the ahWG meetings. "Whitington's Dictionary of Plastics" (Whittington (1978)) has the following definition: "Plastisol. A suspension of finely divided vinyl chloride polymer or copolymer in a liquid plasticizer which has little or no tendency to dissolve the resin at normal temperatures but becomes a solvent for the resin when heated."

It has been discussed whether Carc3 plasticizers or non-phthalate plasticizers could be allowed in plastisol based printing, but the ahWG meeting was predominantly in favour of leaving the criterion as it is. Thus the following formulation is suggested, as the assessment and verification part has been added:

"(a) Printing pastes used shall not contain more than 5% volatile organic compounds (VOCs: any organic compound having at 293.15 K a vapour pressure of 0.01 kPa or more, or having a corresponding volatility under the particular conditions of use).

Assessment and verification: The applicant shall either provide a declaration that no printing has been made or provide appropriate documentation showing compliance together with a declaration of compliance.

(b) Plastisol-based printing is not allowed.

Assessment and verification: The applicant shall either provide a declaration that no printing has been made or provide appropriate documentation showing compliance together with a declaration of compliance"

3.24.3 Future revisions

It is expected that an EU Directive regarding PVC and plasticizers will be negotiated during the coming years, which could make a revision of the criterion relevant.

3.25 Formaldehyde

3.25.1 Current criterion

The current criterion is formulated as follows:

”The amount of free and partly hydrolysable formaldehyde in the final fabric shall not exceed 30 ppm for products intended for infants of less than 2 years of age, 75 ppm for products that come into direct contact with the skin, and 300 ppm for all other products.

Test method: Japan Law 112, PRENISO 14184-1 or Finnish standard SFS 4996. Test report required on application (except for yarns).”

3.25.2 Changes to the criterion

At the first ahWG it was suggested that the criterion could be put in line with the Nordic Swan Label regarding same limits for all textiles in direct contact with skin (indoor clothes and bed linen).

Some interested parties have questioned the reason for having such low limits on formaldehyde. The reason is that formaldehyde is considered carcinogenic (Carc3, R40), toxic (R23/24/25), sensitising (R43) and corrosive (R34).

Test method should be changed to EN ISO 14184-1.

The present criterion does not require a test report for yarns. Normally formaldehyde releasing substances are used on fabric, but formaldehyde releasing dye fastness improvers are sometimes used, which means that they could be used in connection with yarn dyeing as well. This in turn means that the exception should be removed.

The ahWG meeting in May 2001 was predominantly in favour of the revised criterion. Comments received since the meting vary, some are in favour and wants to precise that bed linen should be considered ‘close to skin’, others are against a stricter criterion. At the ahWG meeting December 2001 the criterion was not questioned, thus the formulation is now:

“The amount of free and partly hydrolysable formaldehyde in the final fabric shall not exceed 30 ppm for products that come into direct contact with the skin, and 300 ppm for all other products.

Assessment and verification: The applicant shall either provide a declaration that formaldehyde containing products have not been applied or provide a test report using the following test method: EN ISO 14184-1.”

A test, however, is to be preferred.

3.26.1 Current criterion

” a) Waste water from wet-processing sites (except greasy wool scouring sites) shall, when discharged to surface waters after treatment (whether on-site or off-site), have a COD content of less than 25g/kg.

b) If the effluent is treated on site and discharged directly to surface waters, it shall also have a pH between 6 and 9 (unless the pH of the receiving water is outside this range) and a temperature of less than than 40°C (unless the t° of the receiving water is above this value).

Test method: ISO 6060. Test report and appropriate data required on application.

3.26.2 Changes to the criterion

PARCOM 97/1 has a limit of 160 mg/l COD. Given the following examples of water consumption, a discharge value in g/kg textile produced can be calculated:

100 l/kg corresponds to 16 g/kg COD
200 l/kg corresponds to 32 g/kg COD.

This means, that the existing criterion in relation to the PARCOM-limit corresponds to a water consumption of 156 l/kg. As PARCOM has a limit between 100 and 150 l/kg depending on the type a factory, it indicates that the eco-label criterion can be tightened a bit.

No further information has been received regarding possible changes to the limits in this criterion. It was therefore suggested to leave the criterion unchanged, apart from making an exception regarding flax retting in the same way as for wool scouring. Flax retting is covered by criterion 4. Also the assessment and verification part has been revised, and the complete criterion now is formulated as follows:

“(a) Waste water from wet-processing sites (except greasy wool scouring sites and flax retting sites) shall, when discharged to surface waters after treatment (whether on-site or off-site), have a COD content of less than 25 g/kg, expressed as an annual average.

Assessment and verification: The applicant shall provide detailed documentation and test reports, using ISO 6060, showing compliance with this criterion, together with a declaration of compliance.

(b) If the effluent is treated on site and discharged directly to surface waters, it shall also have a pH between 6 and 9 (unless the pH of the receiving water is outside this range) and a temperature of less than 40°C (unless the temperature of the receiving water is above this value).

Assessment and verification: The applicant shall provide documentation and test reports showing compliance with this criterion, together with a declaration of compliance.”

3.27.1 Current criterion

The current criterion is formulated as follows:

"No use is allowed of flame retardant substances or preparations containing substances that are assigned or may be assigned any of the risk phrases R45 (may cause cancer), R46 (may cause heritable genetic damage), R50 (very toxic to aquatic organisms), R51 (toxic to aquatic organisms), R52 (harmful to aquatic organisms), R53 (may cause long-term adverse effects in the aquatic environment), R60 (may impair fertility) or R61 (may cause harm to the unborn child), as defined in Directive 67/548/EEC.

This requirement does not apply to flame retardants that on application change their chemical nature to no longer warrant classification under any of the R-phrases listed above, and where less than 0.1% of the flame retardant on the treated yarn or fabric remains in the form as before application."

3.27.2 Changes to the criterion

The Swedish Competent Body suggested during the revision of the criterion to divide into two components, one component specifying a number of substances that should be banned from use, and the second component using classification criteria to identify other unwanted substances. The intention of the suggestion was to provide suppliers of chemicals with clear guidelines on which substances to be avoided.

The suggestion was forwarded to the mailing list for the project along with the proposal for a criterion and caused written comments from among others the National Cotton Council (NCC), ATMI and the Finnish Competent Body. The comments were mostly in favour of harmonising EU-regulations in the area, some pointing to specific substances that should be banned due to existing knowledge and national and international classifications.

One of the main problems with flame retardants is that many of these have been marketed for a long time and have never been tested thoroughly for their effects on environment and human health. However, many are today suspected of having a number of potential effects, but this is so far only reflected in the classification of some of the substances. A number of reviews, especially on brominated flame retardants are therefore being conducted or have recently been concluded.

The unchanged criterion was presented at the ahWG meeting in December 2001, but did not cause any reactions or comments at the meeting.

At the subsequent EUEB meeting it was, however, proposed to harmonise the criteria with respect to classification requirements, the argument being that differences in requirements to e.g. dyestuffs and fire retardants could be confusing for applicants as well as consumers. The EUEB was in favour of this suggestion.

Proposal for a new criterion
The proposal for a new criterion is therefore formulated in line with the suggestion at the EUEB meeting:

"No use is allowed of flame retardant substances or of flame retardant preparations containing more than 0.1% by weight of substances that are assigned or may be

assigned at the time of application any of the following risk phrases (or combinations thereof):

R40 (limited evidence of a carcinogenic effect),
R45 (may cause cancer),
R46 (may cause heritable genetic damage),
R49 (may cause cancer by inhalation),
R50 (very toxic to aquatic organisms),
R51 (toxic to aquatic organisms),
R52 (harmful to aquatic organisms),
R53 (may cause long-term adverse effects in the aquatic environment),
R60 (may impair fertility),
R61 (may cause harm to the unborn child),
R62 (possible risk of impaired fertility),
R63 (possible risk of harm to the unborn child),
R68 (possible risk of irreversible effects),

as laid down in Directive 67/548/EEC and its subsequent amendments.

This requirement does not apply to flame retardants that on application change their chemical nature to no longer warrant classification under any of the R-phrases listed above, and where less than 0.1% of the flame retardant on the treated yarn or fabric remains in the form as before application.

Assessment and verification: The applicant shall either provide a declaration that flame retardants have not been used, or indicate which flame retardants have been used and provide documentation (such as safety data sheets) and/or declarations indicating that those flame retardants comply with this criterion."

3.28 Shrink resistant finishes

3.28.1 Current criterion

The current criterion is formulated as follows:

"Halogenated shrink-resist substances or preparations shall only be applied to wool slivers."

3.28.2 Changes to the criterion

Shrink resistant finishes or anti-felt finishing is applied with the purpose of conferring anti-felt characteristics to the wool goods. It is required when the material needs to be repetitively washed in a laundry machine without shrinking.

According to the draft IPPC reference document from February 2001(IPPC (2001)) two treatments, which are also complementary, are applied:

- oxidising treatment (subtractive treatment)
- treatment with resins (additive treatment).

These treatments can be applied at any stage of the process and on all different make-ups. They are most commonly applied on combed tops for specific end products (e.g. underwear).

Oxidising treatments
This treatment has traditionally been carried out using one of the following chlorine-releasing agents:

- sodium hypochlorite
- sodium salt dichloroisocyanurate
- active chlorine (no longer used).

