European Commission

JRC TECHNICAL REPORTS

Revision of the European Ecolabel and Green Public Procurement (GPP) Criteria for Textile Products

TECHNICAL REPORT AND CRITERIA PROPOSALS
Working Document

Nicholas Dodd, Mauro Cordella, Oliver Wolf (JRC-IPTS)
Jakob Waidløw, Mogens Stibolt (Danish Standards Foundation)
Erik Hansen (COWI)

October 2013

Joint Research Centre

European Commission
Joint Research Centre
Institute for Prospective Technological Studies (IPTS)

Contact information
Nicholas Dodd
Address: Joint Research Centre, Edificion EXPO, Calle Inca Garcilaso 3, E-41092 Sevilla, Spain
E-mail: nicholas.dodd@ec.europa.eu
Tel.: +34 954 488 486

http://ipts.jrc.ec.europa.eu/

This publication is a Technical Report by the Joint Research Centre of the European Commission.

Table of contents

1. INTRODUCTION

This document is intended to provide the background information for the revision of the Ecolabel criteria for Textiles and the development of Green Public Procurement (GPP) criteria for this product group. The study has been carried out by the Joint Research Centre's Institute for Prospective Technological Studies (JRC-IPTS) with technical support from the Danish Standards Foundation (DS) and COWI. The work is being developed for the European Commission's Directorate General for the Environment.

The main purpose of this document is to evaluate the current criteria and discuss if the criteria are still relevant or should be revised, restructured or removed. This document is complemented by and informed by the preliminary report, which provides the legislative, market and technical analysis to support the criteria proposals.

For each criterion a table summarising any proposed revisions together with the current criteria is provided. After each table discussions of the rationale for any proposed revisions (or not) to the criterion are presented in chronological date order commencing from the first technical report published in February 2012. Proposals for each subsequent revision of the criteria are presented together with stakeholder feedback from stakeholders and the findings of follow-up research. Together these allow the evolution of each criteria proposal to be traced. The final technical report will bring together the scientific arguments for the proposed new criteria document.

1.1 How the Preliminary Report informs the criteria proposals

The basis of this technical report are the conclusions and recommendations in the preliminary report. The preliminary report sets the framework for the revision and consists of three main chapters which reflect the procedure and methodology for the revision of EU Ecolabel criteria:

- Chapter one provides a **background** for the revision process by:
  - Defining the scope of the criteria revision
  - Summarising the legal framework relevant for the production of textiles,
  - Addressing Commission Statements arising from the 2009 revision
  - Summarising initial stakeholder input to the revision from a questionnaire.

- Chapter two provides updated **market analysis** which brings together:
  - Statistics describing the market for textile products in the EU
  - A summary of eco-innovations by front runners in the industry
  - The market status of the EU Ecolabel textile licenses
  - A summary of other labels and initiatives
- Chapter three provides an up-to-date **technical analysis** which comprises:
  - A review of the findings from two textile product LCA studies
  - .Technical analysis of key environmental issues and industry best practice
  - Discussion of how these issues could be addressed by the criteria revision

This technical report takes the findings from the preliminary report and then discusses all current criteria and how the environmental issues identified can be addressed through criteria revisions. For each criterion consultation questions are listed. Input from stakeholder on these issues is of great importance in formulating the final proposal for a new and updated criteria document.

1.2 The current scope of the EU Ecolabel criteria document for Textile Products

The current scope of the EU Ecolabel criteria document for textile products is defined in article 1 of the Commission Decision of 9 July 2009 'establishing the ecological criteria for the award of the Community Ecolabel for textile products' [Decision 567/2009]. Three categories are defined:

- 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. Mats and rugs are included. Wall to wall floor coverings and wall coverings are excluded;
- Fibres, yarn and fabric (including durable non-woven) intended for use in textile clothing and accessories or interior textiles.

Feedback on the current scope of the label was invited at the beginning of the revision process in the form of a questionnaire sent to registered stakeholders. The

results of the questionnaire and specific comments relating to the scope and definition are presented in section 2 of this report.

The criteria document itself currently consists of a short framework which sets out the objectives of the criteria and provides notes on assessment and verification requirements. The aim of the criteria are described as being:

> *'[the promotion of] the reduction of water pollution related to the key processes throughout the textile manufacturing chain, including fibre production, spinning, weaving, knitting, bleaching, dyeing and finishing.'*

The criteria document consists of forty criteria which are intended to meet this specific aim, together with the aims of the EU Ecolabel Regulation. The forty ecological criteria are divided into three main categories:

1. Textile fibre criteria (9 criteria)
2. Processes and chemicals criteria (24 criteria)
3. Fitness for use criteria (7 criteria)

The detailed criteria under each category are listed in table 1.1. Application of the first set of criteria is determined by the form of textile fibre. Application of the second set of criteria vary depending on the fibre, the processing stages that have been used to produce the finished garment or fabric and the type and application of the garment or fabric. Application of the third set of criteria is generic to all products apart from specific stated exclusions.

Table 1.1: Current textile product Ecolabel criteria according to Decision 2009/567/EC

Textile fibre criteria	1. Acrylic 2. Cotton and other natural cellulosic seed fibres (including kapok) 3. Elastane 4. Flax and other bast fibres (including hemp, jute and ramie) 5. Greasy wool and other keratin fibres (including wool from sheep, camel, alpaca and goat) 6. Man-made cellulose fibres (including viscose, lyocell, acetate, cupro and triacetate) 7. Polyamide 8. Polyester 9. Polypropylene
Processes and chemicals criteria	10. Auxiliaries 11. Biocidal and biostatic products 12. Stripping or depigmentation

	13. Weighting 14. All chemicals and chemical preparations 15. Detergents, fabric softeners and complexing agents 16. Bleaching agents 17. Impurities in dyes: Colour matter with fibre affinity (soluble or insoluble) 18. Impurities in pigments: Colour matter with fibre affinity (soluble or insoluble) 19. Chrome mordant dyeing 20. Metal complex dyes 21. Azo dyes 22. Dyes that are carcinogenic, mutagenic or toxic to reproduction 23. Potentially sensitizing dyes 24. Halogenated carriers for polyester 25. Printing 26. Formaldehyde 27. Wastewater discharges from wet processing 28. Flame retardants 29. Anti felting finishes 30. Fabrics finishes 31. Fillings 32. Coatings, laminates and membranes 33. Energy and water use
Fitness for use criteria	34. Dimensional changes during washing and drying 35. Colour fastness to washing 36. Colour fastness to perspiration (acid, alkaline) 37. Colour fastness to wet rubbing 38. Colour fastness to dry rubbing 39. Colour fastness to light 40. Information appearing on the ecolabel

1.3 The key environmental impacts associated with the product group

Based on the LCA review presented in the preliminary report the overall findings indicate that the fibre production phase, followed by the use phase, are associated with the most significant environmental impacts during the life cycle of textile products. The specific environmental 'hot spots' identified as being of significance were as follows:

- **Cotton production:** The ecotoxicity associated with the production and use of fertilisers and pesticides is the main contributor to both energy consumption and ecotoxicity. The resource impact of water use for irrigation was also highlighted as being significant. A shift to organic cotton should significantly reduce the toxicity profile of products made of cotton, although this would not address water use.
- **Synthetic fibre production** (acrylic, nylon, polyamide, polypropylene): The climate change and ecotoxicity impact of energy and raw material use to manufacture fibres. Nylon and acrylic are the most energy intensive to produce and are technically the most difficult to recycle. The LCA case studies reviewed highlighted how the energy required to produce garments is, to some extent, influenced by fibre blends.
- **Man-made cellulose fibres (viscose):** The climate change and ecotoxicity impact of energy use to manufacture fibres. The LCA case studies reviewed highlighted viscose, which was used as the reference fibre, as being the most energy intensive fibre to produce.
- **Raw material and feedstocks required to manufacture cellulose fibre, soaping agents and softeners.** Timber and bamboo are the predominant sources of raw material for cellulose fibre manufacturing. Palm oil was identified as especially significant as a feedstock for the manufacturing of soaping agents and softeners. Viscose has significantly higher impacts associated with soaping agent and softener use;
- **Process energy and ecotoxicity associated with the fabric formation, finishing and printing and dyeing stages of production.** However, there was conflicting evidence in this area, with one LCA study reaching the conclusion that the effect on ecotoxicity from the production phase for traditional cotton was less significant overall. The scouring stage was highlighted in relation to wool. Dye carriers were highlighted in relation to polyester.
- **Fuel use and climate change impacts associated with shipping and air freight** to distribute products. Although air freight only accounts for a small share of distribution its impacts are proportionally much higher.
- **Energy and ecotoxicity associated with the use phase** of textile products. This primarily relates to washing energy and detergents, and can be influenced by fibre choice and blends.

The findings also highlighted the potential benefits of more sustainable systems of resource use associated with the disposal phase. The allocation of benefits from re-use, recycling and energy recovery was an area specifically highlighted.

A number of environmental issues currently addressed by the EU Ecolabel criteria were not specifically highlighted by the LCA findings as being significant overall. These included flame retardants, dyes and plasticizers. To some extent this may have been due to the exclusion and substitution of the most hazardous substances from the LCA analysis. Nanotechnology was also identified as a new area of focus for which limited data and evidence currently exists for the potential environmental impacts. However, evidence suggests that a precautionary approach may be justified for some specific functional applications.

1.4 The proposed framework for the revision

Based on the discussion in the Preliminary Report a framework has been proposed for the criteria revision. This framework proposes five themes that are intended to inform our approach to the revision:

1. Focussed technical updates: *based on BREF and technical evidence review*
2. Improved whole life scope: *based on a fibre and product LCA review*
3. Reflect product best practice: *based on eco-innovation by manufacturers, retailers and brands*
4. Explore options for label and initiative harmonisation: *based on a review of state, NGO and private label scheme criteria*
5. Improve focus on opportunities in target market segments: *based on textile label, public procurement consumer and industry priorities*

It is currently suggested to keep the overall structure and approach of the existing criteria document and not to split the criteria by market segment.

The suggestion is to improve in the documentation the weight of the proposed criteria by ensuring that the issues highlighted as environmental 'hot spots' have the strictest criteria based on industry best practice. In seeking to do this a number of criteria revisions and new criteria proposals are proposed. For other relevant issues not listed as 'hot spots' relevant criteria would be set but based more on an industry average. It is also to be considered whether all the criteria should be retained.

It is also recommended to discuss harmonisation with other labels or schemes in order to reposition the EU ecolabel within the market and to lower the administrative

burden for both applicants and Competent Bodies. Keeping in mind that harmonisation will have both pros and cons which are to be discussed.

The readability of the document as well options to streamline and focus the assessment and verification element are also recommended to be in focus – again in order to streamline and lighten the application process. The new criteria dealing with hazardous substances may also provide a new way of thinking about the structure of the criterion – for example, in order to highlight criteria that relate to processes and criteria that relate to finished product.

The main focus and the most selective criteria shall be the textile fibre criteria. Here an in-depth revision is necessary, especially for the criteria for cotton, man-made cellulose fibres and man-made synthetic fibres.

With regards to the process and chemical criteria the focus shall be on updating the criteria in relation to REACH, the Ecolabel Regulation and BAT and to analyse the possibility to harmonise with other labels or schemes. The latter being a significant consideration in relation to managing the administrative burden for Competent Bodies.

Several new areas for developing criteria have been proposed. They are relevant either from an environmental point of view or because of market expectations. It has to be discussed whether it is possible to develop criteria in these areas and if it is feasible taken into account the improvement potential and the ability of both applicants and Competent bodies to verify compliance.

2. PRODUCT GROUP DEFINITION

Major proposed changes	○ Improved specification of consumer facing textile products highlighted by the market analysis. ○ Specific reference to the most significant clothing products as identified by IMPRO Textiles. ○ Specific references to knitted textiles in addition to fabrics, as well as to upholstery fabrics and accessories. ○ Harmonisation of the % weight threshold with Regulation (EC) 1007/2011 on textile names. ○ Identification of specific exclusions for medical devices, single use products, wall and floor coverings, and fabric that forms part of structures intended for outdoors.
Present criterion, Decision 2009/567	
The product group "textile products" shall comprise: - **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. Mats and rugs are included. Wall to wall floor coverings and wall coverings are excluded; - **Fibres, yarn and fabric**: intended for use in textile clothing and accessories or interior textiles. This product group will not include textiles treated with biocidal products, except where those biocidal products are included in Annex IA to Directive 98/8/EC of the European Parliament and of the Council (1), where this substance confers to the textiles additional properties directly aiming at protecting human health (e.g. biocidal products added to textile nets and clothing to repel mosquitoes and fleas, mites or allergens) and where the active substance is authorised for the use in question according to Annex V to Directive 98/8/EC. 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.

AHWG1 technical discussion

Here we present the initial background research and argumentation circulated in advance of the first ad-hoc working group meeting in February 2012.

Initial feedback from the stakeholder questionnaire was that in general the scope remains relevant and adequate but that some issues should be clarified:

1. Points from the Competent Body forum should be addressed, eg which product categories are included (single use products, hessian cloth – intermediate product, textiles for outdoor use)
2. Define filling materials more clearly and also take the 90% calculation into account – what is not included in the calculation?
3. Define end products and intermediate products (which are not included in the scope)
4. Define whether B2B products are included, including those produced by spinners, dyers and textiles finishers
5. Define “smart textiles” and textiles containing electronics and how/whether they shall be included.

Single use products such as those used for surgical applications are not currently included. This has been discussed among the Competent Bodies and in order to provide clarification to applicants these have been noted as being excluded. These products have very specific quality requirements that may necessitate exclusions from certain criteria.

Likewise for textiles for use in outdoor structures. These are not covered by the criteria and cannot easily be included. The reasoning is that the fitness for use criteria might not be relevant for these kinds of products. They may also require additional fabric materials to be introduced into the criteria.

Regarding fillings it was noted that the means of calculating the percentage should be made clearer and that fillings made of fibres mentioned in the criteria document shall also fulfill the relevant fibre criteria. Both of these points have now been added.

Smart textiles and electronic textiles are two new areas highlighted by stakeholders for consideration. No specific definition is currently provided in the criteria document for these two product types. However, the textile fibre criteria that would allow for

either product to be included if they constituted less that 15% of the fibre content and if the electronic components constituted less than 10% of the total weight of the product.

Smart textiles have been defined as *functional textiles with engineered properties*. If required a possible definition could be:

> *Textiles that can sense and react to changes in the environment, such as changes from mechanical , thermal, chemical, magnetic and other sources.*

The product may therefore contain substances such as phase change materials or treatments designed to fulfill these functions. These substances may therefore require further consideration in terms of their composition and their impact on the ability to recycle the textile at the end of its life.

Textiles containing electronics – so-called e-textiles - can take a number of different forms. They can include the integration of whole devices such as mobile phones, the interweaving of circuitry and cabling into fabric components or the use of yarns and fabrics with specific electrical properties e.g. solar photovoltaic, transistors.

The inclusion of sub suppliers like spinners, dyers and fibre manufacturers has been discussed among Competent Bodies. The advantage would be that if these steps in the product chain have their own license it would be much easier for the end producer or a retailer to choose the right sub suppliers. Today a sub supplier to a license holder is confidential like other parts of the application. For some sub suppliers it could be attractive to have their own license (B2B). But on the other hand some license holders may wish to keep their sub suppliers confidential as they may be regarded as a trade secret.

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

It was requested by stakeholders that the 90% threshold be lowered to 75-80% in order to reflect the composition of garments such as suits, which incorporate linings and paddings to increase weight and definition.

The ecolabel should apply to different parts of the supply chain and these require clearer definition. The ecolabel should assist producers in sourcing/identifying ecolabelled fibres and fabrics. In seeking to do this it should aim for consistency with other labels/standards e.g. GOTS, GRS, Oeko-tex 1000.

The scope should focus on the end-use for products. Furniture fabrics should be kept within the scope. Specialist technical fibres should be addressed – although criteria in this area may require more detailed analysis and may be more relevant to GPP (e.g. firefighting, military). E-textile electronic elements are best addressed by the WEEE rules as they are a separate supply chain. Professional cleaning products should be addressed but clarification is needed and specific criteria may be required – particularly for micro-fibre products. The fitness for use criteria would also then require revising.

Consideration should be given to accessories such as buttons and closings that may contain elements such as nickel that can be allergens.

Follow-up research and proposed response

In order to better focus the criteria on end-products the definitions for clothing and interior textiles have been revised to reflect the most significant products on the EU market. In response to requests furniture fabrics (upholstery) have been specifically referred to.

A number of comments were received questioning the practicalities of extending the scope to cleaning products. For example, the Nordic Swan criteria for fabric cleaning products contains four additional fitness for use criteria specifically required for this

product group [1]. In response to these concerns, and in order to retain the focus on the most important products on the EU market, it is therefore proposed to exclude cleaning products.

With regard to the request for B2B products to be able to be hold the Ecolabel the current definition, which specifically covers *fibres, yarn and fabric*, is considered to address this issue as far as products are concerned. It may be possible to add wording that would enable other sub-suppliers of processes and treatments such as dyeing and finishing that comply with relevant parts of the criteria but these would not then relate to a specific product. This topic is therefore proposed for further discussion at the 2nd AHWG in order to establish the practicalities of how processes might be licensed and information about them would be shared between Member States.

In order to check and verify the possible composition of a complex textile product a typical mens suit was taken used as an example. A technical paper examining the different constituent elements of example suits was reviewed [2]. The typical materials used to manufacturer interlinings and padding were then also checked using web-based listings of fabric products [3].

Our finding was that in many cases these elements of the suit are manufactured from a combination of cotton, viscose and polyester in woven and non-woven forms. This suggests that the 90% threshold would not exclude a typical suit and that in fact it would ensure that a high proportion of the materials are addressed by the Ecolabel criteria. However, in order to provide some additional accommodation for variations in product composition it is proposed to reduce the composition to 85%, which would align with Directive 2008/121/EC on textile names [4]. Specific reference has also been made to these components, which may also form part of interior products such as curtains, in the product scope and definition.

---

[1] Nordic Ecolabelling, *Fabric cleaning products containing microfibers*, Version 2.0, October 2010

[2] Gam.H.J, Gau.H, Bennett.J, Helmkamp.C. and C.Farr, Application of design for disassembly to a men's jacket, International Journal of Clothing Science and Technology, Vol 23, p 83-94, 2011

[3] Alibaba, Accessed 2012, *Product search results for 'suit shoulder pad'*, http://www.alibaba.com/showroom/suit-shoulder-pad.html

[4] European Parliament and the Council of the European Union, *Directive 2008/121/EC of the European Parliament and of the Council of 14 January 2009 on textile names (recast)*, Official Journal L 019 , 23/01/2009 P. 0029 - 0048

The preliminary report briefly reviewed the emerging market for smart and e-textiles and literature making an early assessment of environmental issues that may arise from their increased use [5]. They are both currently considered to be niche products. Significant potential problems were highlighted in relation to the end of life phase, with the miniaturised and integrated metal components posing problems for recycling. On this basis it is therefore proposed to exclude them from the scope of the product group.

Following further consideration it is proposed not to add specific criteria for accessories. The EDIPTEX LCA study considered accessories within the scope of the analysis and came to the conclusion that they are not a significant area of focus for improvement. Introducing additional environmental criteria would not therefore bring minimal benefit to the product group. Stakeholders main concern appeared to relare to phthalates that may be contained in plastics and potential skin allergens such as nickel and chrome. It is therefore proposed that accessories are addressed within the scope of the proposed new Criteria 11 Restricted Substance List, with a focus on plastic and metal components.

The text excluding biocides is considered to be too technically specific for the product definition. It is therefore proposed to incorporate the biocide exclusion into the new Criteria 11 Restricted Substance List.

Revised criteria proposal v1, September 2012

The product group "textile products" shall comprise:

- **Textile clothing and fabric accessories**: Clothing (defined as tops, underwear, nightwear, hosiery, bottoms, jackets, dresses, suits, sports and swimwear and gloves) and fabric accessories (defined as ties, handkerchiefs, shawls, scarves and bags) consisting of at least 90% by weight of textile fibres;
- **Interior textiles**: Textile products for interior use (defined as curtains, bed linen, table linen, towels, blankets, throws, mats and rugs) consisting of at least 90% by weight of textile fibres.
- **Fibres, yarn and fabric**: Intended for use in textile clothing and fabric accessories and interior textiles, to include upholstery fabric prior to the application of backings and treatments associated with the final product.

For 'textile clothing and fabric accessories' and for 'interior textiles': Down, feathers or

[5] Köhler.A.R, Hilty.L.M. and C.Bakker, *Prospective impacts of electronic textiles on recycling and disposal*, Journal of Industrial Ecology, Vol 15 (4), p496-511

synthetic materials not covered by this document need not be taken into account in the calculation of the percentage of textile fibre. Membranes and coatings need not be taken into account in the calculation of the percentage of textile fibres. Fillings, linings and padding made of fibres covered by this document shall be taken into account in the calculation of the percentage of textile fibres and shall also fulfil the relevant fibre criteria.

Filling materials that are not made from textile fibres should still comply with restrictions listed in Criterion 11 that relate to auxiliaries, surfactants, biocides and formaldehyde.

The following products are not covered by these criteria:

- Medical devices
- Single use products
- Wall and floor coverings (Please see the EU Commission Decision 2009/967/EC for textile floor coverings)
- Fabrics that form part of structures intended for use outdoors (such as banners and tents)
- Garments, fabrics and fibres that contain electrical devices or which form an integral part of electrical circuitry

Garments, fabrics and fibres that contain devices or impregnated substances designed to sense or react to changes in ambient conditions

AHWG2 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

It was clarified that the Textile Names Directive 121/2008 was repealed in May 2012 and a new definition of 80% introduced.

Synthetic material not covered within the scope of the criteria requires further consideration. The Nordic Swan sets thresholds for membranes and coatings of 20%. All of other materials could be set at a limit of 15%.

It was noted by one stakeholder that the barrier to applicants wishing to label a complex product with linings and paddings was not so much related to the 90% textile content threshold but to the 85% threshold for compliance with the fibre criteria.

The inclusion/exclusion of a number of products requires clarification so that stakeholders can be consulted e.g. cleaning products, bags, rucksacks. It was also suggested that it may be better to introduce the list of products 'such as…' rather than a definitive list 'defined as…'

It was queried as to why products such as tents should not be included if they met all the criteria and as to whether the definition of electrical devices should include fibres as an application was not known to exist.

Follow-up research and proposed approach

The Regulation (EC) 1007/2011 on textile fibre names and related labelling and marking of the fibre composition of textile products was briefly reviewed. This confirmed that a threshold of 80% textile content is used within the common market. It therefore seems appropriate to align the criteria with this threshold. This would restrict the content by weight of other materials such as membranes and coatings to less than 20%, in-line with stakeholder proposals.

The issue with regard to the weight threshold and complex products is discussed further in Section 4.1 where corresponding revisions are proposed to the fibre compliance threshold.

With regard to fibres with electrical properties this form of fibre is understood to exist based on a previously cited article on electronic textile waste [6].

[6] see Köhler.A.R, et al

AHWG3 stakeholder feedback and final proposals

Here we present a summary of feedback received following the extra-ordinary ad-hoc working group in Brussels on the 23rd April 2013, together with a brief outline of the final criteria proposal.

Stakeholder feedback

Concern was raised about the exclusion of cleaning products from the scope. A number of cleaning products are currently licensed. A tailored set of fitness for use criteria relating to washing resistance were proposed for consideration.

It is proposed to insert a specific clause stating that only specific fibres for which there are criteria can be awarded the Ecolabel.

On the other hand a Member State requested re-introduction of the clause allowing fibre for which no fibre-specific criteria are set. Without this clause a number of different types of fibres that may be relevant to GPP would be excluded such as aramid fibres.

Follow-up response and final proposal

Inclusion of cleaning products

Cleaning products carry out specific functions to which specific fitness for use criteria would apply. A review of the Nordic Swan criteria for fabric cleaning products, which has four criteria, confirms this.

Evidence from leading brands such as Vileda suggests that an additional sub-criterion on absorbence would be required in addition to washing resistance in order to create a meaningful criteria. A proposal was therefore developed with the input of a CB and a new criteria addressing wash resistance and absorbence has been drafted and inserted into the criteria document.

Addressing fibre with no ecological criteria

The clause relating to fibre with no criteria was deleted earlier in the revision process because of a consensus view that it would allow fibres with no environmental criteria to be used in an Ecolabelled product. This was not a position that could be accepted by most stakeholders. Moreover, comprehensive LCA evidence was not forthcoming for technical fibres such as silk and aramid.

It is therefore proposed to restrict the definition of 'textile fibres' to those with ecological criteria. In order to clarify this further the list of fibres for which there are ecological criteria has been copied into Article 1 which defines the scope.

3. Assessment and Verification Requirements

Major proposed changes	○ A requirement is to be added for accredited laboratories to preferentially be used. ○ A requirement is to be added for certification systems to reflect the guidance in ISO 17065 ○ A summary of the assessment and verification requirements and information sources has been added to support applicants
Present criterion, Decision 2009/567	
The specific assessment and verification requirements are indicated within each criterion. Where the applicant is required to provide declarations, documentation, analyses, test reports or other evidence to show compliance with the criteria, it is understood that these may originate from the applicant and/or his supplier(s) and/or their supplier(s), etc., as appropriate. Where appropriate, test methods other than those indicated for each criterion may be used if their equivalence is accepted by the Competent Body assessing the application. The functional unit, to which inputs and outputs should be related, is 1 kg of textile product at normal conditions (65 % RH ± 4 % and 20 °C ± 2 °C; these norm conditions are specified in ISO 139 Textiles — standard atmospheres for conditioning and testing). Where appropriate, Competent Bodies may require supporting documentation and may carry out independent verifications. The Competent Bodies are recommended to take into account the implementation of recognised environmental management schemes, such as EMAS or ISO 14001, when assessing applications and monitoring compliance with the criteria (*note*: it is not required to implement such management schemes).	

AHWG1 follow-up research and proposed approach

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

As was highlighted by the Preliminary Report the textile industry is increasingly using certificates as a means of verifying the chain of custody for raw materials. To ensure that certification systems provide consistent third party verification it is proposed that certification systems are required to be in conformity with international standards.

This step would ensure that certifications can provide verification that is in conformity with the EU Ecolabel's requirement for independent third party verification as stated by the EU Ecolabel Regulation:

> *'Competent bodies shall ensure that the verification process is carried out in a consistent, neutral and reliable manner by a party independent from the operator being verified, based on international, European or national standards and procedures concerning bodies operating product-certification schemes.'*

Compliance with ISO/IEC Guide 65 'General requirements for bodies operating certification systems' would provide a level of assurance that certification is made by a third party that has been trained to assess the criteria in a consistent way and that there is sufficient due diligence and quality assurance by accreditation bodies (who Competent Bodies would rely on to issue certificates).

Revised criteria proposal v1, September 2012
The specific assessment and verification requirements are indicated within each criterion. Where the applicant is required to provide declarations, documentation, analyses, test reports or other evidence to show compliance with the criteria, it is understood that these may originate from the applicant and/or his supplier(s) and/or their supplier(s), etc., as appropriate. Where appropriate, test methods other than those indicated for each criterion may be used if their equivalence is accepted by the Competent Body assessing the application. The functional unit, to which inputs and outputs should be related, is 1 kg of textile product at normal conditions (65 % RH ± 4 % and 20 °C ± 2 °C; these norm conditions are specified in ISO 139 Textiles — standard atmospheres for conditioning and testing). Where appropriate, Competent Bodies may require supporting documentation and may carry out independent verifications. The Competent Bodies are recommended to take into account the implementation of

recognised environmental management schemes, such as EMAS or ISO 14001, when assessing applications and monitoring compliance with the criteria (*note*: it is not required to implement such management schemes).

Where the applicant uses a certification system to provide third party verifications the chosen system and any associated accreditation of verifiers should be in conformance with the criteria contained within ISO/EIC Guide 65.

AHWG2 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

It was considered challenging and difficult for Competent Bodies to verify this requirement to the level stated in the proposal. A simple declaration would be the best option.

This would require mutual recognition of certification schemes. The only thing that could be possible is to accept accredited certification bodies, which could be listed in the criteria in order to leave no doubt, but then this list would need to be maintained.