The oldest process is the one using sodium hypochlorite. However, since the development of active chlorine is difficult to control, wool fibre characteristics can be deeply changed, also giving irregular results. Dichloroisocyanurate is more advantageous here, because it has the ability to release chlorine gradually, thereby reducing the risk of fibre damage.

The chlorine-based agents have recently encountered restrictions because they react with components and impurities (soluble or converted into soluble substances) in the wool, to form adsorbable organic chlorine compounds (AOX).

Alternative oxidising treatments have therefore been developed. In particular, peroxysulphate, permanganate, enzymes and corona discharge come into consideration here. However, the only alternative to chlorine-based agents readily available today is peroxysulphate. The process with peroxysulphate compounds is quite similar to the chlorine treatment. If necessary, the material is treated with a polymer (see treatments with resins below).

Treatments with resins (additive processes)
In additive processes polymers are applied to the surface of the fibre with the aim of covering the scales with a coating. The polymer may be, in some case, sufficiently effective on its own to make pre-treatment unnecessary. Otherwise an oxidative and reductive pre-treatment is necessary.

Combined treatments
However, the combination of subtractive and additive processes has the largest technical effect.

A combined treatment has been widely used for years as anti-felt finishing of wool in different states (loose fibre, combed top, yarn, knitted and woven fabric) due to its low cost and high quality effects. However, the effluent shows high concentrations of COD and AOX. The formation of AOX is attributable not only to the oxidant, but also to the resin, which is based on a cationic polyamide and involves the use of epichlorohydrine.

Alternative resins have been developed, based on polyethers, cationic aminopolysiloxanes, synergic mixtures of polyurethanes and polydimethylsiloxanes, but they all have some limitations concerning their applicability.

New processes have also been developed, but so far the results achieved with the combined treatment process cannot be fully matched by any alternative, which is why it is still the preferred process particularly for treatments such as the anti-felt finishing of combed tops.

According to the PARCOM recommendations from 1992 chlorinated shrink resistant finishes were still accepted for wool sliver, knitted wool garments and socks before piece dyeing. These recommendations were revised in December

1999 after which chlorinated shrink resistant finishes were only recommended for wool tops.

According to Interlaine (communication, April 2001) research has been carried out to produce shrink resistant wool tops using other compounds than chlorine. Unfortunately, these alternatives are less effective, less reliable and less reproducible than chlorine. In addition, all these new processes are more expensive than the chlorine treatment.

Furthermore, according to Interlaine certain non-halogenated compounds for shrink resist treatment can be used, but at other stages of the processing chain. They can however not be applied on semi-manufactured products. The products are very specific in their application, are very costly and less efficient than the chlorine ones.

Proposal for a new criterion
Based on the considerations regarding the technological and economical constraints on the use of chlorinated substances in shrink resistant finishes, it was proposed to leave the criterion unchanged, apart from adding the assessment and verification procedure:

"Halogenated shrink-resist substances or preparations shall only be applied to wool slivers.

Assessment and verification: The applicant shall provide a declaration of non-use (unless used for wool slivers)."

3.29 Dimensional changes during washing and drying

3.29.1 Currrent criterion

The current criterion is formulated as follows:

"The dimensional changes shall not exceed 6% (length and width) for knitted products, 8% (warp and weft) for terry towelling, or 4% for other woven products. This criterion does not apply to products clearly labelled "dry clean only" or equivalent (insofar as it is normal practice for such products to be so labelled), or to furniture fabrics.

Test method: ISO 5077 (3 washes at temperatures as indicated on the product, with tumble drying unless otherwise indicated on the product, at temperatures as marked on the product, wash load (2 or 4 kg) as indicated on the product). Test report required on application."

3.29.2 Changes to the criterion

For the fitness for use criteria no. 29 – 34 the consultants have tried to establish the quality level of a textile or clothing brand name at the upper end of the market scale. The quality levels have been fixed to ensure that producers of these products will not be met with justified consumer complaints.

From the French Competent Body information has been received about this criterion for instance for bedding that it is very difficult to fulfil. Similar inputs have been received from other competent bodies. Also for knitwear comments have been received that even 6% cannot be met for a number of products.

Acceptable limits of dimensional change depend very much on the type of product. For a woven sheet, which is big enough for the bed 5% shrinkage may be acceptable, but for a long curtain even 2% shrinkage may be unacceptable.

Knitwear constitutes a special problem as many constructions are very elastic, and tight products are often accepted. For knitwear products it could be recommended to use the Swedish TEFO measuring system, which ensures that the particular product fits after wash. The system is applied in 5 Swedish standards (SS 251280 – SS 251284), which cover different knitwear types. In this case measurements only have to be made after washing. This solution does not, however, solve the problem for knitted fabrics, unless they are sewn into sample models.

Another solution could be to establish a list of different product types with corresponding acceptable dimensional changes. A few examples are given below:

Knitted underwear:	8%
Terry towels:	8%
Woven clothing:	2%
Curtains, upholstery:	1%
Bed linen	2%.

Yet another possibility could be to state that producers, who do not fulfil this criterion, should write it on the care label. A number of comments have been received, however, which mention that such a statement would discredit eco-labelled products. For non-labelled products there is no demand for information on dimensional changes, so it could be interpreted as if eco-labelled products have a poorer quality level.

A compromise between what would be desirable from a customer point of view and what is achievable from some producer's point of view could be the following:

Curtains, washable/removable furniture fabrics:	2%
Other woven products:	6%
Other knitted products:	8%
Terry towelling:	8%.

It must be stressed once again, however, that for some products on brand label level the above dimensional changes can be unacceptable, and that justified consumer complaints must be expected.

The wording regarding the test method is modified slightly in order to make it more clear, especially regarding the modifications related to the test method ISO 5077.

A large number of comments has been received to this criterion. Some parties suggest that woven products should be allowed to change 8% and knitted products 10%. Other parties, e.g. Competent Bodies from France and Italy, are mainly in favour of the present suggestion. It has also been requested from some parties that the Competent Bodies could compensate from the limits in case of products, where the dimensional stability is not important.

At the ahWG meeting in December 2001 the criterion was discussed again regarding the reasons for including a criterion on dimensional changes in an eco-label criteria document. One of the reasons are that products, which do not live up to consumer expectations, will be discarded earlier and thus have a larger impact

on the environment, as they have to be replaced by new products. It was argued, however, that this criterion is very difficult to formulate, but that the latest suggestion was a balanced one, when taking into consideration the possibilities of informing of larger changes on the care label, and to suggest modifications in the care labelling (e.g. “stretch in wet condition before drying” or similar).

The new criterion is formulated as follows:

“Information on dimensional changes (%) shall be stated both on the care label and on the packaging and/or other product information if the dimensional changes exceed:

– 2% (warp and weft) for curtains and for furniture fabric that is washable and removable,

– 6% (warp and weft) for other woven products,

– 8% (length and width) for other knitted products,

– 8% (length and width) for terry towelling.

This criterion does not apply to:

– fibres or yarn,

– products clearly labelled “dry clean only” or equivalent (insofar as it is normal practice for such products to be so labelled),

– furniture fabrics that are not removable and washable.

Assessment and verification: The applicant shall provide test reports using the following test method: ISO 5077 modified as follows: 3 washes at temperatures as indicated on the product, with tumble drying after each washing cycle unless other drying procedures are indicated on the product, at temperatures as marked on the product, wash load (2 or 4 kg) depending on the wash symbol. Should any of the above-mentioned limits be exceeded, a copy of the care-label and of the packaging and/or other product information shall be provided.”

3.29.3 Future revisions

It has been questioned why dry cleanable products should not meet the criterion on dimensional changes. This issue should be addressed during the next revision. It also should also be followed whether the future applicants are able to meet the revised criteria.

3.30 Colour fastness to washing

3.30.1 Current criterion

The current criterion is formulated as follows:

“The colour fastness to washing shall be at least level 3-4 (colour change and staining). This criterion does not apply to products clearly labelled “dry clean only” or equivalent (insofar as it is normal practice for such products to be so labelled), to white products or products that are neither dyed nor printed, or to furniture fabrics.

Test method: ISO 105 C06 (single wash, at temperature as marked on the product, with perborate powder). Test report required on application."

3.30.2 Changes to the criterion

Level 3-4 is acceptable for colour change, but should be 4 for staining. In case of multicoloured fabrics or fabrics to be sewn together with white even 4-5 might not be enough to avoid visible staining. At the ahWG meeting December 2001 it was argued, however, that level 4 is too strict for many products, for instance when microfibres are involved. At the end it was agreed to keep the fastness levels at the same level as in the current criterion.

The criterion should also apply to washable/removable furniture fabrics.

The criterion is reformulated as follows:

"The colour fastness to washing shall be at least level 3-4 for colour change and at least level 3-4 for staining.
This criterion does not apply to products clearly labelled "dry clean only" or equivalent (insofar as it is normal practice for such products to be so labelled), to white products or products that are neither dyed nor printed, or to non-washable furniture fabrics.

Assessment and verification: The applicant shall provide test reports using the following test method: ISO 105 C06 (single wash, at temperature as marked on the product, with perborate powder)."

3.31 Colour fastness to perspiration (acid, alkaline)

3.31.1 Current criterion

The current criterion is formulated as follows:

" The colour fastness to perspiration (acid and alkaline) shall be at least level 3-4 (colour change and staining). This criterion does not apply to white products, to products that are neither dyed nor printed, to furniture fabrics, curtains or similar textiles intended for interior decoration. A level of 3 is nevertheless allowed when fabrics are both light coloured (standard depth < 1/12) and made of silk or of blends with more than 20% silk.

Test method: ISO 105 E04 (acid and alkaline, comparison with multi-fibre fabric). Test report required on application."

3.31.2 Changes to the criterion

Level 4 should be used here to be sure to avoid consumer complaints. A number of comments during the revision work recommended, however, keeping the existing level.

The Italian Competent Body informed that the exception for silk and silk blends is wrong, and suggested the reformulated wording as follows:

"The colour fastness to perspiration (acid and alkaline) shall be at least level 3-4 (colour change and staining).

A level of 3 is nevertheless allowed when fabrics are both dark coloured (standard depth > 1/1) and made of regenerated wool or more than 20% silk.

This criterion does not apply to white products, to products that are neither dyed nor printed, to furniture fabrics, curtains or similar textiles intended for interior decoration.

Assessment and verification: The applicant shall provide test reports using the following test method: ISO 105 E04 (acid and alkaline, comparison with multi-fibre fabric).”

3.32 Colour fastness to wet rubbing

3.32.1 Current criterion

The current criterion is formulated as follows:
” The colour fastness to wet rubbing shall be at least level 2-3. A level of 2 is nevertheless allowed for indigo dyed denim. This criterion does not apply to white products, products that are neither dyed nor printed, or to curtains or similar textiles intended for interior decoration.

Test method: ISO 105 X12. Test report required on application.”

3.32.2 Changes to the criterion

This level should be at least 3 (2-3 for denim), and it should also apply to interior decorations as there are examples, where products with such low levels have stained themselves during washing. A number of comments during the revision work recommended, however, keeping the existing level. The exceptions regarding curtains and textiles intended for interior decorations are deleted, resulting in the following formulation:

“The colour fastness to wet rubbing shall be at least level 2-3. A level of 2 is nevertheless allowed for indigo dyed denim.

This criterion does not apply to white products or products that are neither dyed nor printed.

Assessment and verification: The applicant shall provide test reports using the following test method: ISO 105 X12.”

3.33 Colour fastness to dry rubbing

3.33.1 Current criterion

The current criterion is formulated as follows:

“The colour fastness to dry rubbing shall be at least level 4. A level of 3-4 is nevertheless allowed for indigo dyed denim. This criterion does not apply to white products or products that are neither dyed nor printed, or to curtains or similar textiles intended for interior decoration.

Test method: ISO 105 X12. Test report required on application.”

3.33.2 Changes to the criterion

The criterion has not been questioned or subject to other suggestions. It therefore remains unchanged, except for assessment and verification, with the following wording:

”The colour fastness to dry rubbing shall be at least level 4.

A level of 3-4 is nevertheless allowed for indigo dyed denim.

This criterion does not apply to white products or products that are neither dyed nor printed, or to curtains or similar textiles intended for interior decoration.

Assessment and verification: The applicant shall provide test reports using the following test method: ISO 105 X12.”

3.34 Colour fastness to light

3.34.1 Current criterion

”For fabrics intended for furniture, curtains or drapes, the colour fastness to light shall be at least level 5. A level of 4 is nevertheless allowed when fabrics are both light coloured (standard depth < 1/12) and made of silk, wool or other keratin fibres, linen or other bast fibres, or of blends with more than 20% wool or other keratin fibres, or of blends with more than 20% silk, or of blends with more than 20% linen or other bast fibres.

Note: this requirement does not apply to mattress ticking.

Test method: ISO 105 B02. Test report required on application.”

3.34.2 Changes to the criterion

A level of 6 should apply to curtains and level 5 for other products.
If exterior textiles will be included in the criteria document colour fastness to weathering (outdoor light fastness) should be used in stead of colour fastness to light. For weathering a level of 5 should apply to awnings and the like and 4 or 4-5 to outdoor clothing.

During the revision work it was suggested also to include clothing products in the criterion. It was argued, however, that some types of clothing are only seldom exposed to light, so that exceptions should be made in such cases. It was agreed to fix the level at 5 for curtains and furniture fabrics and at 4 for all other products. It was also agreed to still use normal light fastness testing. The revised criterion is formulated as follows:

“For fabrics intended for furniture, curtains or drapes, the colour fastness to light shall be at least level 5. For all other products the colour fastness to light shall be at least level 4.

A level of 4 is nevertheless allowed when fabrics intended for furniture, curtains or drapes are both light coloured (standard depth < 1/12) and made of more than 20% wool or other keratin fibres, or more than 20% silk, or more than 20% linen or other bast fibres.

This requirement does not apply to mattress ticking, mattress protection or underwear.

Assessment and verification: The applicant shall provide test reports using the following test method: ISO 105 B02."

4 New criteria

4.1 Finishes

As mentioned earlier there are a number of functional finishes, which could be used on textile and clothing products under the revised product group definition, such as water proof, rain proof, soil release or UV stabilising finishes.

4.1.1 Water or rain repelling finishes

Such finishes can be one of the following:

Wax or paraffin emulsions, which are produced by emulsifying wax and or paraffin in water using emulsifiers and protective colloids. The use of aluminium salts in the products will improve their substantivity. This type of products will have a low fastness towards washing and drycleaning. This fastness can be improved to a certain extent by using zirconium salts in stead of aluminium salts.

Silicones - or more correctly - polysiloxanes result in a good wash fastness on synthetic fibres, whereas it is quite poor on cellulosics. It can, however, be improved by the use of cross-linking agents.

4.1.2 Soil release finishes

Soil release finishes are normally fluorocarbon polymers, which give the material both a water and a soil repelling character.

4.1.3 Other finishes

Further a number of special finishes entitled to equip the products with a special look or handle (e.g. "peach skin", “paper handle”, “rubber touch”, “wild leather effect”, “oily handle” etc.) can be used. Such finishes are developed on a current basis and are often popular in one or a few fashion seasons and then disappear again. They are often polymer based (PUR, PAC, PVA, rubber, synthetic rubber).

4.1.4 Proposal for a new criterion

In general the number of possible finishes, which textile and clothing products can have is very large, making it difficult to develop individual criteria for all possible finishing products. It is therefore suggested to make a criterion like the one for flame retardants, in order to harmonise the content of these criteria on various chemicals. The following criterion was presented at the third ahWG meeting and was approved without comments:

“No use is allowed of finishing substances or of finishing preparations containing more than 0.1% by weight of substances that are assigned or may be assigned at the time of application any of the following risk phrases (or combinations thereof):

R40 (limited evidence of a carcinogenic effect),
R45 (may cause cancer),
R46 (may cause heritable genetic damage),

R49 (may cause cancer by inhalation),
R50 (very toxic to aquatic organisms),
R51 (toxic to aquatic organisms),
R52 (harmful to aquatic organisms),
R53 (may cause long-term adverse effects in the aquatic environment),
R60 (may impair fertility),
R61 (may cause harm to the unborn child),
R62 (possible risk of impaired fertility),
R63 (possible risk of harm to the unborn child),
R68 (possible risk of irreversible effects),

as laid down in Directive 67/548/EEC and its subsequent amendments.

Assessment and verification: The applicant shall either provide a declaration that finishes have not been used, or indicate which finishes have been used and provide documentation (such as safety data sheets) and/or declarations indicating that those finishes comply with this criterion."

4.2 Fillings

With the new product group definition possible criteria for filling material have to be considered. This should both cover fillings in products like duvets and pillows and the like, and outdoor clothing like coats, skiing suits etc.

The filling in such products is normally down and feathers from ducks or geese, synthetic fibres (most often polyester) especially made for this purpose, or even in some cases different natural fibres.

Down and feathers are washed before being filled into the product. Synthetic fibres are normally used as they are, directly from the fibre producer.

Criteria for down and feathers could include pesticides, biocides, formaldehyde and detergents used for washing.

Regarding pesticides the Association of the European Bedfeather and Bedding Industries (EDFA) has informed that pesticides are normally not used in poultry breeding. Only to make the stables clean and free from pathogenes pesticides may be used, but only before the new ducklings or goslings arrive.

Regarding biocides, formaldehyde and detergents the existing criteria for those chemicals could be used.

Regarding natural or synthetic fibres used as filling the existing criteria for the particular fibres could be used.

4.2.1 Proposal for a new criterion

A criterion based on the above observations was presented at the ahWG meeting in December 2001. It was mentioned that biocides were necessary for sterilisation of down and feathers, and was argued that sterilisation would be acceptable, as long as biocides were not used in order to remain on the product. The following criterion for fillings was approved:

”(a) Filling materials consisting of textile fibres shall comply with the textile fibre criteria (no. 1 – 9) where appropriate.

(b) Filling materials shall comply with criterion 11 on ‘Biocidal or biostatic products’ and the criterion 26 on ‘Formaldehyde’.

(c) Detergents and other chemicals used for the washing of fillings (down, feathers, natural or synthetic fibres) shall comply with criterion 14 on ‘Auxiliary chemicals’ and criterion 15 on ‘Detergents, fabric softeners and complexing agents’.

Assessment and verification: As indicated in the corresponding criteria.”

4.3 Coatings, laminates and membranes

4.3.1 Coatings

With the new product group definition a possible criterion for coatings has to be considered. This should both cover coatings in products like rainwear and similar outdoor clothing, and oilcloth and draw sheets.