It was stated that it would be easy to check the status of the certification body as it will be written on any certification issued by them.

It was stated that the ISO/IEC Guide 65 has been replaced by a new ISO standard 17065.

AHWG3 stakeholder feedback and final proposals

Article 3 was not specifically discussed at the AHWG3. Limited further written comments were received.

Follow-up response and final proposal

The discussions at AHWG3 relating to criteria 13 and 14 suggested that new text was required providing an overview of the assessment and verification requirements for the different sub-sections of criteria – fibre, components and accesories,

chemicals and processes, fitness for use, CSR – with brief identification of what information and from where applicants shall obtain in support of applications.

A general point has also been added to Article 3 that where there are changes in suppliers or production sites then licenseholders should provide CB's with updated verifications. Text has also been added highlighting the ongoing testing requirements of Criteria 13, the Restricted Substance List.

4. CURRENT CRITERIA AND PROPOSED CHANGES

In this section each of the criteria in the current criteria document (Decision 567/2009) are evaluated and, where considered necessary, proposals for revisions or new criterion are made.

To give a better view of any proposed changes a tabular form has been used. This format is used to highlight the major changes proposed followed by the current criterion with the new proposal next to it in order to be able to make a direct comparison. An example of the format we have used is presented below.

Subject to discussion with stakeholders, it is currently the intention to follow the same broad structure as in Decision 567/2009 with the proposed addition of one new criteria area:

- Textile Fibre Criteria
- Process and Chemical Criteria
- Fitness For Use Criteria
- Social Responsibility, Product Use and End of Life Criteria

Under these headings changes in the ordering and arrangement of the criteria in order to improve clarity and to reflect the nature of the proposed criteria revisions are proposed. These are described later in the report.

EXAMPLE STRUCTURE OF EACH CRITERIA PROPOSAL

Major proposed changes *A brief summary of the major proposed changes to the criterion are presented here*

Present criterion, Decision 2009/567
The text of the current criterion as published in the product group Decision is provided here as a point of reference.

AHWG1 technical discussion

Here the technical analysis and arguments put forward at the 1st AHWG to support proposals for criteria revisions are presented and discussed.

Stakeholder feedback
Here a summary is provided of the feedback provided by stakeholders at the AHWG and in written form.

Follow-up research and proposed approach

Here the findings of follow-up research carried out subsequent to the first draft of the technical report and the 1st AHWG and in response to stakeholder feedback is summarised and discussed.

A summary of feedback received from stakeholders is briefly presented alongside the findings. This brings together feedback from the 1st AHWG and subsequent written submissions.

Proposal:

Here proposals for how the criteria should be further revised are presented one by one for each technical issue

4.1 TEXTILE FIBRE CRITERIA

Major proposed revisions	○ Clearer presentation and grouping of the fibre types ○ Removal of the 85% weight threshold for recycled content
Present text, Decision 2009/567	
Fibre-specific criteria are set in this section for acrylic, cotton and other natural cellulosic seed fibres, elastane, flax and other bast fibres, greasy wool and other keratin fibres, man-made cellulose fibres, polyamide, polyester and polypropylene. Other fibres for which no fibre specific criteria are set are also allowed, with the exception of mineral fibres, glass fibres, metal fibres, carbon fibres and other inorganic fibres. The criteria set in this section for a given fibre-type need not be met if that fibre contributes to less than 5 % of the total weight of the textile fibres in the product. Similarly they need not be met if the fibres are of recycled origin. In this context, recycled fibres are defined as fibres originating only from cuttings from textile and clothing manufacturers or from post-consumer waste (textile or otherwise). Nevertheless, at least 85 % by weight of all fibres in the product must be either in compliance with the corresponding fibre-specific criteria, if any, or of recycled origin. *Assessment and verification:* The applicant shall supply detailed information as to the composition of the textile product.	

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

The main feedback received was that the text allowing *'other fibres for which no fibre specific criteria are set'* to be awarded the label should be deleted and for consideration of the inclusion of specialist technical fibres related to public procurement.

A major industry stakeholder considered the 85% threshold for recycled content to be too high as an incentive, suggesting that 50% was more achievable – particularly for blends – and that it would work to incentivise the industry.

Specialist technical fibres should be addressed – although criteria in this area may require more detailed analysis and may be more relevant to GPP (e.g. firefighting, military).

Follow-up research and proposed response

The current criteria are currently listed in alphabetical order. In order to make them clearer and more distinguishable it is proposed to group them into three more commonly understood categories – natural, synthetic and regenerated. It is also proposed that regenerated cellulose fibres are reduced in scope to better reflect the most common fibres used in clothing and interior textiles – namely viscose, modal, cupro and lyocell (see Fibre Criteria 6). Acetate is not understood to be generally used as the basis for clothing or interior textiles.

The text highlighted by stakeholders relating to fibre with no criteria is proposed for deletion. This is because at the moment this allows fibres for which no scientific evidence may exist of their environmental impacts to acquire the Ecolabel.

Meta-aramids are proposed to be investigated for GPP but are not proposed at this stage to be added as an EU Ecolabel fibre. Meta-aramids are high strength, heat resistant synthetic fibres which are an aromatic form of polyamide. Their name is derived from the meta amide linkages between fibres which give them their strength. They are a specialist technical fibre commonly used in the manufacturing of personal protective equipment for emergency services and the military. Global production in 2009 amounted to just 64,000 tonnes, dominated largely by Dupont (USA) and Teijin (Japan) [7]. They are therefore of particular relevance to GPP criteria but appear to be less significant for the EU Ecolabel.

[7] Oerlikon, *The fibre year 2009/10 – A world survey on textiles and non-wovens industry*, May 2010

Revised criteria proposal v1, September 2012
Fibre-specific criteria are set in this section for the following fibre types: - Natural fibres: Cotton and other natural cellulosic seed fibres, flax and other bast fibres, greasy wool and other keratin fibres; - Synthetic fibres: Acrylic, elastane, polyamide, polyester and polypropylene; - Man-made cellulose fibres: Cupro, lyocell, modal and viscose.. The criteria set in this section for a given fibre-type need not be met if a fibre contributes to less than 5% of the total weight of the textile fibres in the product. However, at least 85% by weight of the whole product must be in compliance with the criteria. These criteria do not have to be met if the product contains fibres that are of recycled origin constituting at least 70% by weight of all fibres in the product. In this context, recycled fibres are defined as fibres originating only from cuttings from textile and clothing manufacturers (post-industrial waste) or from post-consumer waste (textile or otherwise). *Assessment and verification:* The applicant shall supply detailed information as to the composition of the textile product.

AHWG2 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

It was queried as to why silk does not have criteria. It is becoming more important for high quality products in combination with other fibres.

It was also queried as to why aramid fibre, which typically has applications such as fire service and military, should not be included.

It was noted by one stakeholder that the 85% threshold for compliance with the fibre criteria is a barrier to more complex products such as suits becoming ecolabelled. The revised proposal does not address this issue because typically linings and paddings cannot currently be commercially sourced to meet the Ecolabel's specifications.

Follow-up research and proposed approach

Literature review for silk LCA

A literature search was carried out for LCA evidence relating to silk production. No LCA studies could be found, either within studies that had already been reviewed for the preliminary report or in the form of standalone LCA studies. Whilst the IMPRO Textiles study includes silk within the results, a closer review of the assumptions reveals that no data could be sourced by the author for the raw material production phase.

The only credible reference point for criteria development that could be found and which may become available within the timeframe of the revision is an LCA study which commences January 2013 in the UK. Funded by the UK Government the university spin-out company Oxford Biomaterials will be carrying out an LCA study of the production phase [8].

Proposal:

[8] Professor Fritz Vollrath, Oxford Biomaterials, Personal communication, November 2012

Given the lack of an LCA evidence base for the environmental impact of silk it is proposed to exclude silk from this revision. Early indications from the Oxford Biomaterials study are that a criteria will be required because of the potential for very high embodied energy. It is understood that upon the time of the next revision full LCA evidence should be available.

Determining the threshold for compliance with fibre criteria

A concern was raised in relation to the ability of complex products such as a mens suit to practically comply with the 85% threshold. This is understood to be because components such as linings and paddings that might generally amount to less than 20-25% of the garment weight are not commercially available to Ecolabel specifications.

Whilst recent high profile product launches such as Marks & Spencers 'worlds most sustainable suit' in the UK demonstrate that it is possible for a suit to meet the (new proposed) criteria, for example through the use of recycled polyester components [9], these tend to be pioneering products with limited production runs (in the case of Marks & Spencers 500 units).

Filling materials are understood to be more readily available in a high recycled content specification. Polyester fillings with 100% recycled content and of a specification used for products such as duvets and jackets are readily available from major European staple polyester manufacturers such as Wellman International [10].

Revised proposal:

On this basis it is proposed to exclude linings and padding from having to meet the fibre criteria. Fillings materials manufactured from fibres covered by the criteria would still be included. It is proposed that all filling materials are manufactured from 100% recycled content.

On this basis it is also proposed to remove the reference to an 85% threshold. This is not considered to be necessary because with linings and padding excluded a greater proportion of the textile fibres should therefore then be compliant.

[9] Marks & Spencer, *M&S unveils the 'world's most sustainable suit'*. 19th June 2012.

[10] Wellman International, Accessed in February 2013, http://www.wellman-intl.com/sustainability.aspx

AHWG3 stakeholder feedback and final proposals

Here we present a summary of feedback received following the extra-ordinary ad-hoc working group in Brussels on the 23rd April 2013, together with a brief outline of the final criteria proposal.

Stakeholder feedback

The definition of recycled fibres should be clarified to recognise that fibres and their feedstocks may be obtained from a range of different sources, textile or otherwise.

Concern was raised by a range of Member States that the applicant should guarantee the absence of SVHC with traceability of the material guaranteed. This could be carried out through a supplier declaration or carrying out a spot check test (i.e. test method).

Follow-up response and final proposal

Assessment/verification text has been added accordingly requiring traceability for recycled content - 'Where required by Criteria 13 declarations and laboratory testing results shall be provided by fibre manufacturers and feedstock suppliers' - and linking to the testing requirement in criteria 13. Text has also been added recognising and defining possible pre and post consumer waste sources.

CURRENT CRITERION 1: ACRYLIC

Major proposed changes	○ No proposed change to the criteria
Present criterion, Decision 2009/567	
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 1 g/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.	

AHWG1 technical background

Here we present the initial background research and argumentation circulated in advance of the first ad-hoc working group meeting in February 2012.

It is suggested based on the LCA findings to include a criterion for process energy consumption or the content of reused material. The LCA findings also highlighted the significance of water-based emissions contributing to aquatic toxicity and resource consumption associated with raw material use. These points were identified as being important areas of potential environmental improvement in the preliminary report.

Process energy benchmarks published by Plastics Europe were presented and discussed in section 3.3.2 of the preliminary report [11]. Further evidence is therefore required as to the environmental benefits of acrylic recycling to produce textile fibres and as to its technical viability and market acceptability as an option.

[11] Plastics Europe, Eco-profiles of the European Plastics Industry – Acrylonitrile, March 2005

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

Limited feedback was received in relation to this fibre criteria. Those that provided feedback highlighted the potential difficulty of applying energy benchmarks and the need to understand the market availability of fibre with a recycled content. The high level of regulation of EU man-made fibre manufacturing means that plant perform to a comparable and high level of efficiency.

One stakeholder emphasised that currently no acrylic fibres are ecolabelled and that the industry and Competent Bodies have experienced difficulty sourcing ecolabelled fibres. The ability of industry to meet the criteria therefore requires reviewing.

Follow-up research and proposed response

Process energy benchmarking

With regard to energy benchmarking the IPPC BREF documents were investigated as a main point of reference. Fibre production is not addressed by the BREF for polymers [12]. The most recent BREF for large volume organic chemicals addresses the production of Acrylonitrile – the copolymer used to polymerise acrylic fibres [13]. The BREF notes that the production process is highly exothermic and that most sites are net steam exporters. The balance of energy recovery is, however, site specific because of the different possible configurations of plant.

The development of CO_2 (rather than primary energy) benchmarks for a number of synthetic fibre polymer feedstocks, including acrylonitrile, were proposed for inclusion within the EU Emission Trading Scheme 2013-2020 [14]. These were not developed

[12] European Commission, Reference document on Best Available Techniques in the production of polymers, IPPC Bureau, August 2007

[13] European Commission, Reference document on Best Available Techniques in the large volume organic chemical industry, IPPC Bureau, February 2003

[14] Ecorys, Fraunhofer ISI & Øko-Institut, Methodology for the free allocation of emission allowances in the EU ETS post 2012 – Select report for the chemical industry, November 2009

further as they were not considered significant relative to other bulk chemical production processes.

Findings:

There is currently no suitable independent reference point for an energy or CO_2 benchmark criteria for acrylic fibre production.

Reference to polymer BAT for acrilonitrile production

As an alternative, BAT processes for acrylonitrile production could be used to inform the criteria. Production of acrilonitrile accounts for 48% of the process energy consumed in manufacturing the fibres [15]. The most significant environmental improvements identified as BAT relate to:

- Optimisation of the catalyst used;
- The conversion of waste outputs from the process into saleable by-products;
- and the biotreatment of wastewater.

This finding is supported by a peer reviewed LCA study of an acrylonitrile plant redesign [16]. These BAT measures would address the energy and wastewater related impacts of acrylic fibres, including the minimisation of upstream impacts associated with propylene production.

Findings:

These options are considered to be overly complex to trace and verify for acrylic fibres, particularly in the light of stakeholder concerns about being able to obtain ecolabelled acrylic fibres.

Minimum recycled content

Whilst acrylic with a recycled content is available on the global market there is limited information as to its availability and technical qualities. As an environmental

[15] Danish Environmental Protection Agency (1997) *Environmental assessment of textiles*, Environmental project number 239,

[16] Morales-Mora.M.A., Rosa-Dominguez.E., Suppen-Reynaga.N. & S.A, Martinez-Delgadillo, Environmental and eco-costs life cycle assessment of an acrylonitrile process by capacity enlargement in Mexico, Process safety and environmental protection, 90 (2012) 27–37

improvement option acrylic with a recycled content does not yet appear to have attracted significant attention from industry or to be readily available enough to warrant a minimum % recycled content criteria.

Findings:

It is not possible during this revision to consider a recycled content requirement for acrylic fibres.

AHWG2 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Feedback from stakeholders

No further feedback was received in relation to this fibre.

Summary of the final criteria proposal

A criterion is to be added reflecting the derogation conditions for the Candidate List substance N,N-dimethylacetamide (127-19-5) which is used during the manufacture of acrylic fibres and may remain on the final product at low concentrations. The new criterion sets an Occupational Exposure Limit Value (IOELV) of 10.0 ppm during fibre polymerisation and spinning.

CURRENT CRITERION 2: COTTON AND OTHER NATURAL CELLULOSIC SEED FIBRES (INCLUDING KAPOK)

Major proposed changes	○ Updates to the pesticide safeguard list to better reflect hazardous and commonly used substances ○ A minimum requirement for *either* 20% Integrated Pest Management (IPM) cotton + pesticide testing *or* 10% organic cotton content ○ A higher organic cotton requirement of 95% for specified products. ○ Conventional and/or IPM cotton combined with organic cotton shall be GM-free ○ A requirement for the certification of IPM cotton by specified certification schemes (or their equivalent) ○ Exemption of IPM cotton from pesticide testing under specific conditions ○ A requirement for traceability of IPM and organic cotton until at least the unfinished greige fabric stage.
Present criterion, Decision 2009/567	
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 test should be made on raw cotton, before it comes through any wet treatment, for each lot of cotton or two times a year if more than two lots of cotton per year are received. 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 of 24	

June 1991 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs (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 at least 95% of the cotton in one product 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 Regulation (EEC) No 2092/91 the applicant may place the mention 'organic cotton' next to the eco-label. Between 70% and 95% it may be labelled "made with xy% organic cotton").

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).

A minimum of 3% of organic 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 Regulation (EEC) N°2092/91 have to be used on an annual basis. The applicant shall provide :

- Information about the certification body,
- A declaration stating the proportion of certified cotton used in the total production of textiles on a yearly basis

The competent body may request the submission of further documentation to enable it to assess whether the requirements of the standard and certification system have been fulfilled.

AHWG1 technical discussion

Here we present the initial background research and argumentation circulated in advance of the first ad-hoc working group meeting in February 2012.

The current criterion focuses on the growing of cotton using methods that minimise or eliminate pesticide use. A number of revisions are proposed based on industry best practice and evidence which suggests that the potential for environmental improvement could be significantly greater:

- Organic cotton: It is proposed to increase the minimum proportion of certified organic fibre content;
- IPM cotton: It is also proposed to recognise Integrated Pesticide Management (IPM) techniques through the introduction of a minimum proportion of certified IPM fibre content. IPM certification routes should also address water use for irrigation;
- Updating of the pesticide list: It is proposed to add a number of substances to the pesticide list. Given the proposed introduction of a minimum % certified IPM content it is proposed that testing against the pesticide list is a requirement alongside compliance with the general principles of IPM production.
- Recycled cotton: The specification of recycled cotton is proposed as an alternative compliance route that would reduce the need for cultivation and reduce the landfilling of textiles.

Below we discuss the technical issues relating to each of these areas of the criterion proposal.

Organic cotton

The environmental benefits of organic cotton relate especially to the avoidance of pesticide use and the avoidance of artificial fertilisers. The use of artificial fertilisers contributes with approximately 106 kg N/ hectare, 63 kg P/hectare (P as P_2O_5) and 64 kg K/ha (K as K_2O)[17]. Artificial fertilisers and pesticides are energy intensive to produce and also contribute to nitrous oxide emissions from soil which mean that conventionally grown cotton also contributes more to the greenhouse effect than organic cotton.

The use of organic cotton results thus in a reduction in the emission of greenhouse gases but the major environmental benefit is the avoidance of the use of pesticides which is good for both the environment and the health of farmers that do not have to

[17] Laursen, S. E., Hansen, J., Knudsen, H. H., Wenzel, H., Larsen, H. F., & Kristensen, F. M. (2007). *EDIPTEX: Environmental assessment of textiles*. Danish Environmental Protection Agency, working report 24

handle the pesticides which, according to studies by the FAO, in some cotton growing regions is carried out without sufficient protection.

The amount of organic cotton production worldwide is still very small. According to the Textile Exchange the global production was less than 1% in 2009 [18]. The biggest producers of organic cotton are India and Turkey and the amount of organic cotton is still increasing. This is largely due to an increasing demand from companies like C&A, H&M, Nike, Adidas and Zara [19].

There are a number of labeling schemes for organic cotton. The most successful labeling schemes for organic cotton appear to be the Textile Exchanges' OE Blended and OE 100% content standards [20] and the International Working Group on Global Organic Textile Standards' GOTS standard [21]. OE blended requires a minimum 5% organic cotton content. GOTS requires a minimum content of 70% organic cotton. The OE standards focus on providing traceability along the supply chain based on transaction certificates. GOTS has a broader focus, with the inclusion of standards that apply to wet processes in the supply chain.

During the revision in 2006-7 organic cotton was discussed which resulted in the current criterion where 3% organic cotton is required. This was a compromise that was decided because most participants wanted a criterion that required organic cotton but most participants agreed that 100% organic cotton was too difficult and would exclude too many products.

Some stakeholders wanted each product made of cotton to contain 3% organic cotton. Others argued that this would be very complicated for the license holders and would make it much more complicated. It was hence decided to require a minimum of 3% organic cotton as an annual average. This criterion has later turned out to be rather challenging to administrate for both license holders and competent bodies.

Since the last revision the OE standards and GOTS have become much more common and global cotton production has increased substantially which has resulted in a boost in the quantity of textiles with certified organic cotton. However, whilst

---

[18] Textile Exchange, *Organic cotton farm and fibre report* 2009/10

[19] Textile Exchange, Organic Cotton press release September 6th 2011

[20] Textile Exchange, *OE Standards*, http://textileexchange.org/content/oe-standards/

[21] International Working Group on Global Organic Textile Standards, *Standard general description*, http://www.global-standard.org/the-standard.html

GOTS has a minimum organic content requirement of 70% the required percentage for the Ecolabel should be determined based on current EU product best practice and taking into account any market constraints to the availability of organic cotton in the EU.

Reducing pesticide use

Cotton is a crop that, as highlighted by the preliminary report's technical analysis, normally requires large quantities of pesticides. It uses approximately 2.5% of the world's cultivated land yet uses 16% of the world's insecticides, more than any other single major crop [22] A study in USA has concluded that the application of pesticides to cotton crops is 3 to 5 times greater per hectare than the application of pesticides to corn in the humid areas of USA [23] .

The current list of excluded pesticides has remained unchanged since the criteria version from 2002. The list was adopted from the Prior Informed Consent (PIC) Procedure which is derived from the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade [24]. This procedure has been accepted by more than 120 member nations of the the FAO (Food and Agricultural Organisation of the UN) and UNEP (United Nations Environment Programme).

Endrin is the only pesticide included within the Ecolabel criterion that is not mentioned in the PIC procedure. Endrin is an organochloride that is not understood to have been used in cotton production in many years. It has been banned in USA since 1986.

Identifying possible additional pesticides using the PIC procedure

The PIC procedure was adopted at the Rotterdam Convention in 1998. The PIC procedure is voluntary - it has been unanimously accepted by member countries to the FAO and UNEP and is supported by the leading chemical industry associations and a variety of non-governmental organisations.

---

[22] EJF. (2007). *The deadly chemicals in cotton. Environmental Justice Foundation in collaboration with Pesticide Action Network UK*: London, UK. ISBN No. 1-904523-10-2

[23] U.S. Geological Survey,http://toxics.usgs.gov/regional/cotton.html

[24] The Prior Informed Consent (PIC) Procedure. http://www.pic.int/Procedures/PICProcedure/tabid/1364/language/en-US/Default.aspx]

The PIC procedure helps participating countries learn more about the characteristics of potentially hazardous chemicals that may be shipped to them. It initiates a decision-making process on the future import of these chemicals by the importing countries themselves, facilitating the dissemination of this decision to other countries, and encourages exporting countries to take measures to ensure that unwanted exports do not occur.

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 may present a hazard under the conditions of use in developing countries, may also be included.

In December 2011 the Annex III of the Rotterdam Convention consisted of 43 chemicals of which 32 are pesticides. The listing from Annex III is presented in table below. The remaining 11 chemicals that are not pesticides are industrial chemicals that are not relevant to this report.

Table 4.1.1 Pesticides from Annex III of the PIC procedure [PIC]

Aldrin	Methyl-parathion
Captafol	Parathion
Chlordane	Phosphamidon
DDT	Alachlor
Dieldrin	Aldicarb
Heptachlor	Binapacryl
Hexachlorobenzene	Dinitro-ortho-cresol (DNOC) and its salts
HCH (mixed isomers)	EDB (1,2-dibromoethane)
2,4,5-T and its salts and esters	Endosulfan
Chlordimeform	Ethylene dichloride
Chlorobenzilate	Ethylene oxide
Dinoseb and its salts and esters	Fluoroacetamide
Monocrotophos	Lindane (gamma-HCH)
Pentachlorophenol and its salts and esters	Mercury compounds
Toxaphene (Camphechlor)	Tributyl tin compounds
Methamidophos	combination of benomyl, carbofuran and thiram

The existing criterion for cotton includes 19 of the 32 pesticides listed on the current PIC-list. Hexachlorocyclohexane (total isomers) in the criterion covers both HCH (mixed isomers) and Lindane (gamma-HCH) on the PIC list. The remaining 13 pesticides from the PIC-list that are not covered by the current criteria document are:

> *Alachlor, Aldicarb, Binapacryl, Dinitro-ortho-cresol (DNOC) and its salts, EDB (1,2-dibromoethane), Endosulfan, Ethylene dichloride, Ethylene oxide, Fluoroacetamide, Mercury compounds, Tributyl tin compounds, combination of benomyl, carbofuran and thiram.*

Of these, four are used mainly for warehouse fumigation. These are 1,2-dibromoethane (EDB), ethylene e dichloride, ethylene oxide and fluoroacetamid. For warehouse fumigation, the use of these substances is often a part of a deferring procedure and seems difficult to substitute. Furthermore the use of the fumigations is not directly linked to the production or handling of eco labelled textiles. For this reason we propose that these four substances should be removed 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) [25] .The references to the use for aerial spraying are however very old, and there is no indication of current use for this purpose. The cost of performing the relevant tests for mercury and its compounds is quite high since a separate test is needed. For these reasons mercury and its compounds are not proposed for this criterion.

Tributyltin compounds have been used in anti-fouling ship paints but have been banned in most countries and have been substituted. It can also been used for conservation purposes but this function is already regulated by the criterion 11 concerning biocides. For these reasons tributyl compounds are not proposed for this criterion.

The remaining pesticides from the PIC procedure: Alachlor, Aldicarb, Binapacryl, Dinitro-ortho-cresol (DNOC) and its salts, Endosulfan, and combination of benomyl, carbofuran and thiram could all be candidates for extension of the criterion based on their relevance to cotton growing.

Managing water consumption for irrigation

The water consumption of cotton production has been raised as an issue because heavy irrigation is sometimes needed. According to the FAO cotton requires 700 to 1300 mm to meet its requirements and the highest water demand is during the flowering period when the leaf area is at its maximum. Approximately 53% of global cotton production is irrigated with the higher yield converting this figure to 73% of production.

Water is added to the crops by both natural sources (rainfall) and artificially (irrigation). The proportion between the two types of sources depends on the time of year and on where the cotton grows. In Egypt the crop water requirement is 1009

[25] Hayes (1982)

mm and almost all is added by irrigation systems whereas in USA the requirement is 516 mm of which 311 mm is from rainfall and irrigation only contributes with 205 mm [26].

Setting requirements for the amount or method of irrigation could possibly reduce the water used but this would require co-operation with the farmers. For conventional cotton it is normally very difficult to trace the cotton back to the individual farmers since the traceability is lost through cotton merchants, ginners and spinners.

Examples of schemes that try to reduce the amount of water used to irrigation are the Better Cotton Initiative and Cotton Made in Africa who both work closely with the farmers in order to help them use less pesticide and water. Helvetas Swiss Intercooperation have also published a guideline called *Irrigation and soil conservation Innovations* that describes how irrigation systems can be improved [27].

Recycled cotton

Recycled cotton is normally defined as cotton made from textile remnants in production. These are segregated by colour and shredded into fibre, spun into new yarns and woven into new fabrics. New recovery processes are also being developed that enable a higher quality of recycled fibre to be produced.

The chain of custody for recycled content can now be certified by a number of emerging schemes. The Global Recycling Standard is the most significant globally and was developed by Control Union Certifications. Since 2011 the standard is owned by Textile Exchange (formally Organic Exchange).

Fairtrade Cotton

Fairtrade is a scheme that primarily ensures that farmers receive a higher price for their cotton but the scheme also includes requirements which apply to production banning the most harmful pesticide and substances [28]. It is claimed that better trading conditions can in turn also facilitate more sustainable management practices. The extent to which Fairtrade may be a certification option that delivers environmental improvements is to be further investigated.

[26] *The water footprint of cotton consumption*. Value of Water Research Report Series No. 18. 2005

[27] Helvetas Swiss Intercooperation (2004) *Irrigation and soil conservation Innovations*

[28] Fair Trade International, *Standards listing*, http://www.fairtrade.net/our_standards.html

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

The pesticide list was still felt to have value as a safeguard for environmental protection. The list should be reviewed for its relevance to substances used/restricted not just in Europe but internationally. Specific additional pesticides should be added including aldacarb and endosulfan – although some RSL's have wider coverage, more closely reflecting Oeko-tex 100. It was also suggested that a sum total should be introduced of 1.0 mg/kg.

Organic cotton's small share of the cotton market was cited as a barrier to raising the minimum % requirement. There is also not enough information for manufacturers as to how/where to obtain certified cotton.

Opinions varied on increasing the minimum organic % content. On one hand the Nordic Swan is proposing to reduce from 100% to 10% because it is too difficult to achieve and is not having the desired market impact. A lower figure was supported by some industry stakeholders. Availability and price was seen as a key barrier.