Coatings for such products can be made from polyurethane (PUR), polyvinyl chloride (PVC) or different wax emulsions.

A criterion for coatings will therefore relate to the different polymeric materials, and it was suggested to collect criteria for coatings, laminates and membranes in one criterion.

4.3.2 Laminates and membranes

With the new product group definition a possible criterion for laminates and membranes has to be considered. This should cover the kind of laminates and membranes, which may be used in outdoor clothing like special workwear and special leisure outerwear.

Permeable membranes are mostly polytetrafluoroethylene (PTFE). Other types of laminates and membranes are polyester foils, polyurethane polymers and foils.

A criterion for membranes will therefore relate to the different polymeric materials, and it is suggested to collect criteria for coatings, laminates and membranes in one criterion.

4.3.3 Proposal for a new criterion

It was proposed to make a criterion, where polyurethane and polyester products should comply with the fibre criteria for elastane and polyester respectively. These parts should be combined with a criterion on plasticizers and solvents of similar nature as the criteria for flame retardants and finishes. The following criterion for coatings, laminates and membranes was approved:

“(a) Products made of polyurethane shall comply with criterion 3a regarding organic tin and criterion 3b regarding the emission to air of aromatic diisocyanates.

Assessment and verification: As indicated in the corresponding criteria.

(b) Products made of polyester shall comply with criterion 8a regarding the amount of antimony and criterion 8b regarding the emission of VOCs during polymerisation.

Assessment and verification: As indicated in the corresponding criteria.

(c) Coatings, laminates and membranes shall not be produced using plasticizers or solvents, which are assigned or may be assigned at the time of application any of the following risk phrases (or combinations thereof):

R40 (limited evidence of a carcinogenic effect),
R45 (may cause cancer),
R46 (may cause heritable genetic damage),
R49 (may cause cancer by inhalation),
R50 (very toxic to aquatic organisms),
R51 (toxic to aquatic organisms),
R52 (harmful to aquatic organisms),
R53 (may cause long-term adverse effects in the aquatic environment),
R60 (may impair fertility),
R61 (may cause harm to the unborn child),
R62 (possible risk of impaired fertility),
R63 (possible risk of harm to the unborn child),
R68 (possible risk of irreversible effects),

as laid down in Directive 67/548/EEC and its subsequent amendments.

Assessment and verification: The applicant shall provide a declaration of non-use of such plasticizers or solvents."

4.3.4 Future revisions

It is expected that an EU Directive regarding PVC and plasticizers will be negotiated during the coming years, which could make a review of the criterion relevant.

The Competent Bodies should currently review the effect of the revised criteria upon the coming applications in order to appoint future areas for revision.

5 Changes to the criteria document

As can be seen in the chapters 3 and 4 a number of changes have been introduced into the criteria document for the award of the Community eco-label to textile products. During the revision work the criteria document has undergone editional changes as well, and to give the reader a quick overview of the most important changes the table below has been constructed. Note, however, that in most criteria the part "assessment and verification" has been changed, and that this fact is not reflected in the table.

Table 9: Changes to the criteria document

Criteria document Version 17/2 1999	Criteria document Version 2002
Products group definition	New: Accessories like handkerchiefs, scarves, bags etc. included. Duvets, pillows and other filled materials included.
1. Acrylic	The word "white" deleted.
2. Cotton	Cotton and other natural cellulosic seed fibres (including kapok). 6 new pesticides added: pentachlorophenol, toxaphene, methamidophos, methylparathion, parathion, and phosphamidon. Transitional cotton accepted parallel to organic cotton. Organic cotton can only be labelled as such if 100%.
3. Elastane	3a. Zinc replaced by organotin. Assessment and verification corrected.
4. Flax	Text clarified (flax fibres instead of linen).
5. Wool	5b. Following pesticide added: chlorpyriphos. 5c. Following pesticide added: flumethrin. Limit reduced from 3 to 0.5 ppm. 5d. Following pesticides added: diflubenzuron, triflumuron with a sum limit of 2 ppm. New pesticide test method. Text on scouring effluent clarified.
6. Man-made cellulose	6b. Sulphur emission limit reduced from 160 to 120 g/kg viscose filament fibres. 6c. Zinc emission limit reduced from 1 to 0.3 g/kg.
7. Polyamide	N_2O emission limit changed to 10 g/kg for PA 6 and to 50 g/kg for PA 6.6.
8. Polyester	8a. Antimony limit reduced from 300 to 260 ppm. "Antimony free" text allowed if appropriate.
9. Polypropylene	No changes.
10. Carding and spinning oils etc.	Text reformulated and split into (a) size and (b) various lubricants. Exceptions made clearer. 10c. The limit of 1 ppm aromatic compound changed to 1.0% PAH.
11. TCP and PCP	Changed to criterion on biocides or biostats. 11a regards transportation and storage. Covers all chlorophenols (their salts and esters). PCB and organotin compounds added. 11b regards a total on biocides and biostats in the use phase.
12. Stripping or depigmentation	No changes.
13. Weighting	No changes.
14. Detergents, fabric softeners etc.	Split into 2 criteria: 14 covers auxiliary chemicals and ads LAS and DTPA. 15 covers biodegradability. Modified version of the earlier 14b.
15. Bleaching agents	New 16. The word "mixed" deleted. "wool before printing" deleted.
16. Impurities in dyes	New 17. 6 metals added: Silver (Ag), Barium (Ba), Cobalt (Co), Iron (Fe), Manganese (Mn) and Selenium (Se).
17. Impurities in pigments	New 18. 2 metals added: Barium (Ba) and Selenium (Se).
18. Chrome mordant dyeing	New 19. Chrome mordant dyeing is not allowed.

19. Metal complex dyes	New 20. Text clarified. Limits for cellulose dyeing changed.
20. Azo dyes	New 21. No changes.
21. Dyes that are carcinogenic etc.	New 22. Solvent dyes removed, other dyes added. Further risk phrases added. Text clarified.
22. Potentially sensitising dyes	New 23. Text clarified. Further dyes added.
23. Halogenated carriers	New 24. Halogenated carriers for polyester. No changes.
24. Printing	New 25. No changes.
25. Formaldehyde	New 26. Limit reduced from 75 to 30 for products with skin contact. Test method changed.
26. Waste water discharge from wet-processing	New 27. Text clarified. Exception added for flax retting sites.
27. Flame retardants	New 28. Text clarified. Further risk phrases added. Text clarified.
28. Shrink resistant finishes	New 29. No changes.
	New 30. Finishes.
	New 31. Fillings.
	New 32. Coatings, laminates and membranes.
C. Energy and water use	New 33. Energy and water use
29. Dimensional changes during washing and drying	New 34. Dimensional changes must be stated if limits are exceeded. Limits changed and clarified.
30. Colour fastness to washing	New 35. Text clarified. Washable furniture fabric not exempted.
31. Colour fastness to perspiration	New 36. Text regarding exemptions changed.
32. Colour fastness to wet rubbing	New 37. Exemptions for curtains and other interior decorations removed.
33. Colour fastness to dry rubbing	New 38. No changes.
34. Colour fastness to light	New 39. A limit at level 4 is introduced for all products, except for furniture, curtains and drapes (level 5). Exemptions for mattress protection and underwear.
	New 40. Information appearing on the label.

6 Market Update

The textile and clothing industry is a very fragmented and heterogeneous industrial sector. The textile and clothing chain is composed of a wide number of sub-sectors covering the entire production cycle from the production of raw materials (fibres) to semi-processed (yarn, woven and knitted fabrics with their finishing processes) and final/consumer products (carpets, home textiles, clothing and industrial use textiles).

The textile and clothing industry's activities are distributed right across Europe, but concentrated in a few EU states. Italy is the leading European producer, far ahead of Germany, the UK, France and Spain (in that order). These five countries together account for over 80 % of the Community textile and clothing industry (European Commission, 2001, based on data from EURATEX).

6.1 Production of fibres

For comparison the world production of fibres in 1989 and 1999 (the most recent available data) are listed in table 10.

Table 10: World production of fibres in 1989 and 1999 (in 1000 tonnes and %).

Fibres	Production in 1000 tonnes		% of TOTAL	
	1989	1999	1989	1999
Cotton	17,431	19,176	45	37
Wool	1,955	1,323	5	3
Synthetics[1]	15,718	28,253	41	55
Cellulosics – man–made[2]	3,284	2,662	9	5
TOTAL	38,388	51,414	100	100

1: Excluding polyethylene for Western Europe.
2: Excluding Lyocell for Western Europe (for confidentiality reasons).
Source: Calculated from CIRFS, 2000.

The figures show the growing importance of the synthetic fibres.
In table 11 the share of the European Union of the world production in 1999 is shown.

Table 11: Share of the European Union of the world production of fibres in 1999.

Fibres	Production in EU in 1000 tons	% of world production
Cotton	553	2.9
Wool	114	8.6
Synthetics[1]	3,256	11.5
Cellulosics – man–made[2]	597	22.4
TOTAL	4,520	8.8

1: Excluding polyethylene for Western Europe.
2: Excluding Lyocell for Western Europe (for confidentiality reasons).
Source: Calculated from CIRFS, 2000.

6.2 Consumption of fibres

In table 12 the consumption of fibres in Western Europe in 1999 is shown.

Table 12: Total consumption of fibres in Western Europe in 1999.

	Consumption in Western Europe in 1000 tonnes
Cotton	1,144
Wool	360
Polyester	1,414
Polypropylene	693
Polyamide	620
Acrylic - staple fibres	361
Other synthetics[1]	367
Cellulosics – man–made[2]	471
Net imports of textiles & manufactured goods	2850
Total Consumption	8,280

1: All types excluding heavy monfilaments and aramids.
2: Viscose (normal & modal), acetate (including tow for cigarette filters) and cupro.
Source: Calculated from CIRFS, 2000.

The total consumption of 8,280 million kg is equivalent to 21,4 kg per capita (population of 387 millions). In 1989 the total consumption was estimated to 6186 million equivalent to 17,2 kg per capita (population of 359 millions).

6.3 End - uses

Table 13 - 15 present market figures in various ways related to the end-uses. The most recent available data are from 1998 (CIRFS, 2000).

Table 13: Total overall consumption of fibres of the main end-uses in 1998 - Western Europe in 1000 tonnes.

	Cotton	Wool	Poly-ester	Poly-amide	Acry-lic[1]	Poly-propylene[1]	Other synthetics[2]	Cellulo-sics	Total
Apparel	726	318	663	262	251	10	19	262	2,511
Home furnishing	400	103	416	274[3]	74	225	168	55	1,715
Industrial uses	177	4	381	103	7	198	40	228	1,138
Total	1,303	425	1,460	639	332	433	227	545	5,364

1: Stable fibre yarns.
2: Including acrylic and polypropylene filament yarns.
3: Almost 90% of the consumption of polyamide in home furnishing are used to produce carpets (240,000 tonnes out of 274,000 tonnes).
Source: Calculated from CIRFS, 2000.

From the table it can be calculated that 47%, 32% and 21% of the fibre consumption are used for apparel, home furnishing and industrial uses respectively.

In table 14 the consumption of woven products in 1998 in Western Europe for woven products are presented.

Table 14: Mil consumption of textile fibres for woven products in 1998 - Western Europe in 1000 tonnes.

	Cotton	Wool	Poly-ester	Poly-amide	Acry-lic[3]	Poly-propylene[3]	Other synthetics[4]	Cellulo-sics	Total
Apparel									
Cotton type apparel[1]	390	1	270	25	2	0	3	119	810
Wool type apparel[2]	5	191	42	9	1	1	0	18	267
Lining & pocketings	3	0	43	8	0	0	0	46	100
Furnishing & household products									
Blankets	4	12	2	0	24	3	0	1	46
Bedding & other household products	275	1	36	3	3	4	2	6	330
Net curtains & transparent curtains	0	8	28	0	1	0	0	1	38
Other furnishing products[5]	69	11	45	2	13	7	12	17	176
Industrial products	76	1	178	60	4	10	14	53	396
Total	822	225	644	107	48	25	31	261	2,163

1: Related to the type of spinning system: e.g. shirts, denims (trousers), cotton coats etc.
2: Related to the type of spinning system: e.g. woven jackets (tweed and worsted), trousers, coats, skirts etc.
3: Stable fibre yarns.
4: Including acrylic and polypropylene filament yarns.
5: Excluding carpets.
Source: Calculated from CIRFS, 2000.

The table shows that cotton is predominantly used for woven cotton type apparel and bedding & other household products, wool for wool type apparel. Polyester is predominantly used for woven cotton type apparel and industrial products, polyamide for cotton type apparel and industrial products, acrylics for blankets, cellulosics for cotton type apparel.

In addition it can be seen that cotton and polyester dominate the market for woven cotton type apparel, wool and polyester the market for wool type apparel, acrylics and wool the market for blankets. Cotton dominates the market for bedding and other household products, polyester the market for net curtains and industrial products.

In table 15 the consumption of knitted products in 1998 in Western Europe for woven products are presented.

Table 15: Mil consumption of textile fibres for knitted products in 1998 - Western Europe in 1000 tonnes.

	Cotton	Wool	Poly-ester	Poly-amide	Acry-lic[3]	Poly-propylene[3]	Other synthetics[4]	Cellulo-sics	Total
Warp, raschel & leaver knitted products[1]									
Apparel[5,6]	6	1	28	69	83	0	7	2	196
Net curtains & transparent curtains	1	1	36	1	0	0	0	0	39
Other furnishing products[7]	6	1	19	14	7	3	2	0	52
Industrial applications	0	0	20	0	0	2	1	0	23
Other knitted products[2]									
Women's stockings	0	0	0	57	0	0	0	0	57
Other footwear[8]	50	9	1	18	6	0	0	3	87
Underwear	96	6	7	11	9	2	2	11	144
Outerwear[9]	161	101	152	49	130	1	2	58	654
Furnishing & household	5	1	16	7	12	2	2	2	47
Industrial applications	14	0	34	0	0	3	0	2	53
Total	339	120	313	226	247	13	16	78	1,352

1: Related to the type of knitting machine.
2: Related to the type of knitting machine.
3: Stable fibre yarns.
4: Including acrylic and polypropylene filament yarns.
5: Including lining & pocketings.
6: E.g. foundation garments, swimwear, sportswear e.t.c.
7: E.g. terry bedsheets etc. Excluding carpets.
8: E.g. socks etc.
9: E.g. T-shirts, sweaters, sportswear, dresses etc.
Source: Calculated from CIRFS, 2000.

The table shows that cotton dominates the market for knitted underwear and other footwear except women's stockings. Wool, cellulosics, polyester and acrylic fibres are predominantly used for knitted outerwear. Polyamide dominates the market for women's stockings and is also used in large quantities for outerwear and warp, raschel and leaver knitted apparel.

6.4 Export and import in EU

In table 16 and 17 data for export and import of fabrics in EU in 1999 for man-made fibres are presented.

Table 16: Export of fabrics in EU in 1999 – man-made fibres (tonnes).

Country	Export				Total export
	Synthetic woven fabrics	Cellulosic woven fabrics	Synthetic knitted fabrics	Cellulosic knitted fabrics	
Germany	103,010	38,511	38,738	3,652	183,911
France	73,390	31,161	30,609	1,478	136,638
Italy	85,917	33,125	25,205	4,407	148,654
Netherlands	28,549	6,708	7,601	213	43,071
Belgium – Luxembourg	93,325	28,237	10,314	249	132,125
United Kingdom	58,854	10,245	12,700	464	82,263
Irish Rep.	2,036	276	30	0	2,342
Denmark	7,150	1,135	2,679	32	10,996
Greece	2,641	960	1,524	86	5,211
Spain	43,915	7,738	17,566	216	69,435
Portugal	12,438	2,037	2,540	9	17,024
Austria	8,640	6,675	5,003	1,326	21,644
Finland	1,634	452	460	18	2,564
Sweden	4,854	507	3,121	26	8,508
Total	526,353	167,767	158,090	12,176	864,386

Source: Calculated from CIRFS, 2000.

Table 16 shows that Germany, Italy, France and Belgium – Luxembourg are the leading EU export countries of fabrics made of man-made fibres (in that order). United Kingdom and Spain are also important export countries.

Table 17: Import of fabrics in EU in 1999 – man-made fibres (tonnes).

Country	Import				Total import	Net import
	Synthetic woven fabrics	Cellulosic woven fabrics	Synthetic knitted fabrics	Cellulosic knitted fabrics		
Germany	90,235	33,216	18,880	2,100	144,431	-39,480
France	79,067	19,967	36,579	1,472	137,085	447
Italy	90,860	16,374	19,467	506	127,207	-21,447
Netherlands	32,476	6,451	7,913	525	47,365	4294
Belgium – Luxembourg	62,860	11,115	16,582	377	90,934	-41,191
United Kingdom	129,628	34,749	20,898	3,249	188,524	106,261
Irish Rep.	5,280	1,175	667	50	7,172	4,830
Denmark	12,949	2,107	4,222	207	19,485	8,489
Greece	22,603	4,244	11,443	307	38,597	33,386
Spain	69,752	8,678	6,479	438	85,347	15,912
Portugal	22,281	3,819	5,413	400	31,913	14,889
Austria	9,072	4,431	2,670	603	16,776	-4,868
Finland	4,791	989	1,295	287	7,362	4,798
Sweden	6,934	938	1,928	64	9,864	1,356
Total	638,788	148,253	154,436	10,585	952,062	87,676

Source: Calculated from CIRFS, 2000.

Table 17 shows that the same countries mentioned above are the leading EU import countries of fabrics made of man-made fibres – however in a different order. Of these major import countries only United Kingdom and Spain are net importing countries.

7 Textile criteria in other eco-labelling schemes

This chapter aims at giving an overview of textile criteria in national eco-labelling schemes inside and outside the EU. The information has been collected from national homepages as well as from the homepage of the Global Ecolabelling Networks.

Within the EU the following Member States have developed national or regional schemes:

Austria
Catalonia
France
Germany
Netherlands
Spain
Sweden (NGO based scheme)
Nordic countries (regional).

7.1 Austria

Textile floor coverings. Textile floor coverings are excluded from the EU criteria.

7.2 Catalonia

No national criteria for textile products.

7.3 France

No national criteria for textile products.

7.4 Germany

Fabric towel rolls.
The fabric towel must be reusable at least 80 times.
The worn out fabric must be forwarded to subsequent utilisation.

Other criteria apply only to the distributor.

7.5 The Netherlands

Clothes. No indication of criteria status.