On the other hand it was felt strongly by some stakeholders that a high % is required to drive the market, distinguish from competitors and make the product meaningful to consumers - '*we would not consider the ecolabel if the minimum is lower then 50%*' - although some concerns were raised about the potential impact on current licenses. Availability and price in this case were not seen as a significant barrier.

Verification of content claims raised concerns. Cotton is not often traced back to the farmer and there is too much reliance on self-declaration. EU Regulation 834/2007 and the use of transaction certificates as evidence should be the main verification route for this criterion. Mixed opinions were raised about recognising GOTS.

Whilst there was interest in IPM certification routes such as Better Cotton Initiative and Cotton Made in Africa concerns were raised that these schemes are not yet mature enough to be recognised by the Ecolabel. Concerns related to both the criteria and the verification systems.

Regarding water use, in general this was felt to be too complex to frame criteria. Not all cotton growing areas are reliant on high levels of irrigation (50% was quoted) and

organic growing may result in better soil moisture retention.

Follow-up research and proposed response

Updating of the pesticide list

The pesticide list is considered a safeguard to ensure that banned or hazardous substances are not used. Evidence suggests, however, that the testing of raw cotton may not always act as an effective safeguard.

Annual testing results for raw cotton commissioned by the Bremen Cotton Exchange illustrates this [29]. Cotton is tested from the major producing countries. The results between 1994 and 2011 show very limited detection of pesticide residues (<0.01 mg/kg threshold) with the exception of the more recent detection of cypermethrin, profenophos, DEF, dieldrin, esfenvalerat and fenvalerat – which, with the exception of dieldrin, are not currently addressed by the Ecolabel criteria. These results are in spite of evidence of the continued use of hazardous pesticides in developing countries, with pesticides listed under the Stockholm PIC list as well as WHO Classes I (1a, 1b) and II understood to be the most frequently used [30].

It is notable that emerging certification systems such as the Better Cotton Initiative, Cotton Made in Africa and Fair Trade ban the use of pesticides that are on the Stockholm Convention PIC list as well as WHO Class 1 (1a Extremely hazardous and 1b Highly hazardous) pesticide classification lists.

The Bremen Exchange results, together with feedback from the Danish Competent Body, suggest that a stronger criteria focus is required on production systems such as IPM and organic, which are intended to educate farmers and control pesticide use at source. However, the route for farmers to make declarations of non-use is still considered to be valid given estimates that 15% of world cotton production is grown without pesticides because farmers cannot afford agrochemicals.

[29] Bremen Baumwollbörse (2011) *Analysis of chemical residues – pesticides as per Oeko-Tex Standard 100*

[30] Kooistra K,J , Pyburn, R and A,J. Termorshuizen, *The sustainability of cotton – consequences for man and the environment*, Wageningen University, Report 223, April 2006

Raising the minimum organic content requirement

Stakeholders emphasised that in 2010/11 organic cotton only accounted for approximately 1.1% of the world market (241,276 tonnes). However, whilst organic cotton is undoubtedly still a niche product this figure does not reflect the distinct global distribution of demand for organic cotton.

Estimates suggest that the top ten EU and US retailers account for 70% of organic cotton demand [31], reflecting the largest two global markets for organic cotton. Assuming an even split of demand for organic cotton between the EU and the USA, and based on an apparent EU consumption of cotton products of 3,686 k tonnes (derived from the IMPRO Textiles study), this would effectively mean that organic cotton holds an EU market share of approximately 2-3%, the majority of which is likely to be accounted for by large brands and retailers. Further data is awaited from the USA NOP and the Textile Exchange in order to verify this estimate.

An analysis of the strategies summarised in Table 4.1.2 adopted by leading manufacturers highlights a dual approach. On one hand organic cotton is blended at lower percentages in order to meet ambitious targets across all mainstream product lines. On the other hand high profile product lines with tailored branding contains higher percentages of organic cotton, usually between 50% and 100%, in order to appeal to 'light green' consumers and create a distinct product. A new trend evidenced by adidas and other market leaders such as Marks & Spencers and Zara is a shift from a focus on organic cotton towards targets for IPM cotton, in part driven by price and availability.

Stakeholders raised concerns about the price and availability of organic cotton. The Nordic Swan's recent public hearing will shortly provide relevant insight into industries viewpoints on these two issues – particularly given their proposal to move from 100% organic cotton requirement to a 10% requirement.

In addition, Ecolabelling Denmark has contacted several license holders regarding these two issues The balance of feedback was that organic cotton was relatively easy to obtain, however, the price premium can vary. The price for organic cotton is normally 5-10 % more expensive but the difference can vary depending on availability.

[31] Yarns and Fibers Exchange, *The biggest markets are Europe and the United States*, 6th February 2012, http://www.yarnsandfibers.com/preferredsupplier/reports_fullstory.php?id=600#

Table 4.1.2 Analysis of organic cotton products sold by brands retailing in the EU that contribute to 70% of global organic cotton demand.

Retailer	Organic cotton purchased		Product strategy	Certification
	Total demand	% retail lines		
H&M	15,000 tonnes (2010)	-	3-50% blend – across selected lines (including EU Ecolabel) 100% content – organic labeled products	Textile Exchange OE blended and 100% (Control Union and IMO), EU Ecolabel
C&A	-	12% (32 million units)	100% content items	Textile Exchange OE blended and 100%
Nike	-	>14% (2009)	5% blend (86% of all apparel) targeting 10% by 2015 100% content – organic labeled products	Textile Exchange OE blended and 100%
Zara	-	1.9 million units	100% content – organic labeled products	
adidas	In the process of switching to BCI cotton	-	Moving away from organic to IPM cotton (40% targeted by 2014)	Better Cotton Initiative (BCI)
Hess Natur	1 million units per season	-	100% content – organic labeled products	GOTS

Co-op Switerland	1,300 tonnes (2011)	-	100% content – organic labeled products	Bio Inspecta Bio Suisse Flo Cert Intertek

The potential for false content claims

Concern was also raised by stakeholders about potential false claims for content. A review of some of the brands and retailers identified as driving the market suggests that organic cotton production is largely certified by control bodies recognised by the EU or the USA or by the independent body IFOAM. These include national control bodies such as APEDA in India, independent certification bodies such as Ecocert and certification schemes such as the Textile Exchange's OE Blended and 100% content claim standards. However, the status of certifiers as EU organic control bodies is more complex because cotton is not formally covered by Europe's organic production Regulation 834/2007.

The most substantial evidence of false claims appears to relate to the contamination of organic cotton from India with GM cotton[32]. Major certifiers such as Ecocert and Control Union were fined as a result, but investigations did not reveal that fraudulent claims had been made.

Organic cotton proposal:

In order to respond to the very divided stakeholder opinions on the minimum organic content requirement, and in order to reflect recent developments in the market and broaden the appeal of the Ecolabel to larger retailers, it is proposed to introduce two minimum requirements:

- Products with greatest market share: The first requirement would be for a minimum of 50%. This would reflect the product content of larger retailers and would signal to them that the Ecolabel recognises consumer demand for high organic content. A higher % content would be required for clothing and

[32] Ecouterre, H&M, other major brands guilty of 'organic cotton fraud'?, 25th January 2010, http://www.ecouterre.com/hm-other-brands-guilty-of-organic-cotton-fraud/

interior textile 'basics' and high profile garments that constitute by far the greatest share of the EU market as identified by IMPRO Textiles.

- All other cotton products: The second requirement would raise the current minimum from 3% to 10%. This figure is likely to be easily achieveable for most manufacturers and retailers, as well as aligning with proposals put forward for amending the Nordic Swan criteria and the suggestions of a number of stakeholders. This would reflect lower blends being used across their product ranges.by larger retailers in addition to their high content products.

All content claims would need to be certified by an independent organisation as having been produced in conformity with the production and inspection requirements in Council Regulation (EC) No 834/2007.

Integrated Pest Management (IPM)

IPM is a system of cultivation that is intended to minimise the application of pesticides by the careful observation and management of crops. IPM cotton is claimed to reduce pesticide use by between 30% and 90%, and to constitute 20% of global cotton production. The system has been promoted by the UN FAO in developing countries that grow cotton. The FAO defines IPM as:

> *A site-specific strategy for managing insect, weed, disease and other pests in the most cost effective, environmentally sound and socially acceptable way*

Definition of IPM has also been developed by the European Commission [33] and is a key part of the European Union's agricultural policy. IPM was defined by Directive 91/414/EEC as:

> *The rational application of a combination of biological, biotechnical, chemical, cultural or plant-breeding measures, whereby the use of plant protection products is limited to the strict minimum necessary to maintain the pest population at levels below those causing economically unacceptable damage or loss".*

Directive 91/414/EEC encouraged Member States to take the principles of IPM into account. In 2006, the EU authorities published a "Thematic Strategy on the

[33] European Commission, Development of guidance for establishing IPM principles, BIPRO, 24th April 2009

Sustainable Use of Pesticides" and this was followed up by Directive 2009/128/EC *Establishing a community framework to achieve the sustainable use of pesticides* [34]. The Directive introduced a definition of the principles of IPM and required Member States to take all necessary measures to introduce low-pesticide input pest management.

The principles of IPM and the learning from educational programmes worldwide promoted by the FAO now form the basis for a number of certification schemes. These schemes aim to bring low-pesticide input cotton to the textile market and allow for traceability from the farm. Schemes include the Better Cotton Initiative and Cotton Made in Africa. The Better Cotton Initiative was established in 2006 and aims to promote measurable improvements in the environmental and social impacts of cotton cultivation worldwide. It is supported by a number of large clothing brands including Gap, H&M, C&A, Levi, Nike, adidas and Marks & Spencers.

The reliability and probity of the emerging IPM certification schemes is further discussed in this document in order to ensure that this improvement option can be verified and that traceability can be ensured that is comparable with the organic cotton verification requirements.

Comparison of conventional, IPM and organic methods

In terms of share of global production it has been estimated that conventional cotton accounts for 80%, IPM around 19% and organic 1%. In order to identify the potential for environmental improvement it is important to understand how the three main methods of cotton production compare. Here we refer to programme evaluations and literature reviews of available evidence by Wageningen University [35], the FAO [36] and the Better Cotton Initiative [37].

[34] European Parliament and the Council of the European Union, *Directive 2009/128/EC of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides*, 24th November 2009

[35] Kooistra K,J , Pyburn, R and A,J. Termorshuizen, *The sustainability of cotton – consequences for man and the environment*, Wageningen University, Report 223, April 2006

[36] Van den Berg, H, *A synthesis of 25 impact evaluations*, Wageningen University for Global IPM facility, January 2004

[37] Better Cotton Initiative, A report on better management practices in cotton production in Brazil, India, Pakistan, Benin, Burkina Faso, Cameroon, Mali, Senegal & Togo, April 2009.

Wageningen University highlight pesticide and water use as the two most significant impacts arising from cotton production They conclude that while organic cotton production has clear benefits in terms of reducing harmful pesticide use the differences between conventional, IPM and organic methods may not be as clear on the ground because significant impacts can still arise from land clearance, natural pesticide use and, depending on the location, unsustainable water use.

Variations in yield also need to be taken into account, with clear variations between high input and low input agricultural systems. IPM production is claimed according to FAO programmes to achieve the highest yields of the three systems [38]. In developing countries it should also be noted that the cost of agrochemicals can also mean that farmers use little or no pesticides.

[38] Kooistra K,J , Mancini F and A,J. Termorshuizen, *Environmental impact assessment of cotton cultivation in India,* p-53-68 in *Mancini,F (2006)* Impact of IPM Farmer Field Schools on the environment, health and livelihoods of cotton growers in Southern India, Wageningan University, The Netherlands

Table 4.1.3: Comparison of conventional, IPM and organic cotton farming systems

Characteristics	Farming technique		
	Organic	**IPM**	**Conventional**
Synthetic/organic fertiliser use	organic	Synthetic/organic	Synthetic/organic
Synthetic/natural pesticide use	natural	Synthetic/natural	Synthetic/natural
Irrigation water use	yes	yes	yes
Average yields	low	high	variable
Monoculture/mixed cropping	mono/mixed	mono/mixed	mono/mixed
Continuous cultivation	no	yes/no	yes/no
Land clearance permitted	yes	yes	yes
Burning of organic material	no	yes	yes
Mechanised labour	yes	yes	yes
Share of world production (%)	1.1	20.0	<79

Source: Kooistra K,J (2006)

Introducing an IPM content requirement

Evidence from the worldwide application of IPM principles suggests that as a method it can reduce pesticide use by between 30% and 90%. The extent to which reductions are made and sustained can, however, vary considerably and cannot be guaranteed. It is claimed that the benefits of improved health and safety and substantial increases in yield (up to +47% based on FAO programme reviews) create incentives in their own right.

The training of farmers to apply IPM and organic techniques is a critical factor in their success. The FAO has promoted Farmer Field Schools in Asia and Africa. In the USA and Australia both Government and industry-led programmes are understood to have achieved over 70% coverage.

The EU has now made a commitment to IPM principles in agriculture. Directive 2009/128/EC Establishing a community framework to achieve the sustainable use of pesticides requires Member States to take 'all necessary measures' to introduce low-pesticide input pest management .

IPM principles as defined by Directive 2009/128/EC

1. The prevention and/or suppression of harmful organisms should be achieved or supported among other options especially by:
   - crop rotation,
   - use of adequate cultivation techniques (e.g. stale seedbed technique, sowing dates and densities, under-sowing, conservation tillage, pruning and direct sowing),
   - use, where appropriate, of resistant/tolerant cultivars and standard/certified seed and planting material,
   - use of balanced fertilisation, liming and irrigation/drainage practices,
   - preventing the spreading of harmful organisms by hygiene measures (e.g. by regular cleansing of machinery and equipment),
   - protection and enhancement of important beneficial organisms, e.g. by adequate plant protection measures or the utilisation of ecological infrastructures inside and outside production sites.
2. Harmful organisms must be monitored by adequate methods and tools, where available. Such adequate tools should include observations in the field as well as scientifically sound warning, forecasting and early diagnosis systems, where feasible, as well as the use of advice from professionally qualified advisors.
3. Based on the results of the monitoring the professional user has to decide whether and when to apply plant protection measures. Robust and scientifically sound threshold values are essential components for decision making. For harmful organisms threshold levels defined for the region, specific areas, crops and particular climatic conditions must be taken into account before treatments, where feasible.
4. Sustainable biological, physical and other non-chemical methods must be preferred to chemical methods if they provide satisfactory pest control.
5. The pesticides applied shall be as specific as possible for the target and shall

have the least side effects on human health, non-target organisms and the environment.

6. The professional user should keep the use of pesticides and other forms of intervention to levels that are necessary, e.g. by reduced doses, reduced application frequency or partial applications, considering that the level of risk in vegetation is acceptable and they do not increase the risk for development of resistance in populations of harmful organisms.
7. Where the risk of resistance against a plant protection measure is known and where the level of harmful organisms requires repeated application of pesticides to the crops, available anti-resistance strategies should be applied to maintain the effectiveness of the products. This may include the use of multiple pesticides with different modes of action.
8. Based on the records on the use of pesticides and on the monitoring of harmful organisms the professional user should check the success of the applied plant protection measures.

Whilst evidence suggests that the benefits of IPM can be substantial until recently it was almost impossible to source certified IPM cotton. So whilst evidence suggests that there are significant quantities of IPM cotton on the global market, no certified, traceable systems have existed to verify this. One of the main problems is the ability to verify that IPM practices are being applied. This task is more difficult than for organic cotton because there are multiple definitions of IPM.

Directive 2009/128/EC now provides a definition of IPM which could form the basis for Ecolabel verification. Furthermore, a number of certification schemes now exist which are based on IPM principles, with the Better Cotton Initiative [39], Cotton Made in Africa [40] , Fair Trade [41] and BMP (Australia) [42] being well known examples. A comparison of these schemes with the EU IPM principles is presented in table 4.1.4

[39] Better Cotton Initiative, P*roduction principles and criteria v2.0*, December 2009

[40] Aid by Trade Foundation, Cotton Made in Africa - Criteria matrix Version 2.0, January 2011

[41] Fairtrade International, *Fair trade standard for small producer organisations*, Version 1.1, May 2011

[42] CRC (2005) Integrated pesticide management guidelines for cotton production systems in Australia, Australia.

below. The EU has also recently launched the SPRING initiative to develop a scheme for Pakistan in conjunction with WWF-Pakistan.

Although no one scheme addresses all of the IPM principles in their criteria it is to be noted that the schemes also include many criteria that could be considered of importance to the Ecolabel. For example, Cotton Made in Africa excludes irrigated cotton and supports the training of farmers, Better Cotton Initiative includes criteria promoting better irrigation and pesticide application practices. Schemes also place a strong emphasis on improvement plans and BCI requires farmers to participate in farmer best practice groups.

Table 4.1.4 Comparison of IPM-based cotton certification programmes with Directive 2009/128/EC IPM Principles

EU IPM principles	Conformity of scheme criteria and systems			
	Better Cotton Initiative	**Cotton Made in Africa**	**Fair Trade**	**BMP (Australia)**
1. Prevention and suppression of harmful organisms	Criteria 1.1 and 3	Criteria 3a/b	*Training required*	IPM and Biosecurity levels 1-2
2. Monitoring of harmful organisms	Criteria 1.1	*Plan required*	Criteria 3.2.3	IPM and Biosecurity levels 1-2
3. Use of decision thresholds	*No specific details*	Criteria 4e	*No specific details*	IPM module (levels 1-2)
4. Preferential use of sustainable control methods	Criteria 1.1	*No specific details*	*Training required*	*No specific details*
5. Use of specific, low impact pesticides	Criteria 1.1	Criteria 4a	*No specific details*	*No specific details*
6. Minimisation of dosage	*No specific details*	*No specific details*	*No specific details*	IPM module (levels 1-2)
7. Anti-resistance strategies	Criteria 1.1	Criteria 4a	*No specific details*	IPM module (levels 1-2)
8. Monitoring of results	Criteria 1.1	*No specific details*	*No specific details*	Not covered at level 1-2
Overall coverage	Good (75%)	Fair (56%)	Poor (19%)	Good (75%)

Sources: BCI (2009), CMiA (2011) Fair Trade International (2012) and BMP (2012)

Availability of IPM cotton

The availability of certified cotton via these schemes is increasingly rapidly in response to demand from large retailers and clothing manufacturers, with some evidence of a shift in focus from organic to IPM cotton. The combined tonnage for BCI and CMiA is estimated at 125,240 for 2010/11 with a projection of 460,000 for 2011/12. Australian BMP cotton is estimated to represent around 60% of the countries total production (1.2 m tonnes in 2010/11) [43].

However, stakeholders raised specific concerns that the verification and assessment systems of current IPM schemes may not yet be developed enough for the Ecolabel to use them for verification. Concerns related to the specifics of the criteria, certification of IPM techniques and traceability.

The organic production Regulation 834/2007 [44], which requires the use of Member State control bodies and transaction certificates, has been referred to by some stakeholders as the benchmark for how IPM certification should operate. We have therefore used this as the basis for criteria development.

Taking this approach IPM certification would need to be in line with Titles V and VI of Regulation 834/2007, and in particular Article 33 of Title VI, and Regulation 1235/2008 [45]. In summary they require a control system in which:

- A certificate of inspection is required for the product up to the first consignee by *'competent authorities, control authorities or control bodies'* with at least one verification annually;
- Traceability is ensured *'at all stages of production, preparation and distribution'*.

[43] *Implications and Opportunities for Australian Cotton*, ABARE Outlook 2005 Conference, Background papers, 1-2 March 2005, Australia

[44] European Parliament and the Council of the European Union, Council Regulation (EC) No 834/2007of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91, Office Journal of the European Union, 20th July 2007

[45] European Parliament and the Council of the European Union, *Commission Regulation (EC) No 1235/2008 of 8 December 2008 laying down detailed rules for implementation of Council Regulation (EC) No 834/2007 as regards the arrangements for imports of organic products from third countries*, Office Journal of the European Union, 12th December 2008

- Control bodies that are certification bodies are accredited to EN 45011 or ISO Guide 65.

Countries listed by the Commission as having adequate organic control systems could potentially also be used to verify IPM production.

Table 4.1.5 makes a comparison between IPM certification schemes and Regulation 834/2007. The main strength of the schemes is their control of the operator. Product certification is a weakness for two of the schemes but it is possible that this could be overcome through the use of existing organic control systems, if available in relevant countries. Only one scheme is certified to ISO Guide 65 suggesting that this may not be a realistic expectation.

Table 4.1.5 Comparison of IPM-based cotton certification programmes with EU organic import control systems

EU control system requirements	Conformity of scheme criteria and systems			
	Better Cotton Initiative	**Cotton Made in Africa**	**Fair Trade**	**BMP (Australia)**
Operator control measures	Yes, due diligence of farmer and farmer group self-assessments	Yes, licensing of producer organisations based on verification of self-assessments	Yes, certification of producer organisation and random checking of farmers	Yes, 3rd party auditing and certification of farms
Product certificate of inspection	Yes, chain of custody for bales	*No, cotton is purchased via a 'Demand Alliance'*	Yes, physical and documentary traceability are required.	*No specific process*
EN 45011/ISO Guide 65	*No, large farms are 3rd party verified every 3 years*	*No, cotton Co. and small holding are 3rd party verified every 2 yrs*	Yes, FLO CERT is ISO 65 accredited. Annual on-site inspections are carried out.	*No, farms are certified for 5 years*

Sources: BCI (2009), CMiA (2011) Fair Trade International (2012) and BMP (2012)

IPM cotton proposal:

Given the global importance of IPM as an improvement measure, its theoretical availability – much more so than organic cotton – and its growing significance as an affordable alternative to organic cotton for retailers and manufacturers it is therefore proposed that minimum IPM requirements are introduced as an alternative to organic cotton in this revision.

A content standard of 10% blended and 50% for selected basics is proposed, mirroring the proposed approach to organic cotton but reflecting the fact that although IPM is potentially cheaper and available in greater quantities, the certified IPM cotton market is not as mature.

However, in response to stakeholder concerns the verification requirements would be aligned with those of Regulation 834/2007. This would signal that IPM is recognised by the Ecolabel but could serve to incentivise these schemes to further improve their systems. Our brief review of existing IPM-type schemes suggests that this may be workable.

Revised criteria proposal v2, September 2012

2.1 Products should contain the following minimum content of organic or Integrated Pest Management (IPM) produced cotton:

- 50% minimum organic or IPM cotton content requirement for selected products: baby clothing, shirts, blouses, t-shirts, jeans, bed linen and towels
- 10% minimum organic or IPM cotton content requirement for all other products

The organic cotton should be grown according to the requirements laid down in Regulation (EC) No 834/2007 [1] or the US National Organic Programme (NOP). IPM cotton should be grown according to the general principles of IPM laid down in the Directive 2009/128/EC[2].

Assessment and verification: Organic and IPM content should be certified by an independent organisation to have been produced in conformity with the production and inspection requirements laid down in Regulation 834/2007/EC or the US National Organic Programme (NOP). The applicant shall provide:

- Information about the control body or certification body,
- Transaction records which provide evidence of the proportion of certified cotton used on an annual basis.

2.2 Cotton and other natural cellulosic seed fibres (hereinafter referred to as cotton) shall not contain more than 0.5 ppm in total of (sensibility of the test method permitting) 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, aldocarb, endosulfan.

This requirement does not apply where more than 50% of the cotton content is organically grown cotton or transitional organic cotton, and more than 75% of the cotton is Integrated Pest Management (IPM) cotton.

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 at least 95% of the cotton in one product 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 Regulation (EEC) No 2092/91 the applicant may place the mention 'organic cotton' next to the eco-label. Between 70% and 95% it may be labelled "made with xy% organic cotton").~~

Assessment and verification: The applicant shall either provide proof of organic or IPM 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). Tests should be made on raw cotton, before it comes through any wet treatment, for each lot of cotton or two randomly selected samples a year if more than two lots of cotton per year are received.

AHWG2 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

Specific additional pesticides were proposed for addition to the testing list. These included Alachlor (15972-60-8) and two pesticides commonly used in conjunction with GM cotton – Glyphosate (1071-83-6) and Ammonium Sulfamate (7773-06-0). Reference was made to the possibility to restrict pesticides classified by WHO as 1a and 1b. It was also suggested by one Competent Body that the 50% and 75% thresholds for avoiding pesticide testing be removed to simplify the criteria as no applicant had used this option.

Concerns were raised that greater minimum requirements for organic cotton would restrict the Ecolabel to a low market share. It was also claimed that moving to organic and IPM cotton would mean that it would no longer be possible to purchase suitable cotton on the spot market.

Views on a minimum organic content standard were still split. On one hand the justification for raising the minimum content requirement was queried. The additional land use for organic cotton growing was highlighted as an ethical issue. False content claims by manufacturers was raised as a major concern in relation to the chain of custody along the supply chain. Some stakeholders suggested that a 50% content requirement for organic cotton was either too high or questioned the fairness of having two different content standards.

On the other hand other industry stakeholders have product lines with 50-100% content and see a high content as being critical in giving a clear message to the consumer. Minimum contents or between 25 and 100% were proposed, with GOTS 70% minimum also being cited.

The justification for different minimum contents would need to be stronger. Whilst some stakeholders supported this as an approach others reasoned that this could only be justified if there were clear reasons e.g. health risks to the consumer.

The method of calculating the content claim to be verified by Competent Bodies should be clarified – is it based on the final product or an annual average? Differing views were presented. Some organic certification schemes such as GOTS do not

permit blending.

It was felt that organic cotton and IPM cotton should not be considered together or as equal in terms of minimum requirements. IPM was seen by some stakeholders as undermining organic cotton. It was felt that there are currently only IPM criteria guidelines rather than criteria and that the improvement potential required clarification. Concern was also raised that IPM schemes may accept GM cotton.

Industry stakeholders that manufacture commercial textiles commented that they would like to see IPM introduced as an alternative to organic cotton. This is because it is cheaper and therefore easier to market to clients than organic cotton. It was also proposed that clear recommendations are made on suitable IPM certification schemes.

Follow-up research and proposed response

Screening of pesticides according to their hazard status

In order to provide a more informed comparison the existing criteria's pesticide listing and the proposed additions were subjected to further screening against the WHO pesticide hazard classifications [46], the Rotterdam Convention PIC list [47] and the Stockholm Convention on Persistent Organic Pollutants (POP's) [48]. Moreover, a list of the most commonly used pesticides in cotton growing was also consulted [49]. Pesticides in WHO toxicity class I (1a and 1b) identified by this list were then also screened for possible addition.

A summary of the screening carried out can be found in Table 4.1.6. The majority of the existing listing are included on the Rotterdam PIC list and are classified by WHO as being obsolete. The production of aldrin, chlordane, DDT, dieldrin, heptachlor and hexachlorobenzene are restricted under the Stockholm Convention. Additional potential additions are drawn from proposals made by stakeholders and from literature that identifies commonly used pesticides (see table 4.1.6 below).

[46] WHO pesticide hazard classifications

[47] Rotterdam Convention PIC list

[48] Stockholm Convention on Persistent Organic Pollutants (POP's)

[49] See University of Wageningen cotton study

Table 4.1.6 Commonly used pesticides in cotton (WHO toxicity class 1a/b)

Active Ingredient	WHO Class	China	India	USA	Pakistain	Brazil	Benin	Carmeroon	Mail	Turkey	Australia
Parathion	1a			x							
Cypermethrin	1b		x			x		x	X		
Methyl-o-dematon	1b		x								
Methamidophos	1b								X		
Monocrotophos	1b	x	x						X		
Thiofanex	1b								X		
Triazopphos	1b				x						

Source: Mancini, F (2006)

Of the new possible additions to the list only aldicarb, methyl-o-dematon, thiofanex and triazophos fall into WHO class I. However, aldicarb and endosulfan are classified according to Annex VI of the CLP Regulation (EC) 1272/2008 as acute toxins (H300 and H330) and acute and chronic aquatic pollutants (H400 and H410). Alachlor is classified as an acute and chronic aquatic pollutant (H400 and H410). Moreover, endolsulfan is not authorised as a biocide in the EU. Ammonium sulfamate is not understood to be used in association with cotton cultivation.

Proposal:

That alachlor, aldicarb, cypermethrin, endosulfan, methyl-o-dematon, thiofanex and triazophos are added to the pesticide restriction list.