Hand dryers (cotton). Inactivated.

Window products (Curtains etc.). Inactivated

7.6 Sweden ("Bra Miljöval")

The very detailed criteria are divided into three groups, relating to:
1. Requirements for "Good fibres" (voluntary)
2. Requirements for "Good manufacturing" (compulsory)
3. Requirements for Final products (compulsory).

Good fibres
In order to achieve the label "Good fibres", at least 90% of the fibres must fulfil requirements regarding:

- recycled fibres (at least 80% being pre or post consumer waste, no chlorine bleaching, oils used in recycling processes must fulfil the same requirements as in spinning), or
- natural fibres (growth fibres (incl. cotton, flax, wool silk) must be organic; organic and conventional fibres must not be mixed; GMO are not accepted, organic fibres to be controlled by accredited institutions)
- synthetic fibres (maximum 30% virgin fibres, only post-consumer waste, no halogenated monomers, solvent spinning only allowed with more than 99% recovery)
- viscose/Lyocell (Cellulose mass produced according to paper mass criteria; emissions less than 10 kg S, 1 kg Zn, 40 kg COD per ton fibres; no chlorine bleaching; solvent spinning only allowed with more than 99% recovery).

Good manufacturing
All products must fulfil the criteria for Good manufacturing, regarding:
- wool wash (tensides, COD, TOC)
- retting (COD/TOC)
- silk "cooking" (tensides, COD/TOC)
- spinning (readily biodegradable oils and waxes, not machine oils)
- weaving (warp size readily biodegradable or be recycled (75%))
- sticking – similar as spinning
- manufacturing (energy < 70 MJ/kg, emissions of COD and P, waste water treatment plant)
- chemicals (classification requirements, negative lists)
- mercerization (recycling of NaOH)
- anti-felt treatment (no perborate, hypochlorite or other chlorine-containing agents)
- bleaching (no perborate or chlorine containing agents)
- wash and de-sizing (general requirements regarding tensides and complex-builders)
- pigments and dyes (ETAD requirements, amines, optical brighteners, complexing agents, emissions to WWTP)
- dyeing process (no Cu, Sn, Cr, urea, all chemicals inherently biodegradable)
- printing (water-based pigment and transfer printing allowed, ink (dye)-printing only with readily biodegradable inks, printing paste max 30% urea),
- appreture (readily biodegradable softeners, no fluorocarbons, formaldehyde-requirements, no disinfectants)
- confection (no chlorine in cleaning agents)
- other (PCP and its salts and esters are not allowed).

Final products
Final products must fulfil requirements with respect to:

- colour stability
- crimping
- formaldehyde emissions
- washable in water
- production country must be stated.

7.7 Nordic countries (The Swan)

The criteria for the Nordic Eco-label, The Swan, are divided into seven areas:

1. Overview of production
2. Fibre production
3. Storage and transport of fibres
4. Requirements of chemical products
5. Emissions from textile processes
6. Energy and water consumption
7. Finished textile products.

Overview of production
Flowchart with all integral industries and process stages must be prepared.

Fibre production
- cotton must be grown without the use of pesticides
- bast and stem fibres (flax, hemp jute, ramie):
  - must be cultivated without the use of pesticides
  - emissions of oxygen demanding substance must be reduced with 75%
- raw wool fibres
  - negative list for pesticides (18 chemicals)
  - COD must not exceed 60 kg/ton
  - negative list for washing chemicals (general for all textile types); no solvent-based washing
- regenerated cellulose
  - COD must not exceed 80 kg/ton; process sulphur 15 kg S/ton, Zinc 0.5 kg Zn/ton
  - no chlorine-based bleaching chemicals
- polyester and polyamide
  - only solvent-free spinning
  - average VOC less than 1.2 g/kg; NO_x less than 1g/kg
  - antimony content in polyester less than 300 ppm
- recycled fibre
  - includes both post-production and post-consumer waste
  - organically bound halogens (EOX) must not exceed 3 mg/kg.

Storage and transport of fibres
- chlorophenols must not be used to store or tansport cotton, flax or wool. Total content must be less than 20 microgrammes/kg.

Requirements on chemical products
- complete list of chemicals must be shown

- no classification in EU/Nordic countries with regard to carcinogenic, teratogenic or mutagenic effects, not harmful to reproduction
- negative lists (chlorophenyls, PCB, certain halogen-based matting-, proofing-, bleaching-, or flame-retardent agents, organic tin, PVC, APEO, LAS, DADMAC, phthalates, EDTA, halogenated solvents)
- PAH in spinning oils less than 1% by weight
- azo dyes decomposing to carcinogenic amines (”German list”) must not be used
- adhesive dressing must at least be inherently biodegradable. For organic, certified fibres readily biodegradability is required
- pickling with metals is not allowed.

Emissions from textile processes
- total emissions of oxygen demanding substances from any wet textile processing unit must be reduced by at least 90% or 25 g COD/kg. Less stringent (50% or 60 g/kg) for organic fibres
- phosphorous-based flame retardants must be collected in concentrated solutions and handled separately – no emissions allowed.

Energy and water consumption
- total energy and water consumption must be documented. A plan for minimising electricity and heat consumption must exist at all plants where wet processing takes place.

Finished textile products
- limit values for metal content (As, Pb, Cd, Co, Cr, Hg, Ni, Sn, Zn)
- able to withstand water washing
- colour fastness requirements
- release of nickel from metal alloys must not exceed 0.5 microgrammes/cm^2 per week
- maximum release of formaldehyde, depending on product groups.

Outside the EU the following Ecolabelling schemes with textile related criteria have been identified:

7.8 Croatia

Linen towel on the rail. The towel rolls must last for at least 80 washes.

Other criteria apply only to the distributor.

7.9 Hungary

Woollen-flax bed clothes. Criteria are not available on the Internet.

Bed mattresses made of natural material. Criteria are not available on the Internet

7.10 Japan

Textiles made of waste fibres (category No. 51)

- The product shall be made solely of fibre, 70% of which shall be waste fibre (such as linter from the spinning process, cloth scrap or shredded waste cloth of cotton).

- The product must not produce toxic substances during the disposal process.

Cloth shopping bags (category No. 48)

- The product shall be used more than 300 consecutive times. The product can be made of natural or synthetic fibre. The product must not contain toxic substances, including those that can be emitted in the disposal process.

Clothing made of recycled PET resin. Discontinued.

Household Textile Products Using Recycled PET Resin (category No. 104)

- polyester fibres from recycled PET resin shall be at least 50% of the product in terms of weight
- if other material than PET is used additionally, recycled PET resin must be at least 75%
- the product must confirm to ”Law to control household products containing harmful substances”
- residual free formaldehyde must not exceed 75 ppm
- dieldrin must not be used
- wool shall not use benzidine dyes, or dyes that generate specified substances on a list (similar to the ”German List”)
- materials other than wool must not use chromium dyes
- fluorescent whitening agents shall not be used in excessive amounts.
- regulated substances must be properly controlled in the production process
- amounts of energy and water must not greatly exceed the amounts required when using a non-recycled material.

Textile products for industrial use Using Recycled PET Resin (category No. 105)
Same as category No. 104.

7.11 New Zealand

The eco-label criteria in New Zealand do not include textiles directly. However, the criteria for Wool Pile Carpets (EC-04-98) include criteria for production of wool products and the most relevant are listed in the following.

- Requirements for wool scours:
    - heavy effluent shall be discharged to a municipal sewage treatment plant with secondary and tertiary treatment before discharge, or to an appropriate contained treatment system where effluent cannot be discharged directly into water bodies
    - rinse water effluent must not raise the BOD_5 level of the receiving water body with more than 2.5 mg/l
    - grease content in primary effluent before discharge or treatment must not exceed 40 kg/tonne of greasy wool
    - water intake must not exceed 30,000 l/tonne of greasy wool scoured
    - total useful energy shall not exceed 4,0 GJ/tonne of greasy wool scoured
    - alkyl-phenol based detergents shall not be used in scouring

- no synthetic pyrethroids shall be used.

- Requirements for yarns and fibres
  - the COD level in the dyehouse effluent shall not exceed 35 kg/tonne of fibre dyed
  - insect-resist agent shall not be applied during opening, carding or spinning operations
  - permethrin insect-resist agent in the total factory effluent shall not exceed 15 g/tonne of fibre treated
  - spinning lubricant additions shall not exceed 3% of the weight of the wool
  - dyeing using after-chroming techniques shall not be used The dye recipe shall not contain more than 100 mg of chromium per kg of wool dyed
  - fluorochemical finishes shall not be used. Sulphonated phenolic stainblockers shall not be used
  - yarn scouring surfactants shall be readily biodegradable
  - total organophosphate pesticide content of the wool fibe shall not exceed 0.5 ppm
  - total organochlorine pesticide content of the wool fibre shall not exceed 0.1 ppm.

8 Marketing and Communication

As a part of the revision of the criteria for textiles, a survey on market and communication aspects has been made. The survey consisted of a questionnaire focusing on experiences, needs and wishes related to promotion of eco-labelled textile products. The questionnaire was sent to the ahWG and interested parties, thus including e.g. national competent bodies, manufacturers, retailers and branch organisations.

15 answers were received on the questionnaire of which 5 came from competent bodies, 3 from textile manufacturers, 2 from business organisations for manufacturers, 1 from a retailer, 1 from a retailer organisation and 3 from other stakeholders.

The following is based on the answers received, supplemented by additional material concerning the Danish efforts (see below) and is structured as follows:

- Status – what has been done so far
- Needs and wishes to promote eco-labelled products, especially textiles
- Catalogue of ideas to be included in a strategy for marketing and communication.

8.1 Status – what has been done so far?

Textiles seem to be one of the most successful product groups under the European eco-labelling scheme. With a total of 32 licences (by September 2001), the textile product group counts for about 40% of all licences.

Nevertheless, the general impression from the questionnaires is a general lack of consumer awareness on eco-labelled products and, as a consequence, very limited interest from manufacturers and retailers. The general feeling seems to be that the costs are high for an uncertain return. However, the criteria do seem to be generating interest and the possibility of using them as a sort of “environmental due diligence” regime seems to be adopted for some organisations.

In Denmark, a comprehensive effort on developing and promoting eco-labelled textiles has been made, whilst in other countries the first signs of textiles as a focus area are appearing. Below, the Danish measures and results so far are described as an example of a multifaceted and co-ordinated effort. The situation in the United Kingdom and Finland are outlined as well to show different experiences and points of view.

8.1.1 Denmark

The vision regarding environmentally friendly textiles in Denmark is that the consumers and purchasers must be in position of and have a desire for choosing environmentally friendly textile products, where the relations between environment, price, quality and design are the decisive parameters. The manufacturers as well are very important players on the field. To unite all the different needs, wishes etc., the Danish EPA established a Textile Product Panel

some two years ago encountering manufacturers, retailers, designers, NGO's, consumer organisations, and authorities.

8.1.1.1 The Textile Product Panel

The purpose and the working areas for the Product Panel are:

- to get new and more visible environmentally friendly products on the market
- to secure a professional foundation regarding environment when it comes to production and marketing of environmentally friendly textiles
- to make the environment a naturally integrated parameter in the decision making
- to increase the consumers' knowledge of the environmental consequences related to production and use of textiles
- to motivate the consumers to buy environmentally friendly textiles.

A major target for the Product Panel has been to take a concerted action for bringing eco-labelled textile products on the market in the beginning of 2001. This has required a determined and co-ordinated action by manufacturers, designers, retailers and other stakeholders. As a result, 9 new licences were awarded to textiles in Denmark according to the EU eco-labelling scheme, reaching a total of 13 licences. The textile products, which so far have received the most attention, are home textiles for the kitchen or the bedroom and clothing such as underwear and nightwear.

8.1.1.2 The eco-label promotional campaign 2001

To support the development of environmentally friendly textiles, the Danish EPA has co-financed projects including training seminars, development of tools for environmental assessments and improvements, dissemination of results etc. Moreover, in February 2001 the Danish EPA launched a campaign to promote the EU Flower and the Nordic Swan eco-labels. Focus of the campaign was on the EU Flower on textile products, but the campaign also promoted the Swan label and the EU Flower on washing powder.

The campaign was launched together with the presentation of a new clothing and textile collection from 11 producers that all have obtained their EU-flower licence recently. The new collections were exhibited at the launching press conference.

The target group of the campaign was all Danish citizens, but mainly women from 20 to 55 years, who are most likely to buy washing powder and the kind of textile products that have been eco-labelled until now. The objectives of the campaign were to increase the knowledge of the eco-labels and the sale of eco-labelled products. In addition the campaign should encourage manufacturers and retailers to market eco-labelled products. Another important issue was to highlight the credibility of the approved eco-labels.

The elements of the campaign were TV commercials, advertisements in women and consumer magazines, a shop campaign, a public relation strategy and NGO activities. The arguments used during the campaign was that eco-labelled products

- are among the least environmentally damaging on the market
- contain no PVC-prints and have a lower output of hazardous chemicals
- are produced with the environment in mind throughout the entire life-cycle
- keep their shape and colour (quality products)
- motivate manufacturers to produce more environmentally friendly products.

The Eco-Label Promotional Campaign is one of the most extensive Danish EPA campaigns to date with a budget of approx. 800,000 Euro. From an overall perspective the campaign has so far produced a series of considerable effects. An evaluation after 3 months stated that the substantial knowledge level for the Swan has increased from 26% before the campaign to 41% after the campaign, whereas the corresponding numbers for the EU-Flower showed an increase from 4% to 16%. For both labels, knowledge is higher within the primary target group (women aged 20 to 55 years) than with consumers in general.

With regard to consumer attitudes, the consumer confidence was status quo on a rather high level after the campaign, and the consumer behaviour has been affected as well. 38% of the consumers stated that they have purchased eco-labelled products at least once within the last six months, compared to 32% before the campaign.

Finally, it is an essential conclusion that the consumer level of knowledge is positively correlated to the inclination for purchasing eco-labelled products.

With regard to the campaign elements, the TV commercials were the far most effective means of communication both in terms of exposing the campaign and promoting substantial knowledge to eco-labelling. However, it was important to supplement the mass communication means with other elements that gave more specific and detailed information to the consumers. In that respect, the retail campaign material are viewed as important - as well as network communication is pointed out as valuable, not only to generate effects on the consumer knowledge and behaviour, but equally with a view to secure involvement and ownership – not at least at the supply side.

As a consequence of the positive results, the Danish EPA decided for a follow-up campaign running throughout the autumn 2001.

8.1.1.3 TEKO Center Denmark and the Center of Knowledge Concerning Environmentally Friendly Textiles

TEKO Center Denmark is the institute of education for the Danish clothing and textile industries and the largest of its kind in Scandinavia. During the last 40 years the Center has obtained a comprehensive experience in developing and implementing training for the business sector including the clothing and textile industries, and TEKO is an active player in the Textile Product Panel.

Lately TEKO Center Denmark has established a Center of Knowledge Concerning Environmentally Friendly Textiles. The objective of the Center is to co-ordinate and give advice primarily to manufacturers and retailers concerning environmental issues related to the clothing and textile industries including environmentally friendly production processes, equipment, products, eco-labelling and marketing.

Users of the Center can also benefit from a database containing information regarding suppliers.

Another area for the Center is to offer course activities in order to train shop personnel, designers and purchasers. Finally, the Center is working for strengthening the end consumers' knowledge of the environmental influence of the clothes.

Following the campaign for promotion of eco-labelled textiles, the Danish textile industry has "appointed" the leader of the Center of Knowledge at TEKO as an independent intermediary between international distributors or clothing companies

and Danish manufacturers having an eco-label license – and also between Danish manufacturers and international environmental conscious suppliers.

The Danish effort has been considerable up till now and it continues. Thus, the Textile Product Panel has set up new targets for the years to come, including a further development of the existing effort and start up of new focus areas like promoting awareness and knowledge among the professional purchasers on the contract market and building international networks.

8.1.2 United Kingdom

In the UK the effort has been on eco-labelled products in general and not especially on textiles. Focus has up to now been on promotion of existing eco-labelled products. Thus, the competent body has produced an eco-labelling leaflet for use at point of sale and asked all manufacturers or retailers whose eco-labelled products are available in the UK, to consider stocking it. Views from all these parties have been invited to clarify, how the competent body can help promoting the eco-labelled products. One outcome has been that the competent body appeared at a major gardening show to answer questions about an eco-labelled soil improver.

Moreover, the competent body produces fact sheets for consumers about the eco-labelling criteria for the existing eco-labelled product groups marketed in the UK. An eco-labelling website with links to the websites of manufacturers or retailers with eco-labelled products is also established, attracting about 10 hits a day. These activities are supplemented by a planned roadshow to encourage consumers to do their bit to help the environment. Yet another new activity is the launch of a newsletter about green labelling and product related issues.

Especially for textiles, an application pack is sent to everyone, who has indicated that they are interested in the eco-label, as well as to all UK test centres. Major industry associations will be targeted too.

As a result, there is a lot of interest in the eco-label as an idea, but manufacturers and retailers have been reluctant to apply, typically stating that there are not sufficient advantages to justify the effort and cost involved. Selling the eco-label will take time, but interest from the textile industry is greater than from any other sector.

According to a major retailer in the UK good environmental performance is a significant future driver for their business. The retail sector has traditionally focused on the environmental performance of the assets it actually owns, i.e. stores and trucks. This is still important, but the true environmental impacts occur upstream (in the supply chain) and downstream (during consumer use and disposal) of the retailers operations. It is in these areas that the efforts will be focused in the future. For now, food production (pesticides, genetic modification etc) dominates the concerns, but according to the retailer textiles/shoes will become increasingly important in the future.

In discussing eco-labelling and the contribution it can make to the aspirations outlined above there is a stark fact - the mass UK consumer market does not currently include environment as a factor in its purchasing decisions. Consistently 80% of the *public* say environment matters to them, consistently less than 5% of the *consumers* actively seek out the better environmental option. This huge gap is closing slightly but to all intents and purposes remains a gaping chasm across any road to a more sustainable future. Until this gap is closed significantly, eco-labelling will, according to the retailer, remain a peripheral driver for improved

environmental performance in the UK. Bottom line, until the general public is made aware of what eco-labelling is, it will have no influence on consumer purchasing decisions. Whilst the retail sector needs to play a role in supporting this exercise, ultimately it needs to be led by the EU and national governments.