Table 4.1.7 Screening of cotton pesticides against WHO classifications and international conventions

Pesticide	WHO Class I (1a/b)	Rotterdam PIC	Stockholm POP
Existing EU Ecolabel cotton pesticide list			
Aldrin	**O**	✓	✓
Captafol	**1a**	✓	
Chlordane	**II**	✓	✓
DDT	**II**	✓	✓
Dieldrin	**O**	✓	✓
Endrin	**O**		
Heptachlor	**O**	✓	✓
Hexachlorobenzene	**1a**	✓	✓
Hexachlorocyclohexane (total isomers)	**-**		
2.4,5-T	**O**	✓	
Chlordimeform	**O**	✓	
Chlorobenzilate	**O**	✓	
Dinoseb and its salts	**O**	✓	
Monocrotophos	**1b**	✓	
Pentachlorophenol	**1b**	✓	
Toxaphene (camphechlor)	**O**	✓	
Methamidophos	**1b**	✓	
Methylparathion	**1a**	✓	
Parathion	**1a**	✓	
Phosphamidon	**1a**	✓	
Proposed additions to the pesticide list			

Alachlor	**III**		
Aldicarb	**1a**		
Ammonium Sulfamate	**III**		
Cypermethrin	**II**		
Endosulfan	**II**		
Glyphosate	**U**		
methyl-o-dematon	**1b**		
Thiofanex	**1b**		
Triazophos	**1b**		
Triafanex	**-**		

Pesticides restricted by IPM schemes

Further investigation of the four IPM certification schemes reviewed following AHWG1 highlights the presence of pesticide restrictions in three out of the four of them. A comparison of the restrictions is presented in table 4.1.8 below. The summary position of the schemes is as follows:

- Cotton Made in Africa and Fair Trade contain complete restrictions on substances that are WHO Class I, PIC listed and/or subject to the Stockholm Convention on POP's.
- The Better Cotton Initiative is less strict on WHO Class I and PIC listed substances, requiring instead phase out plans adapted to local circumstances. Consultation with BCI confirmed that they do not stipulate a timescale for phase-out but that seasonal verification of farmer groups is carried out. These groups generally purchase pesticides in bulk for their farmers [50].
- BMP in Australia does not set out any specific restrictions other than those in place at a national or regional level [51].

[50] Bandi, B, Better Cotton Initiative, Personal communication

[51] Australian Government, *Restricted chemical products*, APVMA, http://www.apvma.gov.au/products/restricted.php

Proposal:

Allow third party verification by CMiA, Fair Trade and BCI as evidence of compliance with the pesticide list, thereby avoiding the need for testing. Where other verifiable schemes provide equivalent restrictions then these should also be accepted.

Table 4.1.8 Comparison between the pesticide restrictions of IPM-based cotton certification programmes

Pesticide restriction reference point	**Conformity of scheme criteria and systems**			
	Better Cotton Initiative	**Cotton Made in Africa**	**Fair Trade**	**BMP (Australia)**
WHO Class I (1a and 1b) substances	Phase out plans are required for producing countries and/or regions	Complete restriction of listed substances	Complete restriction of listed substances	No restrictions other than those of the APVMA at national level
Rotterdam Convention on Prior Informed Consent Procedure (PIC)		Complete restriction of listed substances	Complete restriction of listed substances	No restrictions
Stockholm Convention on Persistent Organic Pollutants (POP's)	Complete restriction of listed substances	Complete restriction of listed substances	Complete restriction of listed substances	No restrictions
Additional specific substances	Endosulfan	*None specified*	*See 'amber' list of substances*	*See above*

Verification and traceability of content claims

Further discussions with an industry association highlighted concerns relating to the verification of content claims made in the EU market. This confirmed that concerns relate to traceability along the supply chain rather than verification of organic or IPM growing techniques. These concerns are substantiated by the Textile Exchange's

organic cotton report for 2011 which shows a decline in production despite estimated market growth based on reporting of up to 19.4% [52].

As a result of this feedback the nature of the traceability requirements, if any, within existing organic and IPM cotton certifications was briefly reviewed. As highlighted in the AHWG1 follow-up research the major organic content claim certifications used by manufacturers and retailers are the Textile Exchange's 100% and 5% blended standards and GOTS. The only IPM certification that addresses fabric content claims is Fair Trade.

Upon review the Textile Exchange and GOTS certifications contain what appear to be comprehensive traceability requirements based on invoices and transaction certificates. The requirements extend from the farm until, as a minimum, greige fabric production.

Moreover, contact with the Danish Competent Body, who have the greatest number of textile licenseholders, also confirmed that existing licenseholders are already requested to provide similar evidence of traceability. It therefore appears that, although not explicitly requested in the current criteria text, a transaction-based form of traceability is currently achieveable by front runners and EU licenseholders in the EU market.

Proposal:

Expand the current traceability from the farm up until greige fabric production, allowing existing certifications to be used as verification where they provide an equivalent level of assurance.

[52] Textile Exchange (2013) *Farm and fibre report 2011-2012*

Extract from Textile Exchange 5% Blended Standard traceability requirements

1. Inputs or incoming goods:

Transaction certficate(s) that states that the organic cotton has been produced accor ding to the applicable organic regulations. This certficate must be issued by an independent certifier that has been accredited or licensed to the standard named in the certificate (e.g. OE or GOTS).

Invoices which show that the input has been purchased by the company seeking certification.

The invoices and transport documents must contain a reference to the organic cotton purchased, including the name and identification code of the certification body.

2. Outputs or outgoing goods

The company seeking certification shall have records of the following information on outgoing goods containing organic cotton:

- A copy of the packing list and/or other transport documents
- A copy of the transaction certificate that states that the products have been produced according to the OE Blended Standard
- Invoices that show that the outgoing goods have been sold by the company seeki ng certification to another party

3. Mass balance test

The records must demonstrate the balance between the inputs (e.g. certified organic cotton fiber, yarns or fabrics) and the outputs (e.g. yarn, fabrics or finished goods) containing the declared blend level of certified organic cotton fiber.

In its simplest form, the equation is (A/B)C = D.

A = Input of claimed organic raw material

B = Total input of raw material, including the material that might be used in the process of the production

C = Total amount of end product produced

D = Amount of end product on which organic cotton can be claimed

Improving the sampling methodology

Discussions with the Bremen Cotton Exchange, who carry out annual testing for pesticide residues on internationally sourced samples of cotton, suggest that the criteria could be improved by ensuring that samples are tested for each distinct country of origin and by the use of composite sampling to increase the quantity of cotton tested within each batch.

Proposal:

It is proposed to make reference to composite sampling according to the origin of the cotton used to make an ecolabelled product line.

Raising the minimum organic cotton requirement

Stakeholders have continued to express contrasting views as to the minimum organic cotton requirement. Availability and cost were cited again as barriers, with 25% given as an example of a possible upper limit in terms of cost and value for a high street retailer. On the other hand it was felt that demand is needed to drive supply, as evidenced by the rapid growth in the last 4-5 years, and that, according to major retail stakeholders, consumers respond to high contents. There was, however, a consensus that introducing some form of differentiated standard for different product sub-groups would not be workable.

Whilst organic cotton cultivation has undoubtedly expanded rapidly as a result of demand created by major retailers such as H&M and C&A, recent data for 2012 and 2013 compiled by the Textile Exchange highlights a dramatic dip in production to less than 1.0% of global cotton production [53]. This is despite publicly reported increases in demand from leading retailers, highlighting potential problems with data collection and systems of traceability.

[53] See footnote 52

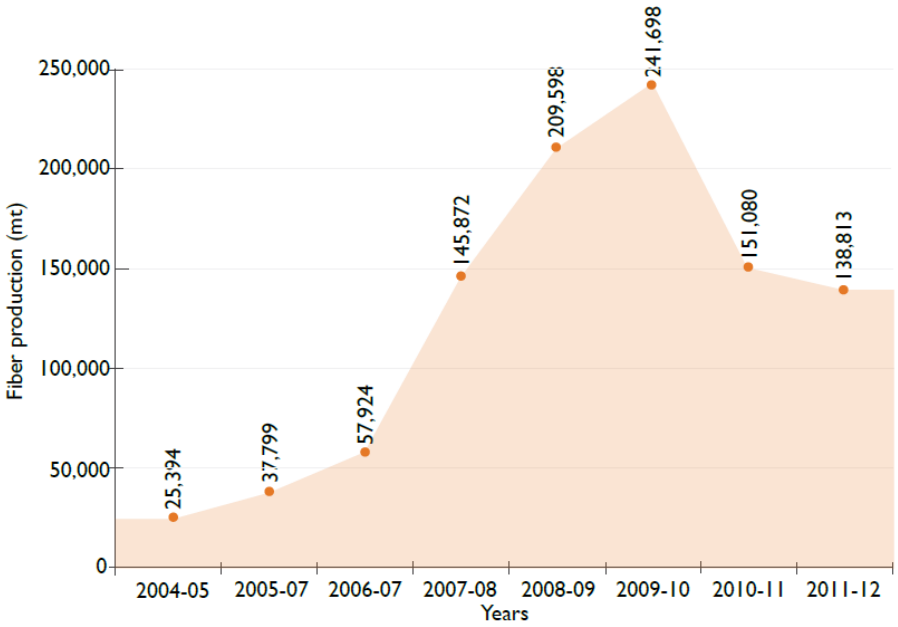


Figure 4.1.1 Organic cotton production trend – 2004-2012.

Source: Textile Exchange (2013)

Without the continued sustained growth in availability it would therefore be difficult to justify a more ambitious requirement for organic cotton. Moreover, as we have previously discussed IPM certified cotton better represents the best available product representing 10-20% of the market. Nevertheless, the criteria should in some way reflect the content strategies of organic textile retailers.

Proposal:

To make organic cotton optional, without reference to product segments, but with a requirement for between 25% and 50% content in order to drive demand and reflect consumer expectations.

Environmental improvements from implementation of IPM practices

The most significant concern raised by stakeholders about IPM cotton relates to the environmental improvement potential. Programmes of IPM training for farmers have been supported by the UN FAO and the EU in Bangladesh, China, Egypt, India, Pakistan, Syria, Vietnam. The USDA and Australian governments have also supported IPM programmes for over a decade.

Monitoring of these various programmes means there is an evidence base for the environmental improvement potential of IPM. A summary of the findings from

selected literature is presented in table 4.1.8 below. Included within this evidence are two LCA studies. Figure 4.1.2 summarises the midpoint results for conventional, IPM and organic cultivation for the Environmental Index Quotient (EIQ) and eutrophication potential from Mancini, F (2006).

Table 4.1.9 Summary evidence for the environmental improvement potential of IPM cotton cultivation

Monitoring study	Sample specification	Environmental improvement potential
Mancini, F (2006)	Study 1: 73 IPM trained farmers and 64 controls (India)	84% reduction in pesticide use for the same yield.
	Study 2: 10 IPM trained farmers and 15 controls	76% reduction in EIQ LCA indicator 66% reduction in eutrophication potential LCA indicator 48% reduction in soil loss 47% increase in yield
G. Walter-Echols and M.H. Soomro (2005)	FAO-EU Farmer Field School programme (sample of 1,060 farmers in Bangladesh, China, India, Pakistan, Vietnam). EIQ comparison sample: - India 37 farmers - Pakistan 87 farmers	55% reduction in insecticide application 43% reduction in overall pesticide application Reductions in field EIQ indicator of 66% (Pakistan) and 46% (India)
from CABI (2009) for BCI	Pakistan ADB CIPM programme, unspecified sampling from 8,724 farmers in the Punjab region.	50% reduction in pesticide use 20% increase in yield
Moritz,Nill and K.Wick (2012) for Cotton Made in Africa	Data assumptions relating to Cotton Made in Africa growers in Benin, Burkina Faso, Côte d´Ivoire, Malawi, Mozambique, Zambia and Cameroon	59% reduction in CO_2 eq emissions 8% greater water consumption (rain fed irrigation only)
FAO-EU (2002)	FAO-EU Farmer Field School, 60 farmers in Lingxian Country,	82% reduction in pesticide quantity used with evidence of reduction in

	China	WHO Class I useage 16% increase in yield
from CABI (2009) for BCI	FAO Africa Farmer Field School, pilot samples from three Senegal villages	57% reduction in pesticide use 11-44% increase in yield

The evidence from these studies suggests that application of IPM principles can reduce pesticide use by between 30% and 90%. Notably IPM is also associated with the highest yield for cotton crops, with increases of between +11% and +47% in comparison with conventional cultivation, and the lowest proportional impacts associated with fertiliser use (whether artificial or organic).

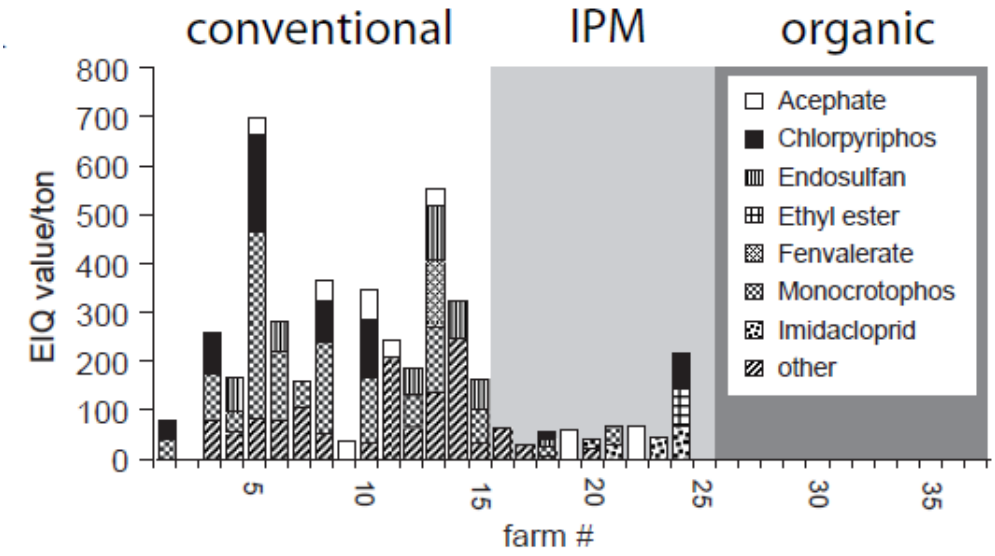
Whilst the level of environmental improvement associated with IPM cannot therefore be specified or guaranteed once a farmer has been trained, the evidence suggests that improvements within these ranges, both in terms of reductions in agrochemical use and in terms of improvements in yield, could be expected in the majority of cases.

Additional benefits highlighted by monitoring studies included reduced exposure of workers, learning by neighbouring farmers resulting in reductions in local pesticide use and reductions in soil erosion.

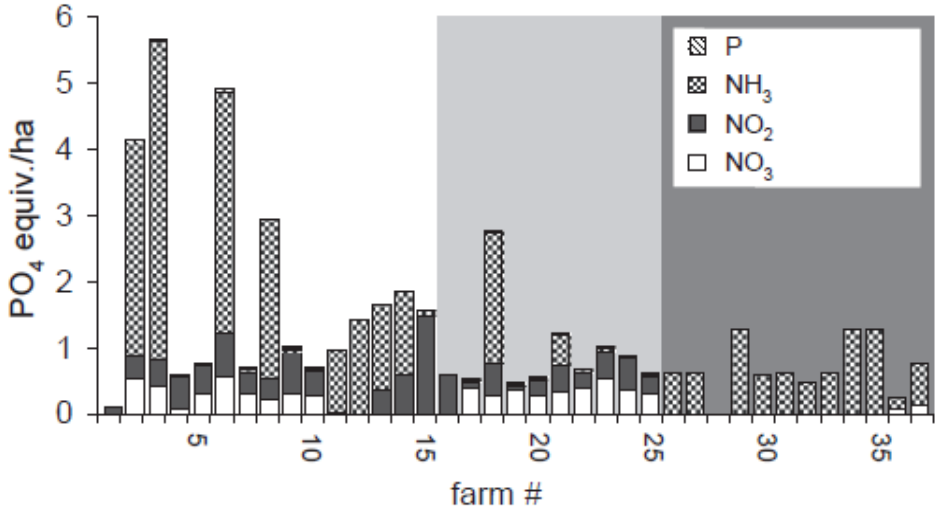
Proposal:

The fundamental problems identified with the existing pesticide restrictions suggest that a stronger criteria focus is needed on farming standards.

- A minimum requirement for farmers to be IPM trained should be introduced alongside specific pesticide restrictions.
- The % content requirement should be higher than an organic requirement, and based on availability and front runner practices this is suggested as being between 50% and 100%.



a) Environmental Index Quotient (EIQ)



b) Eutrophication potential

Figure 4.1.2 Comparison of and for conventional, IPM and organic cotton cultivation on selected farms in India. Source: Karst J. Kooistra, Francesca Mancini and Aad J. Termorshuizen (2006)

Selecting IPM schemes for recognition by the EU Ecolabel

Following the AHWG1 a comparison was made between four IPM schemes. Based on a comparison against EU IPM principles BCI and BMP appear to provide good coverage, whilst CMiA had fair coverage and Fair Trade had poor coverage.

It is likely that at an international level this comparison may have overestimated the weaknesses of the latter two schemes. This is because the most commonly

accepted definition of IPM principles is that of the UN FAO. This was adopted and expanded by the EU in its definition, but it is the UN FAO definition that forms the reference point for international IPM schemes.

IPM principles as defined by the UN FAO

(1) Measures for prevention and/or suppression of harmful organisms

(2) Tools for monitoring

(3) Threshold values as basis for decision-making

(4) Non-chemical methods to be preferred

(5) Target-specificity and minimization of side effects

(6) Reduction of use to necessary levels

(7) Application of anti-resistance strategies

(8) Records, monitoring, documentation and check of success Source: European Commission (2009)

Our more recent comparison of the schemes' pesticide restrictions highlighted Fair Trade as having the strongest restrictions, followed by CMiA. BMP does not contain any specific restrictions other than those of the Australian Government. The Australian Pesticide and Veterinary Medicines Authority (APVMA) lists chlordane, endosulfan, fenthion, heptachlor and mevinphos [54]. These substances are still, however, permitted to be used by 'authorised persons'.

Proposal

- That BCI, BMP and CMiA are listed as schemes that would be accepted by the EU Ecolabel as providing third party verification for IPM cotton.
- That Fair Trade, CMiA and BCI are listed as schemes for which pesticide testing would not be required because their criteria contain pesticide restrictions.

[54] Australian Pesticide and Veterinary Medicines Authority, *Restricted chemical products*, Accessed December 2012, http://www.apvma.gov.au/products/

AHWG3 stakeholder feedback and final proposals

Here we present a summary of feedback received following the extra-ordinary ad-hoc working group in Brussels on the 23rd April 2013, together with a brief outline of the final criteria proposal.

Stakeholder feedback

Whilst a minimum organic cotton content was strongly supported by some Member States concern was raised by an industry representative and some other Member States about the arguments put forward for the organic cotton content requirement. Given that production is still low and even declining it was feared that this would drive up prices due to scarcity of supply, pushing it out of reach of other manufacturers. A manufacturer noted that organic cotton is currently cost prohibitive and as a result they would like to see IPM as another option.

This opinion was not shared by other stakeholders who stated that the market for organic cotton is not closed and that increases in demand when supply may be scarce aren't necessarily reflected in price rises – particularly because of the influence of large buyers. A large variation can be seen in the pricing of organic cotton. Differing views were expressed as to what the minimum content should be, ranging from 70-100% to (the current) 3%.

A content requirement of 95% was requested from within the European Commission and, given concerns relating to market availability, could be specified for certain products that commonly contain organic cotton in order to drive the market. A strategic aim for the organic cotton requirement applied to all Ecolabelled products to be 70% by 2020 at the latest.

A Member State requested that cotton that is not organic or IPM should be tested for pesticides. This was supported by other stakeholders, although some threshold for exemption was also supported. Although the weaknesses of testing were accepted by some stakeholders, it was still felt to be valid as a means of 'preventing scandals'.

Concern was raised by an industry representative about the issue of traceability and misleading content claims. Reference was made to wider concern by the public as illustrated by recent statistics from the Eurobarometer (2012) and attention given to the issue by DG ENV/SANCO. It was felt that we don't currently have the tools to ensure traceability and the findings of CEN TC 248/32 will be important in this respect.

This view was not shared by other stakeholders who stated that traceability can be

demonstrated by transaction certificates and that the proposed traceability for the Ecolabel reflects the strict requirements of the EU Organic Regulation.

Concern was raised by some stakeholders about the potential impact of IPM cotton on the prospects for organic cotton. There appears to be uncertainty about the long-term outlook.

It was felt by some stakeholders that GMO cotton should be restricted by the Ecolabel. GMO has wider implications for farmers livelihoods and on the price of farming. It was stated that GMO is restricted by at least one IPM scheme but that this might in turn limit the market coverage of the ecolabel.

Where a product contains organic cotton the remaining balance of the conventional or IPM cotton should not, according to the EU Organic Regulation (EC) 834/2007, contain GMO cotton.

Follow-up response and final proposal

Setting of a minimum organic cotton content standard

The growth of organic cotton has been driven to date by demand from major brands and retailers such as C&A, H&M and Zara, as well as national retailers such as Co-op Switzerland, specialist retailers such as Hess Natur and niche US brands with an EU market presence such Timberland and Patagonia.

Given a further projected decline in organic cotton production of 2-3% in 2013/14 the European Commission therefore considers it important to sustain demand through the expansion of organic cotton product lines [55]. The EU Ecolabel could play a role in supporting this market development. The Ecolabel Regulation (EC) No. 66/2010 contains a specific reference to the potential role of the label in relation to organic production, stating that:

> *'…the option that only those products certified as organic would be eligible for award of the EU Ecolabel should be considered, to avoid confusion for consumers. '*

However, it is clear from market research and stakeholder feedback that making organic cotton a requirement would, particularly at high content levels, have the potential to lock out potential applicants from the Ecolabel.

[55] See footnote 52

One option would be to retain organic cotton as optional but to introduce a higher content requirement of 95% (in line with GOTS) for specific products, for example, baby clothing and t-shirts. The benefit of this approach is that it could be specified to target products within the market with the greatest potential whilst not completely restricting the product group.

This proposal was put forward in September 2012 and was discussed by stakeholders. Concerns related to how the basics would be identified and that all products should meet the minimum content standards. It was also felt that the IPM content should be higher than the organic requirement, reflecting IPM's better availability on the market but lower improvement potential.

A revised proposal has been formulated with a focus on consumer products. The products to which a higher content requirement would apply were identified based on their market significance (with reference to the IMPRO textiles study) and their presence in the organic product lines related to GOTS certifications (mainly specialist retailers) and the major retailers/brands that account for the majority of EU demand (e.g. H&M, C&A, Zara).

Based on an estimated EU market share for organic cotton in 2012 of 1.7% it is important, however, that IPM cotton is retained as a second, alternative option to organic cotton. This is illustrated by table 4.1.10. The market share for certified IPM is more significant and growing. A combination of organic cotton products at between 10% and 95% contents with BCI, CMiA and Fair Trade IPM cotton products at 20% content or greater could, indicatively, achieve a market share of up to 20%. This is based on current market availability and a simplistic assumption of an average current content in the market of 50%.

Proposal:

It is proposed that for specific consumer products an organic cotton content of 95% is required in order to stimulate the market - clothing for babies of less than 3 years old, t-shirts, woman's tops, casual shirts, jeans, pyjamas and nightwear, underwear and socks. Organic cotton would remain optional, recognising the greater availability of IPM cotton.

Table 4.1.10 Overview of organic and IPM cotton production for 2012/13

Production system	Fibre production (Tonnes)	Estimated Share of world production	Estimated Share of EU market
Total organic production	138,831	0.5%	1.7%
IPM certification schemes	*(estimates)*		
1. Better Cotton Initiative	375,000	1.4%	4.6%
2. Cotton Made in Africa	163,000	0.6%	2.0%
3. Fair Trade	18,330	0.1%	0.2%

Source: Textile Exchange (2013)

Using the EU Ecolabel to dynamically drive demand for organic cotton

As we have already highlighted the EU Ecolabel Regulation contains in clause (6) and Article 6(5) a reference to supporting organic production because of the clear message it sends to consumers. It is considered that demand for organic cotton can be driven by a policy instruments such as the Ecolabel. This is proposed in the form of an annual rise in the 10% minimum requirement in function of the market availability. The adjustment to the minimum requirement would be set to increase faster than market availability in order to create new demand. The strategic aim would be for the organic cotton requirement to reach 70% for all Ecolabel products by at least 2020.

Such a type of requirement shall be checked with the Commission's legal service to see if it can be used within the legal framework of the Ecolabel Regulation. Alternatively, as it was made in the Ecolabel criteria for other product groups the Decision could be accompanied by a note on the commitment of the EC and the EUEB to re-evaluate the minimum organic cotton content requirement within a period of time e.g. 2 or 3 years after the criteria come into force.

Proposal:

The preferred option would be to establish a dynamic content requirement. This would increase in function of the market availability of organic cotton, either on the global market, or as estimated for the EU market. An alternative option would be for

the Decision to be accompanied by a note committing to a re-evaluation of the content requirement.

Pesticide testing of conventional and IPM cotton

Consultation with cotton experts strongly suggests that pesticide testing of the cotton boll is not an effective/accurate method for determining specific pesticide use/non-use. Pesticide restrictions can only have scientific value if they are supported by stronger verification. Farmer/producer group declarations are therefore proposed as an additional measure. However, it currently appears that this may only be possible to obtain this easily in conjunction with an IPM scheme. Not all of the pesticides listed in the criteria are WHO Class Ia or b. In the case of BMP (the Australian IPM scheme) there are no specific restrictions. Farmers within the schemes may therefore use listed pesticides. This, together with the potential for cross-contamination, is understood to make the threshold limit still valid.

Proposal:

It is proposed that where a certification scheme includes a restriction on the same listed pesticides that is verified either by cotton testing or by on-site auditing of producer groups and/or farmers then this shall be accepted.

The challenge of transition for existing licenseholders

Written submissions from existing licenseholders raised concerns about a possible transition to a minimum IPM or organic content of 25-50%. This could present significant production and supply chain challenges. The introduction of stronger environmental criteria for cotton is seen as an important revision. A balance must be struck between bringing along existing licenseholders and attracting new licenseholders.

Proposal:

A transitional period will be proposed for existing licenseholders.

Restriction of GMO cotton

EU policy does not specifically prohibit GM production, although Member States have varying policies. The use of specific GM plant breeds in the EU is subject to authorisation. Of the IPM schemes reviewed only Fair Trade and Cotton Made in Africa restrict GMO's. These two schemes supply significantly less volume into the market than BCI and BMP. The combined global market share of Fair Trade and Cotton Made in Africa in 2012 is estimated to be 0.7%. This can be estimated to translate into an EU market share of 2.2%. On this basis it can be seen that a GMO restriction would unduly constrain licenseholders access to IPM cotton.

Organic cotton is a different case in point. The EU Organic Regulation (EC) 834/2007 states that:

> *'Genetically modified organisms (GMOs) and products produced from or by GMOs are incompatible with the concept of organic production and consumers' perception of organic products. They should therefore not be used in organic farming or in the processing of organic products.'*

The organic production standard 1(a) has been modified to clearly state that where conventional and/or IPM cotton are combined with organic cotton that this cotton shall not be genetically modified. A clause has also been added to the assessment and verification which refers to Regulation (EC) No 1830/2003 on traceability and labelling.

Proposal:

On this basis a general restriction on GMO is not therefore proposed. However, in the case of the organic cotton standard, any blended conventional cotton or IPM cotton shall not be GMO.

The market interaction between organic and IPM cotton

Certification of IPM cotton is a new concept and take-up is growing rapidly according to figures from schemes such as BCI. There is therefore a different market process at work compared to organic cotton, with the aim being to increase the certification and traceability of a product that is already on the market.