Eco-labelling in particular, demands a considerable amount of point of sale information to describe its benefits and why it is worth paying the extra euro for it. For the foreseeable future there is little likelihood that the consumer would be receptive to such an approach. You have a split second to grab the consumer's attention in the shop. It is difficult enough to get across the messages that they are used to as members of the public, for example related to price and functionality. Let alone, issues such as eco-labelling will have absolutely no resonance with the consumers.

Hence, according to the retailer, an approach based on ALL products reaching a reasonable standard is far more enticing and would be far easier to market and manage internally. Independent Brand editors (the media, pressure group, investors, government) can distil all the background information about all products down into a simple message for the consumer - your retailer is good or bad for the environment. So the decision becomes “do I shop with X (good for the environment) or Y (bad for the environment)” rather than “I will buy shoe A, which is eco-labelled, as opposed to shoe B, which is not”.

Realistically, if the retailer proceeds down the eco-labelling route, it is to provide evidence to Brand editors that they are serious about their obligations to the environment, rather than to interact directly with the consumer about a specific product's environmental credentials. With time, say 3-5 years, enhanced public awareness of eco-labelling may allow such direct marketing to be introduced, according to the retailer who will continue to follow with interest the development of eco-labels and will continue to use them to benchmark the overall approach to managing the environmental impact of textiles/shoes. Currently, a sustainable textiles policy is developed to secure systematic action across the full product range. However, in most cases the steps taken will not be as demanding as the eco-labelling requirements.

8.1.3 Finland

In Finland, a working group has recently been established to clarify the environmental concerns of textiles as well as to promote the manufacturing and marketing of environmentally sound products. The group consists of seven manufacturers, three associations (textile industry, fashion retailers, importers and wholesalers), one large retailer, two universities, consumer agency, consumer research centre and an environment institute. NGO’s do not take part in the working group for the time being, but it is assessed to be potentially useful as the manufacturers feel that they don’t know the environmental questions well enough to go for a public discussion and debate.

The working group is seeking inspiration from the Danish experiences. So far there is no demand for Flower- or Swan-labelled textiles, but many manufacturers use Öko-Tex 100 in order to show high quality and safety of their products.

The Finnish manufacturers are willing to ask from their suppliers, if they have cotton (yarn or fabric) that has been manufactured from cotton grown without pesticides or without the use of the most hazardous pesticides (banned in EU or on the POP- or PIC-lists). They will also ask for polyester that fulfils the eco-label criteria. By extending this examination of eco-suitable material to chemicals, some

barriers for applying for the eco-label can be removed. A list of laboratories that can do the required chemical analyses and their prices are under preparation to support the process. Thus, in Finland focus has been put on how to motivate and help the manufacturers in applying for the eco-label. An awareness campaign directed towards the consumers could be the next step.

8.2 Needs and wishes to promote eco-labelled textiles

From an overall point of view, two major needs can be pointed out from the questionnaires:

- The manufacturers and retailers must be motivated to develop and market a substantial number of eco-labelled textiles
- The consumer awareness towards eco-labelled products must be strengthened as a driving force on the market.

These two needs are closely linked – if the consumers don't ask for eco-labelled products, the manufacturers and the retailers will not spend resources on developing and marketing that type of products. But if there are no eco-labelled products on the shelves, the consumers do not have the choice. The Danish experiences show that a coordinated effort on both needs can actually influence the market for eco-labelled textiles.

In brief, the main barriers for eco-labelling of textiles are:

- Environmental aspects are not a point on the agenda in the sector in general – neither in the product chain
- The customers do not ask for eco-labelled products. A large part of them do not even know about eco-labels. And those who care about, how the products are produced, are often more focused on e.g. health aspects, child labour or nature conservation, i.e. aspects which are not included in the criteria for the eco-label
- Environment is not a sales parameter like price, fashion, quality etc.
- The requirements regarding chemicals are very complex and difficult to understand for non-chemists. And even more difficult to explain to the suppliers in e.g. East Asia
- Applying for an eco-label is quite resource demanding – especially for new-comers
- The costs related to producing eco-labelled textiles lead to higher prices on the markets which for some product groups are very price sensitive.

To motivate the manufacturers, retailers, consumers, and other interested parties to develop, promote, market, and buy eco(flower)-labelled textiles, these barriers must be dealt with.

First of all, the manufacturers need to believe in potentials on the market, before they are willing to spend the considerable time and resources needed to obtain the European eco-label. But a joint effort supported by industry, retailers, governmental institutions, NGO's etc. can convince some manufacturers to break new ways on the market. Here, governmental institutions have to lead the process according to the manufacturers and retailers.

The consumers are confronted with an inflationary number of quality and brand labels on each textile article, e.g. suggesting lifestyle, comfort and health aspects. It is well known that the consumer reacts by ignoring the majority of statements and focusing only on the label/brand with the highest awareness. The latter is only

possible by huge investments in awareness campaigns like the big commercial brands are doing. Without the creation of a broad positive public awareness the results will remain disappointing. Thus, an awareness analysis conducted by a specialised institute followed by a professional awareness-raising campaign is a need.

The lack of awareness and interest applies not only to the consumers but also to the manufacturers, retailers and their organisations. An intensive information effort followed by a dialogue between the interested parties is also requested in the questionnaires.

Specifically, concerning the retailers, the eco-label needs:

- a strong and positive co-operation between industry and retailers
- to present easily understandable and appealing arguments for the retail personnel and consumers alike
- promotion across a wider spectrum of products rather than a limited segment of the market.
- a massive investment for advertising coming from retailers, manufacturers and public institutions. The less the proportion of labelled products the higher the investments needed.

The textile market is very varied in relation to sensitivity towards price, quality, design/trends etc. Basically, in many parts of the market price sensitivity affects the sale of these products, and therefore the eco-label must not add too much expense. In other parts of the market, branding on quality and eco-concept seems to be a real possibility. Many young people select very carefully what they wear, but so far the eco-label has not been a criteria in this selection. However, at the same time young people also have deep concern for the future of the Earth. Price is often not the decisive factor in their selection of clothes, and this presents an opening for marketing a Flower-eco-brand for this "earth-responsible new generation".

8.3 Catalogue of ideas to be included in a marketing and communication strategy

Textiles as a product group could be a good pilot for generating awareness of the EU eco-label in general because of the size and variety of the market. An awareness survey could point out the most eco-relevant segments on the European market. Moreover, the supply chain and the market of textile products are international, which calls for an international, co-ordinated effort.

Based on the results of the survey, the following step-wise effort is proposed:

1) Bring eco-labelled products on the market

A visible and co-ordinated effort in several countries at the same time is recommended. To reach a real break-through on the international market a substantial amount of resources from authorities, manufacturers and retailers is needed.

At the level of the competent bodies, tools to make the application and documentation process more simple for the potential applicants could be developed and shared to optimise the use of resources. For example:

- Simplified documentation regarding especially chemicals based on checklists, overviews etc. Easier documentation of the performance of suppliers outside the EU e.g. by establishing a corps of local agents, who could visit the suppliers (the local manufacturers) and check their performance and documentation in relation to the ecolabel criteria.
- The user manual could be revised to make it an attractive selling tool, like the Swedish one for a mobile phone green label.
- Short courses for potential applicants explaining the requirements in the eco-label, how to apply, what benefits could be obtained etc. could be arranged.

Direct mail campaigns targeted at the top management of the textile manufacturers in EU explaining the ideas and potentials in the eco-label is a must to create awareness among the manufacturers. Press releases and articles in the textile trade press has proved to be very effective at generating a lot of interest in the industry, and should be included as well.

Today almost all the licences are granted to household textiles and underwear – not to textiles, where fashion and trends are very important. To create an eco-label brand it could be worth a try to convince one of the leading fashion houses to launch an eco-labelled collection, for example on sportswear. This could be combined with an EU sponsorship at a World Championship or Olympic Games.

The professional purchasers could be targeted as well for example by promoting the eco-label on the international textile fairs, press releases etc. Tools, overviews and checklists explaining exactly, what the Flower stands for, compared to other labels like Öko-Tex 100 (what are the additional benefits in choosing the Flower?) could be used in motivating the purchasers. The newly published Guidelines on using EU eco-label criteria in public procurement gives further support for greening the purchase.

A very important supplement for green purchasing is material for retailers to help them promote and advertise for the eco-labelled products. “Visibility” is a keyword, especially in supermarkets and other shops selling a variety of product groups, and in this context, campaigns and awareness raising for a combination of two or more product groups like textile and laundry detergents may work.

2) Awareness campaign targeted towards consumers

Raising the awareness and demand for eco-labelled products is an ultimate requirement and the experiences show that a major effort is needed. There is a huge competition on brands and labels on textiles meaning that only an effort, which can match the big brands as a minimum will have a chance to reach the mass consumers. This calls for an international, joint and co-ordinated effort among authorities, competent bodies, manufacturers, retailers, and organisations.

Campaign elements could be:

- Awareness raising among the consumers through TV-commercials and advertising in newspapers, magazines etc. depending on the chosen target groups. The purpose is to make the Flower known and accepted.
- PR-strategy focusing on life-style and “your choice makes a difference”. The purpose is to support the eco-label as a modern brand. An internationally known and admired model could be used as trend-setter.
- Sponsoring of clothing and other textiles at mega-events like the Olympic Games or World Championships.

- Involve NGO's and support their activities. Green NGO-members should be challenged to show their green attitudes also by buying eco-labelled products to a much larger extent than is the case today.