Whilst some large brands such as Adidas have switched their focus from organic to IPM the Textile Exchange in their 2012 and 2013 reports on the organic cotton market identify this as only one of four factors constraining growth:

- A crisis in the availability and purity of the cotton seed supply, the result of the increasing dominance of GMO cotton;
- Continued economic uncertainty, which keeps commodity prices down and endangers farmers' stability;
- Specific to India, the more stringent requirements of the Agricultural & Processed Food Products Export Development Authority (APEDA) and its Tracenet service;
- A shift by some companies from established programs such as organic and fair trade to newer initiatives offering a lower barrier to entry without fair prices associated with the initiatives.

It is also the case that for some brands and consumers 'organic' appears to represent a much clearer and effective branding than IPM and a number of the major brands such as H&M and C&A are still committed to significant growth. Nevertheless, major brands such as Adidas and retailers such as M&S (UK) are adopting 'sustainable' cotton strategies in which IPM plays an important role.

This suggests that there exists a distinction in the market that should be recognised by the Ecolabel, with brands and retailers divided between those adopting content strategies based on organic cotton and 'sustainable' IPM cotton.

Summary of final criteria proposal

The final criteria proposal aims to send a market signal to support organic cotton production whilst at the same time broadening the market potential of the ecolabel by introducing IPM cotton.

The proposed EU Ecolabel cotton criteria seeks It would do this by requiring

The proposal is structured as follows:

- Organic and IPM minimum content standards: Introduction of minimum content standards for both organic (10%) and IPM (20%) cotton, reflecting the two most significant improvement options available on the market. Scientific evidence substantiates the significant environmental improvements achieveable with both options:
  - *Organic cotton: The minimum organic standard of 10% represents an improvement on the current 3% and a consensus amongst most stakeholders. A higher content of 95% would be required for specific*

consumer clothing items on the EU market. This would reflect the strategies of leading brands and retailers and would send a market signal to stimulate production. Products containing content greater than 70% would be able to display text in alongside the Ecolabel (see Criteria 28). Genetically modified cotton would not be permitted in blends of organic cotton.

- *IPM cotton: The IPM requirement of 20% reflects its greater market availability . IPM production has the potential to achieve substantial reductions in pesticide and fertiliser use whilst achieving the highest recorded yields for cotton. This production option would ensure that the Ecolabel can achieve an acceptable market share and pricing, particularly for commercial products, whilst achieving a significant environmental improvement in cotton production. A list of suitable IPM schemes would be maintained in the User Manual. Products containing higher contents would be able to display text alongside the Ecolabel (see Criteria 28) claiming reduced pesticide use.*

- Pesticide testing standard: This standard is then maintained as a safety net for all conventional cotton used, as well as for IPM certifications that do not include a pesticide restriction. Testing is on a composite basis for samples taken by country of origin.
- Traceability standard: This standard requires demonstration that transaction certificates for organic and IPM cotton have been passed along the supply chain until at least greige fabric production. This is intended to respond to stakeholder concerns relating to false claims by retailers.

CURRENT CRITERION 3: ELASTANE

Major proposed changes	• The aromatic diisocyanate criterion is to be changed in order to a address occupational exposure • An occupational exposure limit is to be added for the Candidate List solvent DMAC. This limit is a condition for derogation of this substance.
Present criterion, Decision 2009/567	
3.1. Organotin compounds shall not be used. *Assessment and verification:* The applicant shall provide a declaration of non-use. 3.2. The emissions to air of aromatic diisocyanates during polymerisation and fibre production, measured at the process steps where they occur, including fugitive emissions as well 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.	

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

Limited feedback was provided on this criterion. It was highlighted at the 1st AHWG that aromatic diisocyanates are reactive chemicals and that occupational exposure levels would be more appropriate for this criterion. The Blue Angel label specifies a workplace exposure limit based on MAK values [56].

[56] The Blue Angel, *Textiles – basic criteria for award of the environmental label*, February 2011

Follow-up research and proposed approach

Aromatic diisocyanates form the basis for the manufacturing of elastane, commonly termed spandex. The most commonly used aromatic diisocyanates are understood to be toluene-2,4-diisocyanate (TDI) and diphenylmethane-4,4'-diisocyanate (MDI). TDI is classified with H317, H330, H334, H351, H373 and H412. MDI is classified with H317, H334, H351 and H373. These combinations of hazard statements suggest that occupational health exposure pathways should be given more emphasis.

Proposal:

Harmonisation is proposed with the approach taken by the Blue Angel, which focusses on occupational exposure rather than emissions to the environment.

AHWG2 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the criteria.

Stakeholder feedback

The main feedback received related to the solvent N,N-Dimethylacetamide (127-19-5), otherwise referred to DMAc, which is used in the manufacture and spinning of the fibre. It was proposed for derogation as it has been entered onto the ECHA Candidate List for Authorisation.

Concern was raised by one stakeholder that if elastane could not be derogated then this could prejudice a wide range of products that rely on elastane blends from achieving the Ecolabel. Elastane is understood to be generally incorporated at a 20-30% blend.

The question was raised as to whether there are alternatives to DMAc. In response an industry stakeholder stated that although alternatives to DMAc exist their toxicology is similar.

Clarification was requested where the proposed occupational health and safety limit value for diisocyanates was derived from. In the EU there were understood to be mandatory levels – is what is proposed stricter than this level?

Follow-up research and proposed way forward

Derogation screening for DMAC solvent

The solvent DMAc was screened in order to determine whether it should be derogated for use in Ecolabelled products. As a Candidate List substance it can only be derogated subject to the conditions of Article 6(7) of the Ecolabel Regulation.

The screening decision are presented below in table 4.1.11. It is proposed to derogate DMAc subject to specific conditions. These include adherence to occupational exposure limits which it is proposed are added as a sub-criteria. Reference to Commission Directive 2000/39/EC suggests an eight hour shift mean limit value of 36 mg/m^3 (10 ppm) [57].

Proposal:

Derogation of DMAC for use to manufacture elastane, subject to specific derogation conditions setting workplace exposure limits and concentration limits on the final product.

Table 4.1.11 N,N-Dimethylacetamide (127-19-5) derogation screening decision

Derogation findings	The evidence suggests that final product concentrations of 0.05-0.1% are significantly below the derogation threshold of 0.1%. Workforce and environmental exposure are considered to be managed to these levels. Furthermore, DMAC is required to spin elastane, acrylic and aramid fibres, with no safer alternative understood to currently available that can assure the quality of the finished product. It is therefore proposed to derogate the use of DMAC subject to three conditions below. In setting these conditions it should be recognised that fibre production may take place outside of Europe.
Derogation conditions	Fibre spinners must demonstrate that: – Concentrations of DMAC in finished fibres are <0.001-0.005% – Production IOELV's are below EU TWA and STEL values

[57] *Commission Directive 2000/39/EC of 8 June 2000 establishing a first list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work, Office Journal of the European Communities, 16/6/2000*

Determination of occupational exposure levels for diisocyanates

The proposed occupational exposure limit value of 0.005 ml/m^3 (0.005 ppm) for diisocyanates during an eight hour shift is in harmonisation with the Blue Angel. It is understood that the German TRGS 900 (Die Technischen Regeln für Gefahrstoffe) occupational exposure limits form the basis for the Blue Angel sub-criteria [58].

A review of TRGS 900 shows that limits are presented for water and aerial emissions, and that these differ between the two monomers. Aerial emission limits are set at 0.05 mg/m^3 for MDI and 0.035 mg/m^3 for TDI. However, because of their different molecular density these both equate to limits of 0.005 ppm.

A wider review of occupational exposure limits in Europe, North America and the far east suggests that a Time Weighted Average of 0.052 mg/m^3 (0.005 ppm) for MDI and 0.036 mg/m^3 (0.005 ppm) for TDI represent the norm [59]. The most stringent TWA applied in Europe appears to be the UK [60]. The UK's Health & Safety Executive applies an aerial emissions limit value of 0.02 mg/m^3 for total diisocyanates.

Proposal:

Retention of workplace aerial exposure limits for diisocyanates, to be expressed in mg/m^3 and ppm so that they are line with European IOELV's.

[58] Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, TRGS 900, January 2006

[59] Allport, D.C. et al (2003) *MDI and TDI: Safety, Health and the Environment. A Source Book and Practical Guide*, John Wiley & Sons

[60] Bello, D et al (2004) *Polyisocyanates in Occupational Environments: A Critical Review of Exposure Limits and Metrics*, American Journal of Industrial Medicine, 46:480–491

Summary of the final criteria proposal

The proposal comprises two major changes:

- Diisocyanate workplace exposure limits: The focus of the criterion has been shifted from factory emissions to workplace exposure, which were identified as a more appropriate point of control for emissions. Limits are set for the two forms of diisocyanates used.
- DMAc workplace exposure limits: This criterion reflects the derogation conditions for the Candidate List substance N,N-dimethylacetamide (127-19-5). DMAc is used during the manufacture of acrylic fibres and may remain on the final product at low concentrations. The new criterion sets an Occupational Exposure Limit Value (IOELV) of 10.0 ppm during fibre polymerisation and spinning.

CURRENT CRITERION 4: FLAX AND OTHER BAST FIBRES (INCLUDING HEMP, JUTE AND RAMIE)

Major proposed changes	• A sub-criterion is to be introduced which minimises energy inputs required for retting
Present criterion, Decision 2009/567	
Flax and other bast fibres shall not be obtained by water retting, unless the waste water 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).	

AHWG1 technical discussion

Here we present the initial background research and argumentation circulated in advance of the first ad-hoc working group meeting in February 2012.

It is not proposed to change the current criterion. Energy used during the pre-treatment of flax to obtain fibres was highlighted as significant area of potential improvement in the preliminary report. This is therefore proposed as the focus for a potential new criterion.

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Feedback from stakeholders

Limited feedback was received from stakeholders on this criterion. Those that responded were not in favour of introducing a new criterion. Whilst it was accepted that inefficient mechanical processes may be used for fibre extraction, a reduction in energy use should not be traded for greater chemical use. New technologies such as ultrasound have the potential to reduce chemical requirements significantly. The price of energy should be sufficient to place pressure on fibre manufacturers.

Comments were also made by one stakeholder about the potential quantity of herbicides used on some flax crops.

Follow-up research and proposed approach

Retting is the first stage in the extraction of bast fibres. It is understood that in most of Europe, which accounts for 34% of global flax production, water or dew retting are used [61]. Dew retting consists of the spreading of the fibres in the fields. Expert literature also highlights enzymatic, chemical and mechanical retting as industrial options [62] . Chemical retting requires the use of sodium hydroxide, sodium benzoate and hydrogen peroxide bleach.

Research into alternative methods highlights water and chemical use and waste arisings associated with chemical retting [63]. Enzymatic retting is understood to have the potential to have lower environmental impacts, with 'bio-retting' catalysing breakdown of the substances that glue the fibre together [64], but requires energy to be used to heat the water. Ultrasound is currently only used at one site in the EU, so cannot be considered to yet be commercially available [65].

An LCA study carried out by the University of Plymouth which examined energy use associated with the production of flax examined in more detail the 'pre-treatment' stage highlighted by IMPRO Textiles[66]. The study suggests that the most significant 'hot spots' for the Global Warming Potential midpoint are agro-chemical use, retting and scutching with, in contrast to other sources, bio-retting associated with the most significant impact.

[61] Saneco, *Flax production in the world 1993-2010*, http://www.saneco.com/spip.php?article2

[62] Tahir P.D, Ahmed, P.B, Saiful Azry S.O.A, and Z.Ahmed, *Retting process of some bast fibres and its effect on fibre quality*, Bioresources Journal, 6(4), 5260-5281

[63] Harwood R, Nusembaum V and J Harwood (2008) Cottonisation of flax, International conference on flax and other bast plants.

[64] Jan.M, Viktor.A, Marie.B, Prokop.S, Holger.F and J Stefan, (2008) Enzymatic bioprocessing – a new tool of extensive natural fibre source utilization, *Cottonisation of flax, International conference on flax and other bast plants*.

[65] Ecco, *Setralit – Fibres from regenerating raw material*, Accessed 2012, www.ecco-fibre.net

[66] Dissnanyake N.P.J Life cycle assessment of flax fibres for the re-inforcement of polymer matrix composites, Doctoral Thesis, University of Plymouth, May 2011

Proposal:

It is proposed that a criterion is formulated that seeks to minimise energy inputs and the COD impacts of flax production by requiring low impact agriculture and retting processes.

Revised criteria proposal v2, February 2013
Flax and other bast fibres should be retted in ambient conditions without thermal energy inputs. *Assessment and verification:* The applicant should provide documentation and records of retting conditions. Flax and other bast fibres ~~shall not be~~ obtained by water retting~~, unless the waste water from the water retting is~~ should be treated so as to reduce the COD or TOC of wastewater from retting ponds 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 for outflow effluent, using the following test method: ISO 6060 (COD).

AHWG2 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Feedback from stakeholders

Limited feedback was received from stakeholders on this criterion. The only comment received related to the COD limit, with the suggestion that a limit value should be specified.

Follow-up research and proposed approach

Limited further evidence could be found in relation to the COD of discharges. It is not therefore proposed to change the current requirement for a percentage reduction in the COD value of wastewater effluent from water retting.

Summary of the final criteria proposal

A new criterion has been added requiring flax retting to carried out under ambient conditions. This was selected based on LCA evidence that it represented the most significant option to address energy use during fibre production.

CURRENT CRITERION 5: GREASY WOOL AND OTHER KERATIN FIBRES (INCLUDING WOOL FROM SHEEP, CAMEL, ALPACA, GOAT)

Major proposed changes	○ Ectoparasiticide testing is to be required on randomly selected composite farm lots of wool ○ Compliance can now be documented using organic certifications, with the exception of pyrethryn ectoparasiticides that are permitted by certain systems ○ Wool scouring operations shall meet revised COD limit values for effluent prior to any treatment and for final discharge to the environment. ○ Value shall be recovered from grease, waste fibre and sludge
Present criterion, Decision 2009/567	
The following sum totals shall be achieved for wool ectoparasticide concentrations on raw wool prior to scouring: 5.1 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. 5.2 The sum total content of the following substances shall not exceed 2 ppm: diazinon, propetamphos, chlorfenvinphos, dichlofenthion, chlorpyriphos, fenchlorphos. 5.3 The sum total content of the following substances shall not exceed 0.5 ppm: cypermethrin, deltamethrin, fenvalerate, cyhalothrin, flumethrin. 5.4 The sum total content of the following substances shall not exceed 2 ppm: diflubenzuron, triflumuron, dicyclanil. The test should be made on raw wool, before it comes through any wet treatment, two times a year if more than two lots of wool per year are received. These requirements (as detailed in points 5.1, 5.2, 5.3 and 5.4 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 points 5.1, 5.2, 5.3 and 5.4: The applicant shall either provide the documentation indicated above or provide a test report, using the following test method: IWTO Draft Test Method 59.

5.5. 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 45 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). The wool scouring plant shall describe, in detail, their treatment of the scouring effluent and continuously monitor the COD-levels.

Assessment and verification: The applicant shall provide relevant data and test reports related to this criterion, using the following test method: ISO 6060.

AHWG1 technical discussion

Here we present the initial background research and argumentation circulated in advance of the first ad-hoc working group meeting in February 2012.

The current criteria for pesticides (5.1 to 5.4) were discussed thoroughly during the latest revision in 2006-7. The criteria were commented on by several competent bodies and other stakeholders and were revised accordingly to the incoming suggestions and to the recommendations from BREF Textiles [67]. The latter document was published in 2003 and has not been revised since then.

Commercially produced wool uses large amounts of pesticides often described as *ectoparasiticides* that help farmers manage external parasites on ruminants.

[67] BREF Textile 2003. *Reference document on Best Available Techniques for the Textile industry*. European Commission, JRC, Seville.

Ectoparasiticides have important implications for the discharge of raw wool scouring effluent and disposal of the sludge generated by the treatment of the effluent. Different types of ectoparasiticides are used:

- Organochlorides
- Organophosphorous
- Pyrethroids
- Insect growth regulators

Ectoparasiticides are often applied to the sheep through sheep dipping where the animals walk through pools with liquid solutions of insecticide and fungicide.

Testing frequency

The EU Ecolabel already has strict requirements for the amounts of ectoparasiticides in the raw wool. Before the 2009 version of the criteria it was not specified how often the wool should be tested for the specified pesticides which meant that license holders in some cases only submitted a test report when they applied for a license but not continually through the lifetime of the license. The criterion was hence changed in 2009 in such way that tests should be conducted on "*each lot of wool or two times a year if more than two lots of wool per year are received*".

This criterion has been commented on by a stakeholder with significant experience in the wool industry who has pointed out practical difficulties in upholding the Ecolabel criteria*:*

> *A wool scour receives several hundred processing lots of wool per year. An interpretation of the foregoing statement is that the scour requires only 2 processing consignments of wool to meet the EU eco-label requirements per year. In this case the scour will source these lots in early January and the scour will process normal wool from the auction system thereinafter. This will not meet the environmental protection goals of the eco-label. Unfortunately, this is the interpretation that is possible under the heading of Manufacturer's Declaration (2-5) in the Danish User manual.*

A clarification and/or improvement of the criterion is therefore considered necessary in order to ensure it is delivering a high level of confidence in the performance of the wool that is sourced.

Scouring effluent treatment

The criterion for scouring effluent was discussed intensely at the last EUEB meetings in Brussels in 2009 just before the criteria were decided. As a result of this the resulting values for COD (Chemical Oxygen Demand) in the waste water are quite different depending on if the effluent is treated on-site or off-site:

- For effluent treated on-site the criterion is: the COD discharged to surface waters shall not exceed 45 g/kg greasy wool
- For effluent treated off-site the criterion is: 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

This mean that the final COD in effluent treated off-site must not exceed 15 g/kg. This fact means that the final COD level in effluent treated on-site can be three times larger than COD in effluent treated off-site which may seem unfair. To take an example, in areas of New Zealand very few scouring plants have their own waste water treatment plants and the effluent is therefore treated off-site and it is understood that only very efficient waste water treatment plants with secondary treatment can achieve greater than a 75% COD reduction.

A single COD value of 20 g/kg treated wool no matter where and how the effluent is treated has been suggested by stakeholders. This value would harmonise with the requirements of criterion 27 so for practical reasons there could just be a reference to this criterion. Regional differences in how wastewater is treated, together with current industry best practice, must however be investigated before a final value can be proposed.

Organic wool

Production of organic wool is increasing as it is increases in popularity. The total global production of wool is approximately 1.3 million tons per year but it is hard to find estimates for the production of organic wool. The figure is most likely to still be very small and it may be too early to have a criterion that requires a minimum content of organic wool. The criterion could, on the other hand, be expanded to encourage certified organic wool production.

Energy use by wool scouring operations

Energy use associated with wool scouring was identified as a significant area for environmental improvement by the technical analysis. The IMPRO Textile LCA study provided the reference point. The midpoint indicator for climate change, together

with several midpoint indicators that are also influenced by fossil fuel energy use, highlighted wool scouring as the most energy intensive process in the wool supply chain from cradle to factory gate, and potentially comparable with synthetic fibres.

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

The proposal to introduce a minimum requirement for organic wool was not supported. Stakeholders cited the limited development of the supply chain, albeit without data to back this up, and minimal customer demand. There are also varying international definitions and allowable practices, with the definition used in some Countries' deemed unlikely to meet the Ecolabels pesticide restrictions.

Limited feedback was received with regards to an alternative solution to the identified weakness with testing frequencies. It is important to distinguish between sales lots and processing lots. Taking Australia as an example it is claimed based on sample modeling that 30% of sales lots would meet the Ecolabel criteria. A proposal was therefore made to move towards the model used in Australia where pre-identification of suitable wool can be achieved because systems now apply residue tests to farm consignments of wool (sales lots).

The wastewater criteria generated the most comments. It is understood that in New Zealand it is not possible to meet the criteria because at least two scouring processes discharge with limited heavy flow treatment via primary municipal treatment which then discharges to sea. BAT techniques are applied to maximise both top and carbonised grease recovery, achieving much higher recovery levels than those presented in the textile BREF (>76%), reducing COD levels significantly to between 28 and 190 g/kg and minimising the use of detergents.

Conversely it was also highlighted that at least one major Australian scour which has invested in modern BAT downflow treatment cannot meet the current off-site target as defined because the treated effluent fluctuates between 60 and 80 g/kg and this is then reduced by 90% by a municipal plant, resulting in a very low COD. Technical evidence was also provided demonstrating that on-site investment by scours in

combined flocculation and aerobic treatment plant in New Zealand and China can enable the proposed 20 g/kg on-site target to be met.

No feedback was received with regards to process energy benchmarking.

Follow-up and proposed response

Ectoparasiticide testing

During our follow-up research it has been noted that the New Zealand Ecolabel criteria for wool scouring test for an additional insect growth regulator - cyromazine [68]. More information from stakeholders is required in order to determine assess the risks associated with this substance. However, it is not proposed to update the ectoparasticide list at this stage.

The evidence received suggests that the current testing process do not provide sufficient re-assurance that the Ecolabel criteria are being met. It is our view that sales lots of wool should therefore be specified for testing rather than scouring lots, which can be made up of many different sales lots. This would provide greater re-assurance and traceability that farmers have managed the wool under appropriate conditions. The auction systems in Australia and UK have been considered in order to test this proposal [69].

With regard to sample frequency, IFOAM provide sampling recommendations for residue testing of bulk goods. They suggest between 4 and 8 samples per 10-50 tonnes of lot [70]. However, it is understood from a testing authority in Australia that composite samples from 10 sales lots can now be obtained, making higher assurance more cost effective [71].

---

[68] New Zealand Ecolabelling Trust, *License criteria for wool scouring services - Responses on submissions*, October 2011

[69] British Wool Marketing Board, *Auction buyers,* Accessed 2012, http://www.britishwool.org.uk/woolbuyers.asp?pageid=46

[70] IFOAM, *Guideline for pesticide residue contamination for international trade in organic*, March 2012

[71] AWTA Ltd, *AWTA raw wool testing fees 2012-13 – Pesticide residue analysis reports*, Australia *see also* Australian Wool Testing Authority Ltd, *Pesticide residue analysis,* Accessed 2012, http://www.awta.com.au/en/Home/Our_Services/Pesticide-Residue-Analysis/

Proposal:

A minimum of one randomly selected composite sample per 50 tonne of sales lot or, for large orders, twice per year is therefore proposed for discussion. Composite samples should be made up of at least 10 randomly selected farm lots.

Scouring effluent treatment in Australia and New Zealand

The current position with regard to scouring operations in Australia and New Zealand was investigated further with input from stakeholders and the New Zealand Ecolabelling Trust. The regulatory position in both countries was also briefly investigated.

In both countries scouring processes are under heavy competitive pressure from China. Only four plant appear to remain in Australia and the industry in New Zealand has consolidated down to four plant. Some operators have sought to differentiate themselves by pre-cleaning wool to improve optical brightness and reduce detergent use or, in the case of at least one EU Ecolabel supplier, by investing in advanced effluent treatment technology. Those that have invested in subsidiaries in China also appear to be investing in high standards of energy, water use and wastewater management in order to meet Chinese environmental standards for new plant [72].

In terms of water policy frameworks the National Water Quality Management Strategy adopted by both Australia and New Zealand in 1997 set the framework for protecting and enhancing the quality of water resources. Supporting guidance for the Australian wool industry states the objective to '*minimise and as far as possible use the effluent they produce'* and to '*minimise the effect of effluent addition to land'* [73].

The revised *New Zealand Waste Strategy* (2005) contains a target to upgrade or close substandard wastewater treatment facilities by 2020 [74]. Significant expenditure is understood to be underway in order to upgrade wastewater treatment plants and trade waste permits have been updated to introduce new requirements for on-site waste treatment.

---

[72] Michell, *Leading by example – Michell Suzhour raises the bar on environmental management*, Press release, 17th July 2007, http://www.michellwool.com

[73] Agriculture and Resource Management Council of Australia and New Zealand, *Effluent management guidelines for aqueous wool scouring in Australia*, June 1999

[74] Ministry for the Environment, *Waste management in New Zealand - a decade of progress*, New Zealand, http://www.mfe.govt.nz/publications/waste/waste-management-nz-oct05/html/page3d.html

As of 2010 four out of five of the remaining wool scouring operations in New Zealand discharged to municipal wastewater treatment works [75]. Of these works one has treatment to a tertiary level. The other three have primary treatment. Two of these are introducing requirements for further pre-treatment by industry and/or secondary treatment stages. The site discharging to surface waters had on-site anaerobic treatment. During 2011/12 one further operation has installed on-site treatment which will enable it to comply with the requirements of the EU Ecolabel.

Evidence collected suggests that at least two of the five remaining sites in New Zealand (Kaputone and Awatoto) and two of the four sites in Australia (Michell and E.P.Robinson), including the largest site which represents approximately 37% of their scouring capacity, have the potential to comply with the initial proposal of 20 g/kg COD based on high standards of on and off-site wastewater treatment.

Differing strategies for COD reduction

Wool scourers in New Zealand are pursuing different strategies for COD removal from effluent. Both major scourers have implemented BAT technologies as specified in the BREF for Textiles but their overall approach differs.

In the first example grease recovery is combined with the pre-cleaning of wool before scouring in order to minimise COD at source. This is a BAT technology which is installed by most wool scourers as it generates important additional revenue. Here 75% grease recovery (the highest figure achieved in the Textile industry BREF) is claimed to be being achieved, which is higher than the BAT figure of 35%. This has the benefit of improving the product, increasing the amount of valuable by-products recovered from the wool and minimising energy use and the need for detergents and advanced wastewater treatment. The resulting COD emissions are, however, higher corresponding to BREF estimates of up to 180 g/kg depending on the type of wool.

In the second example a multi-stage effluent treatment works has been installed which includes chemical flocculation, activated sludge and evaporation. This is a BAT technology which has also been installed by wool scourers in Australia and China. The most commonly installed solution appears to be a combination of grease

[75] New Zealand Ecolabelling Trust, *License criteria for wool scouring services - Responses on submissions*, October 2011

recovery with Sirolan CF-A [76] (flocculation) and B [77] (aeration) processes. This combination of treatment stages enables a COD of below 25 g/kg to be achieved.

The additional detergent required for wool cleaning and the energy and chemical consumption associated with the multiple stage treatment plant are, however, likely to be higher. For example, the addition of a flocculation stage would increase power consumption by 50%. This is based on the unit cost estimates contained within the Textile industry BREF.

On the basis of these two examples, it is proposed that the limit values in the criteria should be updated to better reflect the performance of BAT pre-cleaning, grease recovery systems, advanced on-site wastewater treatment (modeled on EU scouring plant) and secondary off-site municipal treatment when applied to effluents from coarse and fine wool. The criteria could be configured to incentivise waste removal at source – using pre-treatment and grease recovery - over advanced 'end of pipe' wastewater treatment.

Proposal:

It is proposed that two options for the COD limit are included within the revised criteria proposal:

- Option 1: To combine a COD target with high required levels of grease recovery: It is proposed that a 70% level of grease recovery shall be rewarded by allowing a higher on-site COD level. The effluent discharged must then be treated by a municipal wastewater treatment plant with a minimum of secondary treatment (see below).

  It is therefore proposed to raise the off-site COD value to 180 g/kg greasy wool based on a net water consumption of 6 l/kg greasy wool. This COD reflects effluent following a high level of grease recovery (>70%). This change would enable a number of scours that did not meet the on-site element of the existing criteria to comply.
- Option 2: To combine a COD target with higher levels of on-site wastewater treatment: It is proposed that where grease recovery is less than 70% then

[76] Andar Fibretec, *Sirolan CF – recovering residual solids*, Accessed 2012, http://www.andar.co.nz/woolscours/andar_fibretec

[77] Andar Fibretec, *Sirolan CFb – reducing organic pollutant levels*, Accessed 2012, http://www.andar.co.nz/woolscours/andar_fibretec

lower on-site COD value of 24 g/kg greasy wool would apply based on a net water consumption of 6 l/kg greasy wool.

This would reflect the performance of a combination of an installed grease recovery loop, a flocculation plant and aerated sludge treatment. These measures represent the BAT for standalone on-site treatment and have been installed by scours in Australia, New Zealand and China. The criteria would therefore reflect the investment made by a number of scours in modern treatment plant.

In addition it is proposed to reference the minimum EU standards for secondary municipal wastewater treatment in the criteria wording, reflecting the approach taken by the Blue Angel [78]. The standards provide some flexibility, giving a choice between a COD target value of 125 mg/l (equivalent to 0.75 g/kg greasy wool at a 6 l/kg flow rate) or a 75% COD reduction.

Wool scouring and resource efficiency

A whole life cycle approach should also identify opportunities for resource efficiency. The textile BREF highlights the value of recovered grease, as well as appropriately treated sludge and suint as a fertiliser. Evidence from industry suggests that grease already has a market value based on its refinement into lanolin.Australian Wool Innovation illustrate the potential of currently available technologies to achieve multiple by-product recovery from wool scouring (see Figure 4.1.3).

Proposal

It is therefore proposed that scouring operations are required to demonstrate that grease, suint and sludge are used as a resource rather than being disposed to landfill.

[78] Council of the European Communities, *Council Directive of 21st May 1991 concering wastewater treatment*, 91/271/EEC, Office Journal of the European Communities.

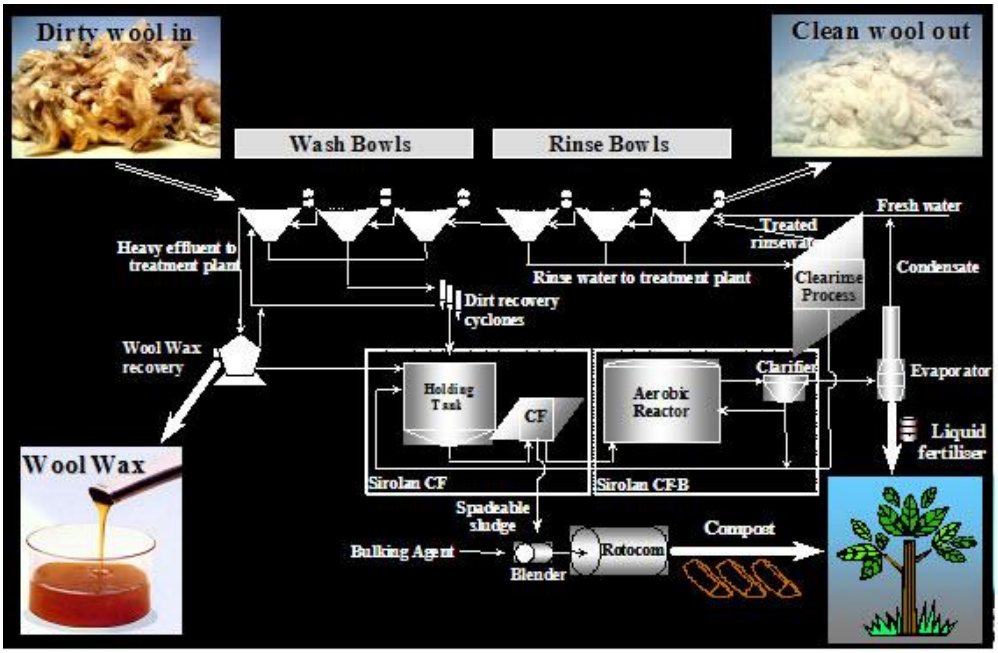


Figure 4.1.3: Diagram of comprehensive wool effluent treatment and by-product recovery system. Source: Australian Wool Innovation Ltd (2012)

Process energy criteria

The BREF Textiles provides evidence from a sample of scouring operations which could be used as the basis for setting an energy benchmark. The performance of scouring operations varies widely according to the data. The New Zealand Ecolabelling Trust have for a number of years had an energy criteria of 4 GJ/tonne greasy wool in their wool scouring criteria. Certification and testing organisation ENco have also used a similar target to certify scouring operations.

Both these criteria sets were based on the BREF [79] and evidence shows this can be achieved by a number of New Zealand scouring plant which have been awarded their label. It is understood that a combination of the innovative scour bowl designs developed by New Zealand engineering firm ANDAR, heat recovery and grease recovery loops facilitate a high level of energy efficiency and that this technology is now used in other countries.

During the last revision of the criteria it was recognised that the 4 GJ/tonne criteria is challenging and might only be achieveable by New Zealand scourers and selected

[79] European Commission, *Reference document on Best Available Techniques for the textile industry*, IPPC Bureau, July 2003

international scourers using similar technology [80]. It is therefore proposed based on the BREF Textile data to set the criteria at 8 GJ/tonne based on a linear correlation with an assumed water consumption of 6 l/kg wool (see Figure 4.1.4 below). This would encompass all processes from the scour bowl to final dryer as well as effluent treatment.

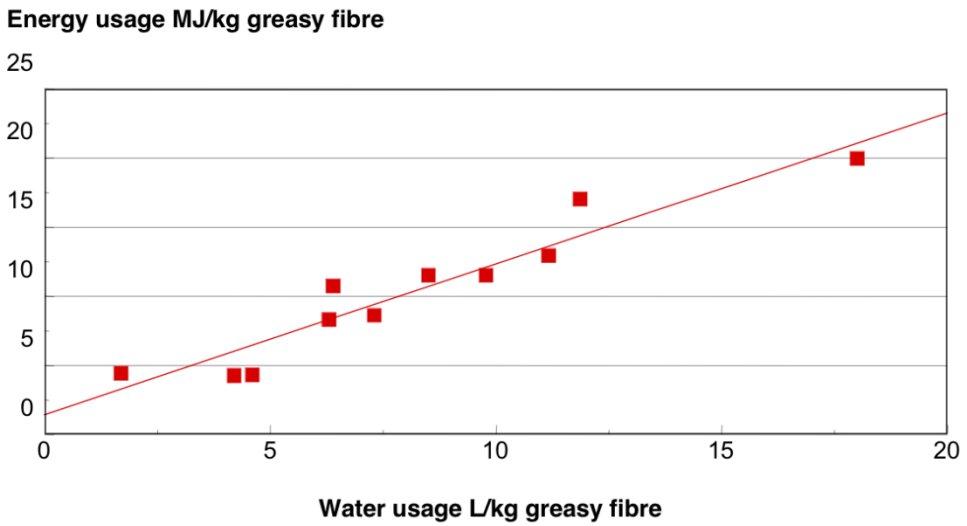


Figure 4.1.4: Correlation between energy and water used by wool scouring operations. Source: BREF textiles (2003)

Proposal:

An energy benchmark criteria of 8 GJ/tonne greasy wool is proposed. This would encompass all processes from the scour bowl to final dryer as well as effluent treatment.

This new sub-criterion would have the benefit of minimizing wool scouring energy use in-line with the IMPRO textile LCA results which suggested that energy use can be as high as for synthetic fibres such as polyamide and acrylic.

However, the views of stakeholders with regard to energy benchmarks for any fibre type must also be respected. It is therefore proposed for discussion at the second AHWG.

[80] New Zealand Ecolabelling Trust, *License criteria for wool scouring services - Responses on submissions*, October 2011

Revised criteria proposal v2, September 2012

5.1 The following sum totals shall be achieved for wool ectoparasticide concentrations on raw wool prior to scouring:

- 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.

- The sum total content of the following substances shall not exceed 2 ppm:

  diazinon, propetamphos, chlorfenvinphos, dichlofenthion, chlorpyriphos, fenchlorphos.

- The sum total content of the following substances shall not exceed 0.5 ppm:

  cypermethrin, deltamethrin, fenvalerate, cyhalothrin, flumethrin.

- The sum total content of the following substances shall not exceed 2 ppm:

  diflubenzuron, triflumuron, dicyclanil.

These requirements (as detailed in points 5.1, 5.2, 5.3 and 5.4 and taken separately) do not apply if:

- Wool is organically produced wool (including transitional wool), 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 (EC) No 834/2007.
- 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 points 5.1, 5.2, 5.3 and 5.4: The applicant shall either provide the documentation indicated above or provide a test report, using the following test method: IWTO Draft Test Method 59.

The test should be made on sales lots of raw wool, before it comes through any wet treatment. A minimum of one composite sample of multiple farmer lots should be tested per 50 tonne of sales lots where only one lot is purchased, or two randomly selected samples per year for larger orders. A composite sample should consist of

wool fibres from at least 10 randomly selected farmer lots within the sales lot.

5.2. For scouring effluent discharges the COD limits applicable will depend on the efficiency of grease recovery.

For wool scouring operations that achieve a minimum total recovery of grease from raw wool of 70% the COD discharged to sewer shall not exceed 180 g/kg greasy wool. The effluent shall then be treated off-site to a minimum of secondary treatment standard as defined by Annex I of Council Directive 91/271/EEC.

For wool scouring operations that achieve a total recovery of grease from raw wool of less than 70% the COD discharged to sewer shall not exceed 24 g/kg greasy wool. No further treatment is then required.

In all cases 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 should provide reports and annual data from on-site monitoring of wool lots and grease recovery equipment .The wool scouring plant shall describe, in detail, their treatment of the scouring effluent, how value is recovered from by-products and monitoring systems for COD-levels. The applicant shall provide relevant data and test reports related to this criterion, using the following test method: ISO 6060.

5.3 Value should be obtained from ~~wool grease, suint and~~ sludge collected from recovery circuits and wastewater treatment plant. Sludge should not be landfilled ~~or incinerated~~.

Assessment and verification: The applicant should provide reports and waste transfer notes confirming the recovery routes for waste streams.

AHWG2 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

The proposal to introduce a minimum requirement for organic wool was not supported by a number of stakeholders. This was because there are varying international definitions and allowable practices with, for example, EU Regulation (EC) 834/2007 cited as permitting the use of certain synthetic pesticides. A specific example was cited of a wool consignment from Argentina that had had to be rejected by the EU Ecolabel because of the presence of pyrethroid insecticides. In contrast to this, in Australia organic certification their use is strictly controlled.

Feedback on testing focused on the methodology and frequency of the testing, which was still felt to need improvement. It was felt by one stakeholder that the proposed approach was based to much on the UK system and might therefore not be as widely applicable. A number of industry stakeholders highlighted the preferred practice of applying residue tests to all farm consignments of wool (sales lots) in order to provide a higher level of assurance. Concern was raised by a Member State that the frequency of testing was still not sufficient and proposed four times a year.

The option of being able to avoid testing where the farmer identity can be established for more than 75% of the wool raised concerns from one stakeholder. They stated that this should only be kept if it was to be supported by third party verification by an independent body. This is because of the poor level of knowledge of chemical formulations applied by farmers and a general lack of respect for 'unverified vendor declarations'.

There were differing views about the gearing of COD limits to grease recovery and advanced wastewater treatment. On one hand this was felt to reflect cleaning of the wool at source, with associated benefits in terms of energy, detergent and chemical use. On the other hand concern was raised that high levels of grease recovery cannot represent BAT as not all of the grease can be sold as it is likely to be of a low grade. A previously cited example of an Australian scour that discharges 80-90 g/kg COD effluent to sewer followed by 90% tertiary COD reduction was cited as an example for which it should be made easier for them to comply but now would find it harder.

The final COD achieved for the 180 g/kg starting value (= 45 g/kg wool) was felt by a number of stakeholders. A lower COD limit of 24 g/kg should be achieveable in New Zealand based on the information they had. The reference to the EU wastewater treatment directive should be replaced with a specific COD limit value or % COD reduction.

Queries were raised about the potential for an energy benchmark and concerns were raised should this proposal be taken forward. A number of concerns were raised. Such a criteria might discriminate against scourers that have had to invest in wastewater treatment plant to reduce COD that as a result use more energy. It might also discriminate against scours located where natural gas is not available e.g. China.

With regards to the recovery of value from waste streams the main feedback was that composting is only possible where there is a commercial composting project in the local area and that only a small number of scours had successfully implemented this. Over half of all scours have desuint bowls installed, allowing for recovery of potassium. However, there is then the need for access to local market gardens to serve as an end-market. In the opinion of two industry stakeholders this criteria should held back for the next revision, which would allow more data on industry practices to be collected.

A suggestion was made by a wool scourer that residue testing could be exempted if evaporative wastewater treatment processes were used, resulting in zero effluent.

AHWG2 Follow-up and proposed response

A number of themes were identified from the AHWG2 meeting and stakeholder's written responses which formed the basis for the final round of follow-up research:

Ectoparasiticides permitted in the production of organic wool

Stakeholders highlighted the potential for wool grown according to the production standards in Regulation (EC) No 837/2007 to contain pesticides restricted by the Ecolabel. Article 14 of the Regulation covers livestock production rules and clause 1(e)(ii) states that:

> *chemically synthesised allopathic veterinary medicinal products including antibiotics may be used where necessary and under strict conditions, when the use of phytotherapeutic, homeopathic and other products is inappropriate. In particular restrictions with respect to courses of treatment and withdrawal periods shall be defined…*

These are understood to include the pyrethroid group of insecticides, some of which are restricted by the Ecolabel. This problem is reflected by a requirement in GOTS for residue testing against a sum parameter of <0.5 mg/kg for organic wool. So whilst allowing organic certification as a form of verification could avoid duplication it would still be necessary for the criteria to stipulate testing for insecticides which are permitted by Regulation (EC) No 837/2007.

Proposal:

To retain the clause allowing verification if an organic certification is held, but with a requirement for the testing of pyrethroids, or any other substances permitted by a specific organic certification.

Improving the wool lot sampling frequency

The key point emphasised by industry stakeholders, including existing licenseholders, was that buyers compiling an Ecolabelled wool lot need to be confident that lots will pass testing. This implies the pre-selection of farm lots of wool.

Random testing may also pose commercial problems because it could take place at any time during the year. Disclosure of when it had taken place would not be possible and there would be the risk to the applicant of a sample then failing at the end of the year. Reserving samples for testing would also add expense.

Proposal:

- The random selection of samples during the year is to be removed, with the requirement being for the composite testing of at least 10 randomly selected of sales from within each processing lot. An additional clause is to be added allowing testing certificates for all wools within a processing lot to be submitted as verification.
- In the case that the identity can be established of at least 75% of the farmers supplying the wool and they declare not have used the specified ecoparasiticides then this should be independently verified.

Setting a COD limit that incentivises wool grease recovery

The main concern raised was in relation to the gearing of the COD limit to grease recovery levels. The textile BREF (p-142) quotes reference Mill E as achieving the highest level of grease recovery of 71 kg/tonne fine wool, whereas 35 kg is quoted in the BAT 'use of integrated dirt removal/grease recovery loops' as a possible practical limit for recovery using centrifuges. The possibility of higher levels of wool cleaning and grease recovery was therefore investigated further.

Further investigation of a reference scourer claiming a very high level of wool cleaning confirmed that using a three stage grease recovery system 76-78% grease recovery can be achieved (approximately 74 - 104 g/kg) and that all of this grease can currently be sold on the world market, including oxidised grease which is also recoverable. Before the wool reaches the scouring bowls the raw wool is opened and machined in order to achieve a high level of organic waste removal. This is claimed to result in demonstrably cleaner and brighter wool, as well as minimising detergent and energy use for scouring.

As grease is understood to contribute to approximately 48-71% of the COD from wool scouring its removal is a critical factor in COD reduction. Dirt is understood to contribute to approximately 17-31% of the COD. The findings from the reference scour illustrate the measures that can be taken to minimise COD as far as possible through removal at source and value recovery. The benefit to COD levels will, however, vary depending on the type of wool.

Table 4.1.12compares grease recovery options with other BAT techniques. Option 4 with the potential addition of extended aeration treatment is understood from

stakeholders and background research to represent the most commonly applied solution, bringing the COD level down to below 20 g/kg.

The benefits of a high level of recovery (option 2b) can be clearly be seen for coarse wool, resulting in COD values comparable with a combined recovery and flocculation plant (option 4). The COD values for fine wool are reduced measurably from a starting point of approximately 556 g/kg but secondary off-site treatment would be required to bring them down to an acceptable level.

Analysis of two reference scours suggests that with modern wool pre-cleaning together with three stage dirt and grease recovery loops the option 2b COD limits should be achieveable prior to trade waste discharge or discharge to the environment.

With regards to the potential additional energy, detergent and chemical use associated with advanced effluent treatment, the Textile industry BREF suggests that the addition of a flocculation stage to grease recovery (as is understood to represent common practice) would increase power consumption by 50%. In order to achieve a COD of less than 20-25 g/kg an additional extended aeration stage would also be required.

Table 4.1.12Comparison of COD levels before and after different wastewater treatment technologies

mg/g greasy wool	**1. Discharge to sewer**	**2. Dirt/grease recovery loop**		**3. Flocculation plant**	**4. Dirt/grease recovery (35%) + flocculation**	**5. Evaporation**	**6. Dirt/grease recovery + evaporation**
		2a. 35% recovery	**2b. 89% recovery**				
Coarse wool							
COD discharged from mill	299	203	93	93	81	3.2	2.7
COD discharged to environment	75	51	23	23	16	20	0.7
Fine wool							
COD discharged from mill	529	352	170	118	97.4	4.8	3.7

COD discharged to environment	132	88	43	30	24	1.2	0.9

Adapted from European Commission, *Reference document on Best Available Techniques for the textile industry*, IPPC Bureau, July 2003

Proposal:

It is proposed that two COD limits must be met, with differentiation based on the type of wool being scoured, reflecting the approach taken by the textile BREF:

1. COD prior to any on-site treatment, set at a level that requires high levels of wool pre-cleaning and grease recovery.
2. Final effluent COD before discharge to the environment, requiring either on-site or off-site treatment to reduce COD by at least 75% to be defined by specific COD values.

Table 4.1.13 Proposed COD effluent limits for greasy wool

Type of wool	**COD limits for effluent**	
	Prior to any on-site treatment	**Final effluent discharged to the environment**
Coarse wool	100 g/kg	25 g/kg
Fine wool	180 g/kg	45 g/kg

Encouraging resource efficient scouring

The criteria proposal from September 2012 highlighted wool grease, suint and sludge for value recovery. Feedback from stakeholders highlighted the capital cost and complexity of suint (potassium-rich fatty acid salts) recovery. A dated technical source on the subject suggests that recovery is implemented by very few scourers worldwide [81]. However, feedback from an industry expert confirmed that recovery is

[81] Savage, M.J. *Integrated treatment process for primary wool scouring effluent*, University of Canterbury Thesis, December 2002.

possible for approximately half of scours worldwide. Some scours inject evaporated effluents into soils.

With regard to composting this appears to be implemented by scours in New Zealand and Australia but data for scours worldwide could not be found. It was claimed by one industry stakeholder some scours choose high temperature incineration, so this option should be permitted. It is also understood that scours in the EU and New Zealand also use anaerobic digestion.

Proposal:

Wool scours should recovery value from at least one resource efficiency measure, chosen to address one of the following waste streams – fibre, suint or sludge. Value recovery could take the form of composting, liquid fertiliser, anaerobic digestion or incineration. This flexibility should make the sub-criteria as widely applicable as possible amongst the best performing scours.

AHWG3 stakeholder feedback and final proposals

Here we present a summary of feedback received following the extra-ordinary ad-hoc working group in Brussels on the 23rd April 2013, together with a brief outline of the final criteria proposal.

Stakeholder feedback

Regarding ectoparasiticide testing it was proposed by one stakeholder that this must be differentiated by the individual source for the blend e.g. country from which wool is sourced and the farm. An industry stakeholder raised concerns about the potential cost of the new sampling proposals where large amounts of wool are required for the product.

A European wool scourer proposed a derogation from ectoparasiticide testing for scourers that do not release wastewater contaminated with ectoparasiticides. This is because they evaporate/distill their wastewater and use the resulting sludge to recover energy and/or anaerobically digest it to produce fertiliser and biogas.

A stakeholder requested that coarse and fine wool be defined for the purposes of the criteria as they are not internationally recognised terms.

Concern was raised about allowing organic claims to be used to evidence compliance with the ectoparasiticide requirements. It was stated by one stakeholder that it is difficult to obtain reliable certifications and that this can vary by country. It was felt by one Member State that stating on one hand that organic certifications can be accepted but then listing exceptions did not send out a good signal.

Regarding the proposed sub-criterion dealing with value recovery it was felt by one Member State that this may require a site visit to verify. The value of the criteria was additionally questioned.

Follow-up response and final proposal

Acceptance of organic certifications

The current approach was not felt by stakeholders to provide a high level of assurance, particularly in terms of sample frequency. Some industry stakeholders and licenseholders argued for testing of all sales lots to provide assurance, but this is an expensive option. An approach based on composite sampling for sales lots was agreed to be a cost effective means of increasing the sampling.

Different organic wool regulations would allow the use of different ectoparasiticide groups. For example, Regulation (EC) No 837/2007 was identified as permitting pyrethroids. Comparison would therefore need to be made for wool certified under different schemes and any gaps in restrictions identified. It was also understood from earlier in the process that availability is very limited.

Proposal:

The reference to organic certification as a compliance route for the ectoparasiticide restrictions has therefore been removed because of the issue highlighted.

Derogation of zero discharge wool scours

The philosophy of the criteria is to reduce ecoparasiticide application to animals at source, with associated reductions in diffuse pollution of the land. The main source of environmental impact is, however, understood to relate to ectoparasiticides that are released into wool scouring effluent.

Proposal:

If the derogation is to be accepted then it is proposed that wool scourers with zero discharges to the environment should demonstrate that the ectoparatisicides are destroyed by the waste treatment technique and that a high level of resource efficiency, with reference to criteria 3(c). Destruction of ectoparasiticides is understood from the textile BREF to be the case for the incineration of sludge, however, evidence could not be found to support the inclusion of anaerobic digestion.

Wool scouring effluent COD limit

The measurement of COD from wool scouring processes before treatment was intended to encourage the cleaning of wool at source, thereby reducing the need for wastewater treatment plant. There was, however, uncertainty as to how selective these targets would have been and the balance of energy saving from eliminating certain wastwater treatment stages.

It is therefore proposed instead to set point of discharge COD limits for fine and coarse wool, with the fine wool limit value set at a level that would be feasible for scourers that maximise dirt and grease removal at source.

Discussion points remained about the distinguishment between fine and coarse wool. The EU textile BREF makes a clear differentiation between the two grades of wool –

fine and coarse – and our previous analysis demonstrates a clear variation in the resulting COD of scouring effluents.

Proposal:

A cut-off of 23.5 microns is proposed based on Australian wool classifications, which would encompass ultra-fine, fine and medium fleeces [82].

Encouraging resource efficient scouring

Industry stakeholders expressed concern about the potential for scourers to comply as this would vary greatly depending on their location, access to investment and the availability of end-markets.

Resource efficiency is a key area of EU policy and an area of improvement potential for wool scours, which require significant land and natural ressource use and can produce multiple waste streams. It is proposed to retain a flexible criteria proposal, including a number of specific measures, which should ensure that sufficient scours can comply.

Summary of final criteria proposal

The final proposal introduces a number of improvements focused around wool scouring. These address the assessment and verification of the previous criterion on ectoparasiticides and a whole life approach to the environmental improvement potential of wool. The revisions are as follows:

- Ectoparasiticide sample methodology: The assessment and verification methodology has been improved to better differentiate between different farmers lots within sales lots of wool and by country of origin. Composite sampling has been introduced, offering better sampling at lower cost. Applicants may also submit tests from all lots if they wish. Where the derogation relating to zero wastewater discharge sites applies then destruction of the ectoparasiticides must be evidenced.
- Wool scouring wastewater COD limits: The requirements have been simplified into final point of discharge COD limits of 45 g/kg and 25 g/kg.

[82] Ryan, M, *The implicit market for characteristics of merino wool*, PhD thesis, University of Sydney *downloaded from* www.awex.com.au

These limits are based on reductions in COD of 75% by coarse and fine wool scourers respectively. 45 g/kg would permit scourers achieving a high level of dirt and grease removal to comply.

- Resource efficiency of wool scouring: A new criterion requires value to be recovered from at least one of the many waste streams generated by scourers, reflecting the need to maximise utilisation of natural resources. A flexible approach is taken, allowing selection from the improvement options identified.

CURRENT CRITERION 6 : MAN-MADE CELLULOSE FIBRES (INCLUDING VISCOSE, MODAL, LYOCELL AND CUPRO)

Major proposed changes	○ Certification of a minimum of 25% of cellulose pulp feedstock as being from sources certified to follow the principles of Sustainable Forestry Management. ○ Due diligence is required in order to ensure that the balance of cellulose pulp feedstock is from legal forestry or plantation sources. ○ A reduction in the OX level in the final fibre to reflect the best Elemental Chlorine Free (ECF) pulp production processes ○ Value recovery from spent process liquor is to be required for at least 50% of pulp production ○ Cotton linter feedstock to comply with the cotton criteria
Present criterion, Decision 2009/567	
(a) 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). (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 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. (c) 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.	

(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.

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

AHWG1 technical discussion

Here we present the initial background research and argumentation circulated in advance of the first ad-hoc working group meeting in February 2012.

Viscose fibres are made from regenerated cellulose pulps. This cellulose may be derived from a range of different sources, including timber, bamboo and, increasingly in China cotton pulp. Over the last decade production of viscose fibres stabilised at approximately 2.6 million tonnes world-wide (Europe : 600 thousand tons) but has recently risen sharply again to 5.5 million tonnes because of the increase in the price of cotton [83].

The pulp required to manufacture viscose fibres is a specialised grade called dissolving pulp. Dissolving pulp is a commodity product which manufacturers buy from different sources on the world market. Benchmarking of the performance of global pulp mills suggests that pulp production technology varies considerably in the amount of energy used and the quantity and nature of the emissions to air and water.

A number of different processes exist to manufacture the fibres, with the viscose and modal processes being the most widely used. The lyocell production process has been developed over the last two decades and whilst it has cleaner process chemistry it is understood that the process uses more energy.

Pulp feedstock sourcing, pulp liquors and process solvents have cited as being associated with deforestation and water pollution in developing countries [84].

[83] Asia Paper Markets, *Commodities to watch – dissolving pulp*, Market briefing paper, February 2001

[84] NRDC, *Not all bamboo is created equal*, August 2011 http://www.nrdc.org/international/cleanbydesign/files/CBD_FiberFacts_Bamboo.pdf *see also* Patagonia, *On bamboo and rayon*, April 2009

AOX levels in fiber

In the last revision it was discussed if point (a) could be removed. According to the "Environmental Assessment of Textiles" elaborated in 1997 by the Danish Environment Protection Agency, there are no reasons to have emissions of AOX during the production of viscose. Only chlorinated bleaching can generate this type of emission. The proposal was to delete the reference to AOX in this criterion. But the representative body of the European man-made fibre industry, stated that the sentence “the level of AOX in the fibres shall not exceed 250 ppm” should be kept, because the AOX not only depends on bleaching during the production of the fibres (and in the follow up during fabric finishing), but also from the process conditions of the cellulosic raw material. It is possible that a distinguishment could be made between the production of pulp and the production of viscose fibres in order to more accurately determine an appropriate AOX level.

Sulphur emissions to air

The toxicity of carbon disulphide emissions from viscose fibre production stage was highlighted by the LCA findings in the preliminary report. Data from the polymer BREF provide the following data for emissions of Sulphur to air:

- Fiber production: 12,5 – 30 kg/t
- Filament production (with integrated washing): 170 – 210 kg/t
- Filament production (batch washing): 40-60 kg/t

This indicates that the limit for filament production could be split into 2 separate limits. Today batch washing can very easily perform better than these limits whereas integrated washing will have great difficult passing. However, the significantly better performance data for batch processes suggests that the criterion should retain their focus on the performance of batch washing processes.

Emissions to water of zinc

Zinc can be eliminated by leading the wastewater through staged neutralization, whereby the pH is raised from 4 to 10 by lime milk. According to the BREF this technique is “generally applicable”. The BAT would be to achieve 1,5 mg/l Zn. The BAT for sensitive waterbodies would be to achieve 0,3 mg/l Zn.

This means that the present limit value is equal to BAT for sensitive waterbodies. It is therefore recommended to keep the value but to change the unit from g/kg to g/l as stated in BREF.

Copper content of effluent water

This criterion has not been changed in the last 2 versions. No reference is made in the BREF and since the criteria has not been challenged or commented on it is suggested to keep the criteria as it is.

Process energy consumption

The preliminary report discussed the energy intensity of viscose production, with a benchmark of consumed primary energy data suggested as being 196 MJ/kg of fibre [85] . This figure is significantly higher than the data for synthetic fibres. However, closer examination of the polymer BREF highlights the difference between staple and filament fibres.

The process energy use for staple fibre use is 26.1 – 33.2 MJ/kg of fibre and filament fibre between 70 – 125 MJ/kg depending on whether it is a batch or continuous process. The preceding pulp production stage also requires consideration, with the draft pulp, paper and board BREF suggesting a range of 7.5 – 16.5 MJ/kg for dissolving pulp production.

Further investigation of energy benchmarks for man-made cellulose fibres is therefore required in order to determine to identify if there are variations in process energy use between different forms of cellulose fibre production and whether a criterion is justified to achieve environmental improvements.

Pulp feedstock sourcing

With the growth of viscose production in countries such as China concerns have risen about the possible extent of deforestation in order to supply cellulose pulp feedstock. Whilst the use of raw material from forestry was highlighted by the preliminary report the issue of deforestation will not have been identified by the IMPRO LCA findings as it is regionally specific.

In other sectors such as construction the responsible sourcing of timber has been successfully regulated by certification schemes such as FSC and PEFC which set requirements for the sustainable management of forestry and require third party verification of the chain of custody for timber products.

[85] Laursen, S. E., Hansen, J., Knudsen, H. H., Wenzel, H., Larsen, H. F., & Kristensen, F. M. (2007). *EDIPTEX: Environmental assessment of textiles*. Danish Environmental Protection Agency, working report 24

It is therefore proposed that a requirement for evidence of responsible sourcing is introduced for viscose fibres. Comparisons suggest that the FSC and PEFC certification schemes provide a high level of assurance in their verification of the chain of custody [86]. It is to be investigated whether certification can be obtained for bamboo plantations.

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

Stakeholders highlighted a number of technical points that inform the follow-up research for this criterion:

- The AOX limit cannot be reduced much further because chlorinated bleaches must be used to meet market requirements. It should be clarified if the focus is to be on AOX in wastewater or the fibre.
- The ISO test specified for use to verify AOX content requires checking as it may not be the appropriate test;
- Energy benchmarks are difficult to apply and the processes used to produce regenerated cellulose fibres are not as energy intensive as stated;
- The LCA study carried out by Shen and Patel (2010) 'Life cycle assessment of man-made cellulose fibres' should be reviewed as evidence;
- The introduction of certification for sustainable dissolving pulp was supported, however, it is difficult to obtain and therefore a target of 25% was proposed as a starting point for the criterion.

[86] CPET, *UK Government timber procurement policy – definition of legal and sustainable for timber procurement*. April 2010

Follow-up research and proposed approach

Dissolving pulp – a specialist pulp grade

Dissolving pulp is required to manufacture regenerated cellulose fibres. It is a specialist pulp grade because it requires longer fibres, a higher level of quality control and more feedstock to produce than paper pulp [87]. It is understood to be largely produced using eucalyptus, a tree grown in warmer climates, as well as beech and bamboo pulp in Western Europe and China respectively.

There are less than a dozen sites producing market dissolving pulp globally, with 4.5 million tonnes/annum based on wood pulp and 1.0 million tonnes/annum based on cotton pulp [88]. The most significant production sites are located in Brasil (Bahia-pulp) and South Africa (Sappi). The majority of the remaining capacity is located in North America and Europe, although India and China are looking to rapidly expand capacity. Commentators highlight that some of the global market dissolving pulp capacity is ageing and may therefore have environmental performance problems – for example, in China and North America.

A number of integrated pulp and fibre production sites exist, mainly in Europe – for example, SNIACE in Spain and Lenzing in Austria, but these account for only a small proportion of global capacity. These plants produce pulp to very high environmental standards (see the next section).

LCA-derived options for reducing the impacts of fibre production

A peer reviewed LCA study completed by Utrecht University and commissioned by Lenzing (2010) compared the different processes for the production of viscose, modal and lyocell fibres [89]. The study identifies the most significant environmental improvement potential as:

1) Using cleaner sources of power/steam, which in part can be influenced by locational factors such as the electricity grid emission factor and the availability of local district heating;

[87] European Commission, *Best Available Techniques reference document for production of pulp, paper and board*, IPPC Bureau, Draft May 2012.

[88] Patrick, K, *Dissolving pulp gold rush in high gear*, Paper 360, September 2011, p-8

[89] Shen, L and M.K.Patel, *Life cycle assessment of man-made cellulose fibres*, Utrecht University, Lenzinger Berighte 88 (2010) 1-59

2) Moving to integrated pulp and fibre production (a biorefinery approach) with black liquor and other by-products being used to fuel the processes and to offset on-site emissions;

3) Minimisation of caustic soda use in pulp and fibre production because of the environmental impacts associated with its production, which mainly relate to the electrolysis of sodium chloride;

4) Minimisation of carbon disulphide solvent emissions to air and water from the viscose and modal fibre production stage;

5) Moving to lyocell production because of the different chemistry which is based on a safer, biodegradable solvent which is 99% recycled within the process, although this benefit is partly offset by greater process energy use.

Option 1 would be complex to measure and benchmark. The polymer BREF contains energy consumption figures for staple and filament fibre production. It does not, however, provide data for integrated pulp and fibre production. Market pulp production would require reference to the pulp, paper and board BREF. Variations in electricity grid emissions and the availability of district heating would further add to complexity. It is considered that a hybrid response to Option 1 and 2 may, however, be possible by reference to the pulp, paper and board BREF (see below).

Option 2 is understood to be very site specific and is not currently representative of the industry, with market dissolving pulp sourced from separate sites generally being used. However, the new draft pulp, paper and board BREF suggests that energy recovery from black liquor waste (termed 'spent sulphite liquor'), a pollutant which has raised concerns in relation to the environmental impact of viscose production in China, would represent the BAT for pulp production [90]. Plants recovering energy from organic compounds can reach 90% energy self-sufficiency. This technique also has the benefit of reducing COD loads in wastewater.

With regards to Option 3 consultation with the current Ecolabel licenseholder suggests that the polymer BREF value of 0.5 t/t for the staple fibre product would be feasible, however, further investigation would be required to identify a limit value for dissolving pulp production.

Option 4 is already addressed by the criterion.

[90] European Commission, *Best Available Techniques reference document for production of pulp, paper and board*, IPPC Bureau, Draft May 2012.

In relation to Option 5 the polymer BREF claims that Lyocell fibres have different properties to Viscose and Modal fibres and therefore the fibres and production process should not be seen as a substitute [91]. However, consultation with the leading producer of lyocell has confirmed that modal and lyocell are of a higher quality than viscose. Although it was also highlighted that lyocell only currently accounts for 3% of world cellulose market [92].

The improvement potential of substituting cotton was also highlighted by the study. Lyocell and modal fibres are commonly substituted for cotton in women's apparel where greater uniformity of the product and lower tenacity (moisture retention) are required. Viscose, modal and lyocell are also blended with polyester to produce a superior fabric product to cotton with high tenacity and strength.

Proposal:

Based on the options presented by the LCA study it is proposed that a new criterion is introduced requiring that energy is recovered from by-products at the pulp production stage in order to meet on-site power and heat requirements. This is understood to be achieveable by the current licenseholder and represents European BAT.

Bleaching and AOX emissions

In order to better understand the position with regard to possible AOX emissions the draft BREF for paper and pulp products was consulted. This is currently at an advanced stage of drafting by the European Commission's IPPC bureau. As of May 2012 the draft BREF claims that apart from some very specialist applications no EU dissolving pulp is produced using chlorine bleaching and that Elemental Chlorine Free (ECF) processes are increasingly being replaced by Total Chlorine Free (TCF) processes in order to reduce/eliminate AOX emissions and dioxin formation [93].

In order to further investigate whether ECF or TCF specifications are feasible for fibre manufacturing a current licenseholder was consulted. They confirmed that at the pulp

[91] European Commission, Reference document on Best Available Techniques in the production of polymers, IPPC Bureau, August 2007

[92] Lenzing Group (2012) *Fact sheet*,

[93] European Commission, *Best Available Techniques reference document for production of pulp, paper and board*, IPPC Bureau, Draft May 2012.

stage ECF bleaching predominates and that TCF dissolving pulp is difficult to obtain on the market.

Whilst the Polymer BREF (2007) specifies TCF pulp for the integrated pulp and fibre production plant used as a reference case study, suggesting a range of 7-50 mg AOX/kg product [94], integrated plant supplied with TCF dissolving pulp are not understood to be typical for the industry globally, which relies on market ECF pulp production.

This position was further confirmed by consultation of publicly available information from leading producers of dissolving pulp. Based on manufacturers production volumes TCF dissolving pulp appears to account for around 13% of global production. It also only appears to be produced for specialist applications, for example medical devices.

At the fibre production stage it is understood that sodium hypochlorite (NaClO) is still required by the industry to meet customer requirements for uniform whiteness of the fibres. Hydrogen peroxide bleaching is used, but only for medical applications where chlorine cannot be present.

Proposal:

A limit value of 150 mg/kg in the fibres was considered to be representative, based on operational experience, of a fibre produced from market ECF pulp and bleached using sodium hypochlorite. This can also be verified by reference to the pulp, paper and board BREF.

Sustainable timber certification and chain of custody

Further investigation of the basis for both European sustainable forestry policy [95] and certification schemes for sustainable forestry [96] confirmed their basis in the UNEP

[94] European Commission, Reference document on Best Available Techniques in the production of polymers, IPPC Bureau, August 2007

[95] European Commission, *EU forests and forest related products*, http://ec.europa.eu/environment/forests/home_en.htm

[96] Rametsteiner, E and M, Simula, *Forest certification—an instrument to promote sustainable forest management?* Journal of Environmental Management 67 (2003) 87–98

and FAO principles of Sustainable Forestry Management (SFM) [97]. These principles should therefore provide the reference point for selection of appropriate certification schemes. Their conformance with ISO/IEC 17065 is also a consideration in relation to the quality of verification systems [98].

In terms of market share the two most significant certification schemes are those operated by the Forestry Stewardship Council (FSC) [99] and the Programme for the Endorsement of Forestry Certification (PEFC) [100]. The PEFC scheme now incorporates the Sustainable Forestry Initiative (SFI), the Malaysian Timber Certification Council (MTCC) and American Tree Farm System (ATFS) [101].

In 2009 these schemes accounted for 9% of global forestry and 26% of industrial timber supplies [102]. Bamboo is currently certified under these schemes. PEFC is the most significant scheme, accounting for over two thirds of certified timber. The majority (over 90%) of certified timber is from Europe and North America.

Belgium [103], Germany [104], the UK [105] and the Netherlands [106] are notable for their detailed monitoring and evaluation of forestry certification schemes in support of Green Public Procurement (GPP) [107]. Their current consensus is that FSC and

---

[97] Castaneda, F. *Criteria and indicators for sustainable forestry management*. UN FAO, http://www.fao.org/docrep/x8080e/x8080e06.htm#TopOfPage

[98] ISO/IEC 17065: 2012, Conformity assessment – requirements for bodies certifying products, processes or services.

[99] Programme for the Endorsement of Forestry Certification, http://www.pefc.org/

[100] Forestry Stewardship Council, http://www.fsc.org/

[101] UNECE, FAO and UNFF (2009) *Vital forest graphics*

[102] UNECE and FAO (2010) *Forest products annual market review 2009-2010*

[103] UK Central Point of Expertise on Timber, *Government procurement of timber in Belgium*, http://www.cpet.org.uk/uk-government-timber-procurement-policy/international-context/international-policies-1/belgium

[104] Germany Government Procurement Policy, *Wood and paper based products*, http://www.sustainableforestprods.org/tools/german_government_procurement_policy

[105] UK Central Point of Expertise on Timber (2008) *Review of forestry certification schemes results*,

[106] Timber Procurement Assessment Committee, Netherlands, http://www.tpac.smk.nl/

[107] UK Central Point of Expertise on Timber (2008)*A comparative study of the national criteria for 'legal and 'sustainable' timber and assessment of certification schemes in Denmark, UK, Netherlands and Belgium*

PEFC provide sufficient levels of assurance, with the exception of PEFC Malaysia which is excluded by the Netherlands because of weaknesses in a number of Sustainable Forestry Management principles, including customary rights, limited public availability of forestry plans and identification of areas of high ecological value [108].

The availability of certified dissolving pulp

No reliable market data is currently available for the quantity of certified dissolving pulp that is available, however, a review of publicly available information from the major producers suggests that at least 14.5% of capacity may be certified to either FSC or PEFC. Consultation with the only current EU licenseholder confirmed that certified market dissolving pulp can be obtained but that the maximum they could practically achieve would be 50% certified fibre content. Wider consultation by CIRFS with EU producers suggested 25%.

Proposal:

Given the potential for growth in certified dissolving pulp availability during the new license period an initial target of 25% is therefore proposed, which could be increased by an increment of 5% each year.

Given that some fibres from China may be produced from cotton lint pulp it is also proposed that regenerated fibre produced from cotton should conform with the cotton criterion.

The market impact of certification

Whilst the proportion of forestry covered by these certification schemes market is still relatively low they are considered by the FAO and independent research to have played an important role in influencing forestry practices and in raising awareness of the threat to global forests [109]. However, it has been highlighted by the UNEP, the

---

http://www.cpet.org.uk/uk-government-timber-procurement-policy/international-context/international-policies-1/comparative-study-of-danish-uk-dutch-and-belgium-national-criteria

[108] [108] Timber Procurement Assessment Committee, Netherlands http://www.tpac.smk.nl/webadmin/files/Uitspraak%20College%20van%20Beroep%20inzake%20MTCC.pdf

[109] UNECE and FAO (2010) *Forest products annual market review 2009-2010* see also Rametsteiner, E and M, Simula, *Forest certification—an instrument to promote sustainable forest management?* Journal of Environmental Management 67 (2003) 87–98

FAO and by European Commission policy that in countries where there is poor governance and limited enforcement of forestry protection these schemes cannot be expected to work [110]. This point is picked up in relation to illegal forestry later in this section.

In the previous section the dissolving pulp was highlighted as a specialist pulp product. Given that the feedstock commonly used to produce market dissolving pulp is eucalyptus or bamboo, a proportion of feedstock may be sourced from countries where the availability of certified timber is lower and where there may be greater concerns about illegal forestry [111]. This can be illustrated by the categorisation in Figure 4.1.5. There is therefore a clear justification for seeking sustainable certification of dissolving pulp and restriction of illegal sources.

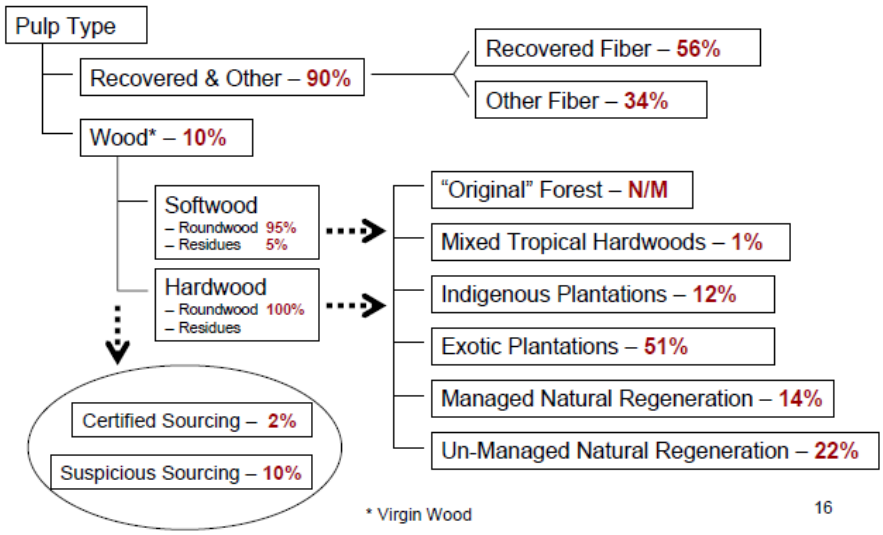


Figure 4.1.5 Categorisation of fibre sourcing for China

Source: Goetzl, A (2008)

[110] UNECE, FAO and UNFF (2009) *Vital forest graphics*

[111] Goetzl, A (2006) *Wood for paper: fibre sourcing in the global pulp and paper industry*, Presentation made to 'Forestry trends Potomac Forum' 14th February 2008

Certification that timber is from legal sources

A reduction in illegally harvested timber is a policy objective for Europe. There are three main routes currently available to demonstrate legal sourcing:

- UN CITES permits have historically been the main form of documentary evidence that timber is from legal sources.
- Both FSC and PEFC certify that timber is legally sourced, labelling it as being from 'controlled sources'.
- Europe is in the process of introducing the FLEGT (Forest Law Enforcement Governance and Trade) licensing scheme. FLEGT is based on bilateral agreements between the EU and timber producing countries [112].

As we noted in the previous section, forestry certification and legality are strongly influenced by governance and the effectiveness of local enforcement. The FLEGT scheme attempts to tackle this issue by addressing both governance and certification.

The new EU Timber Regulation (EC) 95/2010 will introduce new requirements for the sourcing of timber products from 2013 [113]. For new products introduced onto the EU market the regulation will prohibit illegally harvested timber and introduce requirements for 'due diligence', which it defines as comprising:

> *(a) measures and procedures providing access to the [origin of] the operator's supply of timber or timber products placed on the market;*
>
> *(b) risk assessment procedures enabling the operator to analyse and evaluate the risk of illegally harvested timber or timber products derived from such timber being placed on the market.*
>
> *(c) except where the risk identified in course of the risk assessment procedures referred to in point (b) is negligible, risk mitigation procedures which consist of a set of measures and procedures that are adequate and proportionate to minimise effectively that risk and which may include requiring additional information or documents and/or requiring third party verification.*

In terms of proof of legality the regulation states that:

---

[112] European Commission, *Illegal logging and FLEGT action plan*, http://ec.europa.eu/environment/forests/illegal_logging.htm

[113] Regulation (EU) No 995/2010 of the European Parliament and of the Council of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market

'Timber and timber products covered by valid FLEGT or CITES licenses are considered to comply with the requirements of the Regulation.'

The regulation will also recognise existing third party certification systems for legal timber (which could, for example, include FSC or PEFC) as long as they can meet the due diligence criteria setout in Article 6 of the Regulation.

Whilst the Regulation does not therefore introduce a legal requirement for all timber, it will require existing products to demonstrate full traceability of their supply, which it defines as being able to identify:

(a) the operators or the traders who have supplied the timber and timber products; and

(b) where applicable, the traders to whom they have supplied timber and timber products.

Given the likely sources of pulp feedstock, and the focus of Europe's new timber policy, the legality of sourcing is considered to be an important consideration. An Ecolabelled product should therefore demonstrate the highest level of assurance required by Regulation (EC) 95/2010.

Proposal:

It is therefore proposed that all pulp must be demonstrated through due diligence processes, supported where necessary by CITES, FLEGT or independent third party certification of legal sourcing. Moreover, consultation with the current Ecolabel licenseholder has confirmed that this is a feasible criterion.

AHWG2 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

It was stated that Cupro is no longer manufactured in the EU. The need for reference to it in the criteria was therefore questioned.

The BAT limit values were queried. It was requested to check that the VOC levels are correctly quoted and include for both types of filament fibre processes in the polymer BREF.

An annual increment in the certified dissolving pulp % requirement was not considered possible by Competent Bodies because of the need to renew licenses if conditions change. The % that certified sustainable fibre content requirement could reach should be clarified if this approach is introduced.

Concern was raised that the energy self-sufficient proposal would only be achieveable for integrated production sites, of which there are only a limited number in the world, so it would restrict potential licenses. The criteria should be feasible for suppliers of market pulp. A specific figure would be needed in the final proposal, if the criteria is shown to be feasible.

The reference to AOX in the criteria requires clarification as the ISO standard referred in the verification conditions measures OX. The criteria could be made simpler by stating that elemental chlorine gas is excluded, reflecting the use of ECF technology. The current Nordic Swan criteria were suggested as a reference point.

Follow-up research and proposed response

Continued inclusion of cupro fibres

It is understood that cupro fibres are still manufactured outside of the EU and are sometimes used as a man-made alternative to silk. It is also understood that they are manufactured using pulp obtained from cotton linters, for which a new requirement to comply with the cotton criteria has been introduced [114]. This is

[114] Asahi Kasei, *Bemberg cupro fibres*, http://www.asahi-kasei.co.jp/fibers/en/cupro_fiber/index.html

understood to be particularly relevant to production in China, the main source of the EU's textiles.

Proposal:

Retain the reference to cupro and the associated limit value for copper effluent and cotton sourcing.

Correction of the BAT sulfur content of aerial emissions

A leading industry stakeholder noted that the sulfur emissions did not tie up with those in the polymer BREF. This included the need to distinguish between two different forms of filament fibre washing, which are understood to correspond to different fibre end-uses.

Table 4.1.14 BREF polymer BAT sulfur emission levels

Fibre type	**Performance value**
Staple fibre	12.5 g/kg
Filament fibre - Batch washing - Integrated washing	 40 g/kg 170 g/kg

Source: European Commission (2007)

Proposal:

Revision of the BAT VOC limit values to reflect the two different filament fibre washing processes in the polymer BREF.

Industry adoption of pulp spent liquor recovery

The draft pulp, paper and board BREF highlights the recovery of black liquor waste (termed 'spent sulphite liquor') as an overall BAT for dissolving pulp production [115]. Moreover it highlights two options. The first being energy recovery in boilers to supply steam and power to a site. The second being use of the waste as feedstock

[115] European Commission, *Best Available Techniques reference document for production of pulp, paper and board*, IPPC Bureau, Draft May 2012.

to manufacture by-products – the so-called 'biorefinary' concept (as illustrated in figure 4.1.6 below).

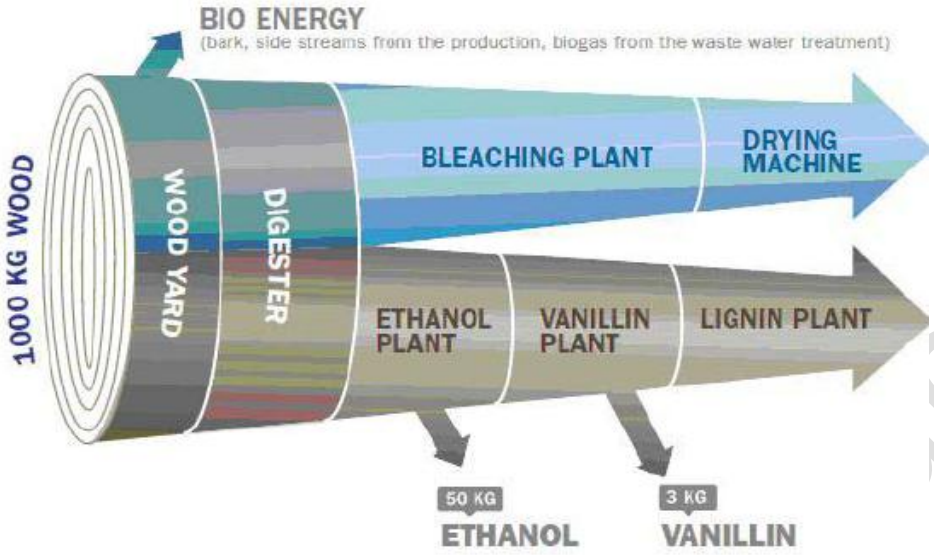


Figure 4.1.6: Basic principle of the flow of pulp and spent liquor in mills applying the biorefinery concept. Source: IPPC Bureau (May 2012)

The environmental benefits of energy recovery were highlighted by the LCA study undertaken by Shen, L and M.K.Patel (2010). However, the potential benefits of a biorefinary approach were referred to by this study but were not fully analysed. A short literature search was therefore carried out for related LCA evidence. Both options are highlighted by the pulp and paper BREF as BAT with the potential for reduction of COD emissions and total dissolved solids to wastewater.

A peer reviewed, independent study of a Swedish TCF pulp mill incorporating biorefinary production was identified as being relevant 116. The study explored how the environmental impacts associated with the by-products can be allocated and the extent to which this improves the environmental performance of the TCF mill. It concludes that the TCF mill achieves a more efficient use of raw materials and that lignosulfanate and ethanol production allow for a reduction of 5% in the overall contributions.

[116] *Gonzalez-Garcıa et al., LCA of a Swedish Dissolving Pulp Mill Integrated Biorefinery*, Journal of Industrial Ecology, 15 (4) p-568

In order to better understand the prevalence of dissolving pulp production with by-product recovery installed a review of publicy available reports from pulp suppliers was combined with an email survey by an existing Ecolabel licenseholder of its suppliers. These were used to identify a possible level of energy-self-sufficiency that could be required and to better understand the alternative option of by-product manufacturing.

Five mills in North America – Cosmo Speciality Fibres (USA), Fortess Mill (Canada), Neucel Speciality Cellulose (Canada), Rayonier (USA) and Tembec (Canada),- one in Europe - Birla Cellulose (Sweden) – and one in Africa - Sappi Saiccor (South Africa) – were identified from public available literature as having energy recovery installed. As we have already noted the Sappi Saiccor site is significant for being one of the world's largest, although the proportion of the production lines with energy recovery installed could not be identified.

The results of dialogue between an existing Ecolabel licenseholder and their pulp suppliers can be found in Table 4.1.15. The results support the availability of the two proposed options, as well their interrelationship, highlighting the potential for sites to divert waste from energy recovery to by-product manufacturing. It was noted that verification for by-product production may, however, need to be confidential because of commercial sensitivities.

Table 4.1.15. Summary of dissolving pulp suppliers' response to leading fibre manufacturer questionnaire

Mill	Implementation of energy recovery	% energy self-sufficiency	Implementation of co-product recovery	% of waste converted
European mills				
1.	Yes	100%	Lignosulfanates, *others*	20%
2.	Yes	100%	Lignosulfanates, acetic acid, furfural. *others*	*Not disclosed*
Mills outside of Europe				
1.	Yes	55%	Lignosulfanates	*Not disclosed*
2.	Yes	>95%	Turpentines, soap	*Not disclosed*
3.	Yes	100%	*Not available*	*Not disclosed*
4.	Yes	100%	*Not available*	*Not disclosed*

Whilst the results might suggest that a requirement for 100% of pulp supplies would be workable this was not , however, considered to be practical. This is because a proportion of pulp may still need to be bought on the open market and fibre producers would need to retain some degree of freedom to do this during each year. A figure of 50% was therefore proposed instead as a realistic starting point.

A further concern was raised in cases when licenseholder may change their pulp suppliers during a year. The question was asked whether they would then need to re-apply for the Ecolabel. Consultation with a Competent Body experienced with textiles confirmed that it should be possible to submit relevant documentary verification to a Competent Body as and when new, compliant suppliers are used. Furthermore, this could, if need be, also be done confidentially between pulp supplier and Competent Body.

Proposal:

That 50% of the pulp used to manufacture fibres is obtained from dissolving pulp production plant that recover value from their spent liquor by using it to either:

1. Generate heat and power

2. Produce chemical by-products

A dynamic requirement for sustainable pulp certification?

The proposal to increase the percentage of sustainably certified pulp required year on year raised concern from Competent Bodies. A 5% increase was proposed in order to reflect the growing availability of certified pulp. Although there is a precedent for this approach from the floor coverings product group it was felt in principle not to be compatible with the Ecolabel's approach to licensing.

Proposal:

Omit the dynamic element of the criteria proposal.

Simplification of the fibre OX requirement to elemental chlorine free pulp

A proposal was made to replace the fibre OX limit value with a simpler requirement for Elemental Chlorine Free (ECF) pulp. If we reflect back on the overall objective of the criteria it is understood to be the minimisation of dioxin formation from lignin and to minimise the formation chlorophenols, chloroform and other halogenated compounds.

The pulp and paper BREF states that a shift from the use of elemental chlorine to the use of chlorine dioxide gas in combination with hydrogen peroxide during selected bleaching stages is effective in reducing the potential for 2,3,7,8-TCDD and 2,3,7,8-TCDF formation to non-detectable levels [117]. Although a study from Sweden still claimed to have detected furans and dioxins in ECF effluent [118].

The overall level of halogenated compounds can, however, vary considerably depending on the bleaching sequences, highlighting the fact that there is no definitive form of ECF pulp production. The pulp and paper BREF suggests that AOX levels in wastewater can vary between 30 and 400 g/t. The term 'ECF-light' has been used to describe bleaching sequences at the lower end of this range. Literature suggests

[117] European Commission, *Best Available Techniques reference document for production of pulp, paper and board*, IPPC Bureau, Draft May 2012.

[118] Johnston, P. A., Stringer, R.L., Santillo, D., Stephenson A. D., Labounskaia, I. P., and McCartney, H. M. A., Technical report 7/96, Greenpeace Research Laboratories, University of Exeter, UK (1996).

that this specification would be required to minimise the formation of dioxins, furans and halogenated compounds.

It is understood from an existing licenseholder that without being sure that an ECF-light sequence had been used the OX in fibre limit value of 150 ppm could be exceeded. A study looking at the influence of different bleaching sequences on OX levels supports this assertion, suggesting that 'ECF light' would equate to OX levels 50-100 ppm [119]. However, no means of determining equivalence between the AOX levels cited in the BREF and the cited OX levels in pulp, as well as the final contribution by the fibre NaClO bleaching stage, could be found.

Proposal:

It is proposed to retain the 150 ppm OX limit as this would correspond to ECF-light bleaching sequences, which evidence suggests serve to minimise dioxin, furan and halogenated compound formation in wastewater and on the fibre.

[119] Suess, H.U, Leporini-Filho, C. and K, Schmidt, *Bleaching of eucalyptus kraft pulp with low residual of halogenated compounds*, APTCP conference, Sao Paulo, October 1999

AHWG3 stakeholder feedback and final proposals

Here we present a summary of feedback received following the extra-ordinary ad-hoc working group in Brussels on the 23rd April 2013, together with a brief outline of the final criteria proposal.

Stakeholder feedback

AOX in wastewater should also be considered. Not all manufacturers measure OX in fibre. Additionally it was claimed that restrictions on OX in fibre and sulphide in air emissions do not ensure low wastewater content. AOX would allow pulp manufacturers to verify ECF bleaching. Limit values were separately proposed of 0.150 and 0.170 kg/ADT.

The Polymer BREF emission value ranges for criterion should be accepted for all production technologies. The proposed staple fibre emission limit of 12.5 g S/kg is not readily achievable and 30 g S/kg already requires a combination of different recovery technologies.

COD and sulphide in wastewater should additionally be considered. Restrictions on sulphides in emissions to air do not ensure low wastewater content. A COD limit may also be more effective than value recovery from waste.

Differences between the criteria proposals and those of the EU Ecolabel copying and graphic paper criteria set should be mentioned and justified in the Technical Report.

Follow-up response and final proposal

AOX in wastewater versus OX in fibres

It is understood from industry stakeholders and scientific literature that fibre OX is an indicator of whether chlorine bleaching sequences have been used and therefore also the presence of AOX in wastewater, although residual chlorinated compounds may not directly correlate to the level of AOX [120].

The current OX limit value can, as highlighted earlier in this report, only be achieved by 'ECF light' production which combine hypochlorite and hydrogen peroxide bleaching sequences. These are understood from the Polymer BREF and additional

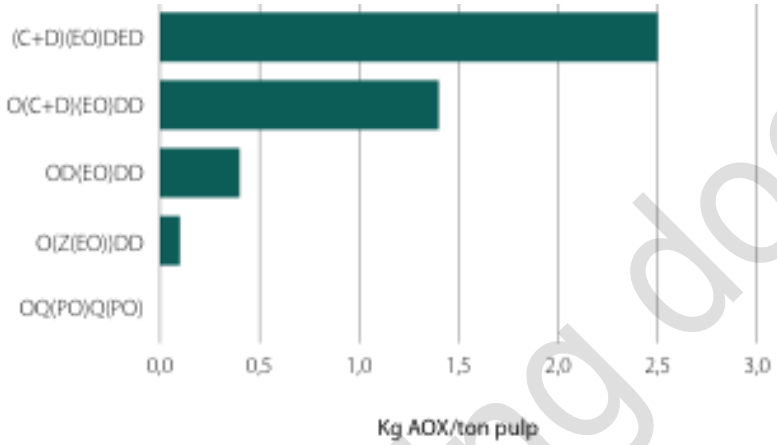
[120] Suess, H.U, Leporini Filho, C and K, Schmidt, *Bleaching of eucalyptus kraft pulp with low residual halogenated compounds – "ECF light"*, Paper presented as APTCP, April 1999

technical literature reviewed to minimise the potential for the formation of dioxins and other chlorinated compounds of concern.

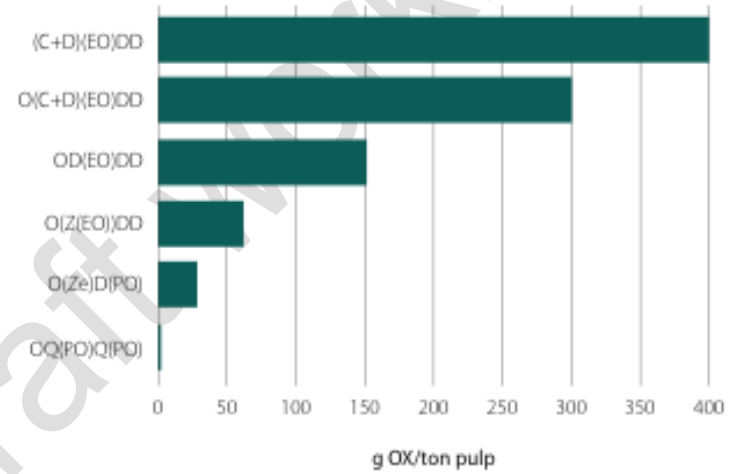
AOX would offer an alternative verification route, but could only be accepted if broad equivalence can be determined with the OX limit value. An indicative comparison of bleaches sequences published by METSO suggests that only sequences with AOX emissions of <0.15-17 kg/ADT pulp would permit an OX in fibres of <150g/tonne pulp to be achieved (allowing for a contribution from bleaching of the final fibre) [121].

Figure 4.1.7 Comparison of AOX and OX arising from bleaching sequences

a) AOX emissions from different bleaching sequences



b) OX levels in pulp bleached with different bleaching sequences



Source: Metso (2009) *Bleaching of chemical pulp*

[121] Metso (2009) *Bleaching of chemical pulp*

Proposal:

An AOX limit of 0.17 kg/ADT pulp is therefore proposed.

BAT limit values for sulphur emissions

All three viscose fibre production technologies are addressed by the criteria. The filament fibre limit values would, for integrated washing proceses, represent an increase in the limit value from 120g/kg to 170-220g/kg. A limit value of 170g/kg is proposed in order to minimise the increase.

It is understood that for batch filament fibre processes the lower end figure of 40g/kg is readily achieveable, which would represent a decrease on 120g/kg (see Technical Report, February 2012).

A staple fibre emission limit of 12.5g/kg is not understood to be readily achievable as 30 g S/kg already requires a combination of different recovery technologies.

Proposal:

It is therefore proposed to retain the filament fibre limit values at the lower end of the BAT emissions ranges, 40g/kg and 170g/kg respectively, and the staple fibre limit value to the upper end, 30g/kg of the range.

Broadening the scope of the wastewater limit values

It was proposed that sulphide and COD emissions to water be added as criteria. Sulphide emissions to air are identified alongside raw material sourcing, energy use in production and caustic soda production as the most significant impacts of man-made cellulose production (Shen and Patel 2010).

It is therefore proposed to maintain a focus on sulphur emissions to air. Evidence suggests that the new criterion addressing energy recovery from waste will serve to reduce COD to wastewater.

Proposal:

On this basis it is also proposed to delete the criterion relating to zinc in order to minimise the number of criterion.

Justifying differences with the copying and graphic paper criteria

As discussed earlier in this report dissolving pulp is a specialist grade of pulp used to manufacture viscose fibres and is manufactured from a limited number of specific tree species. A higher sustainable pulp content is therefore difficult to justify for this pulp grade.

It was proposed to reflect the approach to COD and energy efficiency taken in the copying and graphic paper criteria. Our main reference LCA study for viscose (Shen and Patel 2010) prioritised raw material sourcing, energy use in production, caustic soda production and sulphide emissions. Targets set on COD/TOC would not necessarily encourage energy recovery from process waste, which in turn reduces net CO_2 emissions. Simplified and easy to verify criteria for energy recovery have been developed. Industry has commented on and has been involved in this process throughout.

Summary of final criteria proposal

The final proposal is intended to reflect the most significant areas of improvement potential along the life cycle of fibre production, whilst also reflecting EU policy on timber sourcing. This is reflected in the following revisions:

- Minimum requirement sustainable and legal timber sourcing: Certification of a minimum of 25% of cellulose pulp feedstock as being from sources certified to follow the principles of Sustainable Forestry Management. The remaining pulp must be obtained from legal sources, with reference to EU and UN verification and due diligence requirements.
- OX and AOX emissions: Emissions of dioxins and chlorinated compounds are minimised by setting OX and AOX limit values for pulp production that require ECF 'light' or TCF pulp production. Either OX or AOX data can be accepted, giving manufacturers flexibility in verification.
- Minimised CO_2 emissions from production: Value recovery from spent process liquor is to be required for at least 50% of pulp production, reflecting the improvement potential identified by a major LCA study and the EU BREF. The 50% requirement responds to the need for manufacturers to retain some flexibility to obtain pulp on the open market.
- Alignment of sulphur emissions with the polymer BREF: The limit values have been revised to align with the lower BAT values for filament fibre production.
- Addressing cotton linter feedstock: Fibres manufactured from cotton linters rather than wood pulp should reflect the environmental improvements in the cotton criteria.

CURRENT CRITERION 7: POLYAMIDE

Major proposed changes	○ Lowering of the N_2O emission limit for PA66 fibre ○ Proposal to explore an alternative approach based on emissions from adipic acid production ○ Introduction of a minimum 20% recycled content
Present criterion, Decision 2009/567	
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.	

AHWG1 technical discussion

Here we present the initial background research and argumentation circulated in advance of the first ad-hoc working group meeting in February 2012.

Emissions to air of N_2O

Nitrous oxide is a significant greenhouse gas and is emitted during the polyamide (nylon) production process. According to [Boustead, 2000] the "process" air emissions of N_2O in the production of Nylon 6 polymer are calculated to be 8.6 g / kg polymer ("when all production sequences are traced back to the extraction of raw materials from the earth") [122].

CIRFS reports that 3 different factories in Europe emit 50, 50 and 196 g/kg and 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.

The Blue Angel differentiates between the limit for N_2O between polyamide 6 and polyamide 6.6. The associated limits are:

- Polyamide 6: 10 g/kg

[122] Asqual, *Revision of the textile Eco-label – final report 2007*,

- Polyamide 6.6 16,5 g/kg.

The question is therefore whether the criterion for polyamide 6.6 should be harmonised with the stricter requirements of the Blue Angel noting, however, that there are no current licenseholders against which to judge whether they can be met by industry.

Process energy consumption

The Preliminary Report highlighted the significance of energy consumption associated with nylon production. Process energy consumption associated with the fibre production stage has been benchmarked by the BREF for polymers. Process energy data for all production stages has been compiled by Plastics Europe as part of their Ecoprofiles collection.

For nylon 6 the BREF suggests benchmarks of 6.500 – 7.000 MJ/tonne for continuous processes and 9.500 – 10.000 MJ/tonne for batch processes. This is estimated to represent 7.6% - 10.6% of the life cycle process, excluding feedstock energy. It can therefore be seen that an energy benchmark for the fibre production stage would have minimal improvement potential compared to improvement to upstream processes.

Table 4.1.16 Process energy benchmarks for the polyamide 6 and 6.6 fibre production stages

	PA 6 (MJ/tonne production)				**PA 66 (MJ/tonne production)**			
	Continuous process		**Batch process**		**Continuous process**		**Batch process**	
Total process energy	6,500	7,000	9,500	10,000	5,700	7,500	5,050	7,250

Table 4.1.17 Process energy consumption for polymer production

Material	Total average energy consumed to produce 1 kg material	Reference/comments
Polyamide 6 (nylon 6)	66.12 MJ	PlasticsEurope 2005a,
Polyamide 6.6 (nylon 6.6)	64.51 MJ	PlasticsEurope 2005a,

Minimum recycled content

The preliminary report highlighted evidence for the manufacturing and use in textile products of nylon 6 with pre and post consumer waste nylon content. This improvement option would have the benefit of avoiding energy intensive feedstock production, as highlighted by the Plastics Europe Eco-Profiles data. It is understood that nylon 6.6 is, at the moment, technically more difficult to recycle because of its chemical structure.

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Feedback from stakeholders

Stakeholders highlighted a number of technical points that inform the follow-up research for this criterion:

- The criteria should better reflect values given in the polymer BREF
- An energy benchmark was not supported because it would be too complex to normalise and verify.
- More evidence was requested as to whether the criteria could be harmonised with the Blue Angel.
- Nylon with a recycled content is not generally available and there is only one example of such a project in Europe.

Follow-up research and proposed way forward

Process energy benchmarking

With regard to energy benchmarking the IPPC polymer BREF document was investigated as a main point of reference. Whilst the document does provide benchmarks, for nylon the preceding stages of caprolactam (an amine), adipic acid and cyclohexanone are understood to be more significant, accounting for 89.4% - 92.4% of the primary energy inputs required, excluding feedstock energy.

CO_2 (rather than primary energy) benchmarks for a number of synthetic fibre polymer feedstocks, including caprolactam, were proposed for inclusion within the EU Emission Trading Scheme 2013-2020. These were not developed further as they were not considered as significant relative to other bulk chemical production processes, including adipic acid (a polyamide monomer).

Our conclusion is therefore that an energy or CO_2 benchmark criteria for nylon fibre would be too complex to introduce and would not achieve a significant enough impact. A recycled content is considered to be a more effective option as it would reduce raw material and process energy use upstream of lactam polymerisation into polyamide.

Setting a minimum recycled content

Recycling of nylon 6 was pioneered by the carpet industry as part of a closed loop recycling services. Nylon can be recycled by mechanical or chemical recycling of nylon waste. A comparative LCA study of virgin nylon and recycled nylon for carpet manufacturing carried out for Shaw Carpets (2010) and reviewed by LBP-GaBi University of Stuttgart highlights the significant environmental improvement potential of recycled nylon [123]. This is because the production of the feedstock adipic acid is avoided. No similar comparative studies could be found to determine the environmental improvement potential of recycled nylon textile fibres.

In order to understand the possible availability and quality specifications of nylon 6 and nylon 6,6 fibre with a recycled content an attempt was made to identify EU and global manufacturers. The following products have been used in clothing products available on the EU market:

- Aquafil (Italy and Slovenia): The Econyl nylon 6 product is a 100% recycled content product [124]. Pre (70%) and post (30%) consumer waste is used as feedstock. The production capacity is understood to be 9,000 tons/annum, although the proportion of recycled product is unspecified. In 2011 the company launched a nylon textile take-back system.
- Hyosung (Taiwan): The MIPAN Regen nylon 6 product is a 100% recycled content product and is third party certified by the Global Recycled Standard (GRS) [125]. Pre and post consumer waste is used as feedstock. Data on production capacity could not be obtained.
- Unifi (USA): The REPREVE nylon 6,6 product is manufactured with 100% recycled content and is solution dyed [126]. Pre and post consumer waste is used as feedstock. Data on production capacity could not be obtained. The

[123] Binder, M, Albrecht, S, Marincovic, C, Flanigan, L and D,McGavis (2010) *Life Cycle Assessment of Caprolactam production from Nylon 6 carpet recycling*, http://www.lbp-gabi.de/refbase/files/49_Binder_etal2010.pdf

[124] Aquafil, *The Econyl project*, Accessed January 2013, http://www.aquafil.com/en/sustainability/the-econyl-project

[125] Hyosung, *MIPAN Regen product*, http://www.mipan.com/eng/products/regen.html

[126] Unifi, *REPREVE product line*, http://unifi.com/pdf/utsc_repreve_eng.pdf

recycled content of the fibre is third party certified. In 2011 the company launched a nylon textile take-back option for industry production waste [127].

Consultation with a stakeholder who has experience specifying recycled nylon confirmed its limited availability and higher price. Quality is also still a concern, particularly in relation to dyeability and mechanical strength. However, it was emphasised that without the creation of demand by retailers and manufacturers, as was the case with polyester a decade ago, production capacity and waste collection will not expand and develop.

Proposal:

On the basis of the evidence gathered it is proposed that minimum pre and/or post consumer recycled content of 3% is introduced. This would:

- Reflect the introduction of recycled content into the GPP criteria for textiles;
- Reflect the growing interest of clothing manufacturers and retailers in specifying recycled content, whilst reflecting its limited availability;
- Support emerging supply and demand for nylon 6 for recycled fibre, allowing for the use of a blend of pre and post consumer waste in order to ensure quality;

It is also proposed that content claims should be supported by verification of traceability, either using third party certification schemes such as GRS, third party independent verification or documentary evidence from suppliers or processors.

[127] Unifi, *Unifi Launches the REPREVE® Textile Takeback Program- Polartec to team up with Unifi in a first of its kind recycling program*, http://unifi.com/un_news_pr.aspx?id=43

AHWG2 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

The N_2O emission mainly arise from adipic acid production. There is no emission during the PA66 condensation process and the PA66 spinning process. Man made fibre manufacturers have attempted to address this issue over the last years via several abatement projects, but it is largely out of their control.

The present value should only be changed if there is a reliable N_2O emission/kg PA66 available. Although the proposed target for PA66 looks realisable, industry would like to refer to the PA66 polymer LCA being currently reviewed by Plastics Europe.

Concern was raised that the proposed 3% recycled content minimum was very low and would not justify the modification of production lines to achieve this. A minimal 20% recycled raw material content could be proposed for PA6, as well as a minimum 20 % recycled content for PA66.

Recycled content was felt by some stakeholders to be only one possible environmental improvement and that others should be considered. This could include the ISO 50001 energy management standard.

The recyclability of fibre should also be addressed by the criteria. For PA6, recycling is already successfully practiced based on the volume available. Chemical recycling is viable and applied, while mechanical recycling is not. For PA66, the collected volume is limited and hard to increase. Compared to PA6, chemical recycling is technically not viable, and mechanical recycling is very difficult.

Follow-up research and proposed approach

N_2O emissions from adipic acid production

The BREF on large volume organic chemical production, which is currently under revision, does not address adipic acid production in detail [128]. It suggests 300 g N_2O /kg adipic acid production as the overall release from the process. Various abatement technologies are then outlined which suggest residual emissions could be brought down to 6-18 g N_2O /kg adipic acid.

Plastics Europe's LCA data from 2005 suggests figures for adipic acid production of 8.6 g/kg for nylon 6 and 0.73 g/kg for nylon 66. The nylon 66 figure is significantly different from the current Ecolabel criteria, suggesting the use of different boundaries and assumptions.

Proposal:

A benchmark for g N_2O emissions per kg adipic acid production could be proposed and may be easier for industry to verify.

Raising the minimum content standard to 20%

Industry have proposed that the minimum recycled content should be 20%. Our review of existing manufacturers suggests that current specifications available in the market are manufactured from a blend of post consumer and post industrial waste, reflecting the limited current availability of post consumer sources of nylon.

Quality issues that may arise from the use of nylon with a recycled content are not well documented and limited information could be obtained from stakeholders. An industry review suggests that recycled nylon is available in a wider range of deniers than recycled polyester and that dyeability is comparable [129]. Information on comparative mechanical strength and abrasion resistance could not be obtained.

[128] European Commission, Reference document on Best Available Techniques in the large volume organic chemical industry, IPPC Bureau, February 2003

[129] Thiry, M.C. (2010) *Everything old is new again – Recycling, recycled and recyclable fibres*, AATCC review, USA

Proposal:

Introduce a 20% minimum recycled content which will serve to support emerging best practice in nylon recycling. Existing licenseholders would require sufficient time to changeover existing Ecolabelled product lines and to identify if any quality issues arise. Derogations could be considered if pre-defined quality criteria cannot be met.

Alternative improvements options to recycled content

From a whole life cycle perspective the use of recycled content is considered to be the best available technique for reducing the impact of polyamide production. However, industry has requested alternative sub-criteria alongside recycled content. To be suitable alternative options would need to be able to deliver comparable whole lifecycle improvements.

The ISO 50001 energy management standard was cited as a possible alternative. Proponents of the standard claim based on case studies that savings in the range of 2-30% may be achieveable, with the standard aiming to promote well recognised system of analysis and prioritisation of opportunities for energy saving [130].

The improvement potential of this option will depend on the process stage to which it is applied and the extent to which energy efficiency measures have already been adopted. This is because, as we have identified previously, the preceding stages of caprolactam (an amine), adipic acid and cyclohexanone production are understood to be more significant, accounting for 89.4% - 92.4% of the primary energy inputs required, excluding feedstock energy.

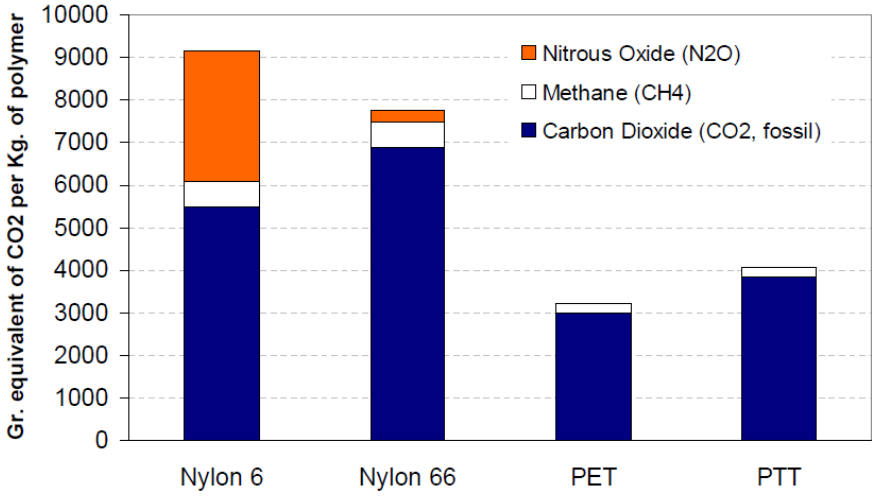
It would therefore be necessary for these production stages to carry ISO 50001, raising difficulties for verification up the supply chain. A company that has already made energy efficiency improvements but which does not have ISO 50001 would also be disadvantaged.

An alternative could be to require adipic acid production to be part of an emissions trading scheme. Data collected by the Stockholm Environment Institute before and after production sites entered the international JI scheme suggests a reduction in

[130] Steele, R, *Reflections on the potential global impact of ISO 50001 and the evolution of new energy standards*, 2nd International Conference on the Global impact of Energy Management Systems, 4th May 2012

CO_2 emissions of 20-31% [131]. N_2O abatement was also seen to rise from 90% to 97%. Moreover, the significance of N_2O and CO_2 emissions in the fibres lifecycle varies between nylon 6 and 6,6, as can be seen from the LCA results in Figure 4.1.8 below.

Figure 4.1.8. Contribution of N_2O and CO_2 to fibre Global Warming Potential



Source: Shell Chemicals (2005) *A life cycle assessment of Corterra polymer*

It is important to note, however, that production sites in some countries such as the Italy, USA and Japan are excluded from joining the international CDM/JI system and/or may not have national trading systems. This might therefore lead to discrimination based on a country's environmental regulations. It might therefore be preferable to use reporting data from these schemes to set a generic CO_2 benchmark.

Proposal:

Feedback is to be obtained from stakeholders on the options that could be required for adipic acid production:

1. ISO 50001 energy management certification
2. Benchmarking of adipic acid CO_2 emissions/kg production

[131] Schneider.L, Lazarus.M, and A, Kollmuss, *Industrial N_2O Projects Under the CDM: Adipic Acid - A Case of Carbon Leakage?* Stockholm Environment Institute, October 9, 2010

AHWG3 stakeholder feedback and final proposals

Here we present a summary of feedback received following the extra-ordinary ad-hoc working group in Brussels on the 23rd April 2013, together with a brief outline of the final criteria proposal.

Stakeholder feedback

Two main points of discussion arose at the AHWG3 – the potential for recycled fibres to contain hazardous substances and how/whether existing commercial licenseholders should be derogated from the recycled content proposed requirement.

In addition, written comments highlighted that the adipic acid criterion only relates to PA66 and is not based on reliable (amongst others different system boundaries) and verified criteria.

Concern was raised by Member States at AHWG3 that recycled fibres could contain hazardous substances restricted by other proposed criteria. It was felt that this situation should not be permitted. The clause exempting recycled content from the Ecolabel's substance restrictions should be removed.

An industry stakeholder responded stating that the main sources of feedstock for polyamide was likely to be fishing nets. Fishing nets are depolymerised to form caprolactam feedstock.

An industry stakeholder stated that if derogations are permitted then these should be strict and clear. Derogations were proposed where specific conditions set by legislation or internationally recognised standards cannot be met and/or where there is proven evidence that quality specifications cannot be met.

Concern was raised by one Member State that derogation of existing commercial Ecolabel licenseholders would lead to there being two sets of criteria running in parallel. It was proposed to encourage existing licenseholders to renew. The Ecolabel has a 12 month transition period to allow for this.

It was proposed by a Member State that different requirements could be introduced for blended fibres, taking into account their difficulty to recycled e.g. by allowing Cradle to Cradle certification.

Follow-up response and final proposal

Adipic acid production

Adipic acid is the feedstock for nylon 6,6 production and was identified by stakeholders as being the most significant N_2O source along the lifecycle. The criteria on N_2O emissions from adipic acid production was identified in order to ensure that there was an alternative criteria to recycled content with a comparable level of improvement as it relates to feedstock production. Industry feedback suggests, however, that verification of this criteria would be problematic.

The adipic acid criterion was derived from verifiable CDM/JI emissions data for adipic acid production sites globally and based on the installation of abatement technology (Stockholm Environment Institute 2010 and IPCC guidance). However, following further investigation comparable data relating to abatement of either N_2O or CO_2 emissions for caprolactam feedstock production could not be sourced.

An option previously proposed by stakeholders would be to retain the current limit value of 10 g N_2O/kg which has been shown to be verifiable by current licenseholders with products containing nylon.

Proposal:

On this basis it is therefore proposed to retain only the recycled content requirement for nylon 6, with derogations applying to commercial and publicy procured products (see below for related discussion).

Given the relative importance of N_2O emissions from caprolactam (see Figure 4.1.8) it is proposed to retain the limit value from the current criteria for nylon 6 as an alternative to recycled content.

Derogation of the recycled content requirement

Industry had previously highlighted the need for derogations where commercial and publicly procured products cannot meet quality requirements and procurement specifications e.g. for the military. This need was accepted but Competent Bodies expressed concern relating to the verification of an open derogation placing the burden of proof for derogations on applicants. This was not felt to be practical for Competent Bodies with less technical expertise.

A specific derogation would not be required if recycled content was to be made optional for commercial and/or publicly procured textiles. Commercial applicants are,

in the meantime, likely to test out recycled content in their product lines. The position could therefore then be reviewed on the basis of experience at the time of the next revision process.

Hazardous substances in recycled content

Assessment/verification requiredments have been added to Article 3 requiring traceability for recycled content - 'Where required by Criteria 13 [Restricted Substance List] declarations and laboratory testing results shall be provided by fibre manufacturers and feedstock suppliers' - linking to the testing requirement in criteria 13. In addition fibre manufacturers will have to comply with Criterion 14 on hazardous substances.

Summary of final criteria proposal

The main proposal introduced by the revision is for a 20% minimum recycled content. This is a requirement for textiles for sale predominantly for consumer and domestic use, but because of concerns relating to quality issues it is optional for products destined for commercial and public sector customers. Traceability is required in order to provide re-assurance to consumers.

The minimum content figure was put forward by the EU man-made fibre industry and is supported by evidence from international fibre suppliers.

A workable basis for retaining a criteria addressing N_2O or CO_2 emissions from feedstock or polymer production could not be reached. The original criteria will therefore be deleted.

CURRENT CRITERION 8: POLYESTER

Major proposed changes	○ Revision of the VOC limit values to reflect the polycondensation and fibre production stages ○ Introduction of a minimum post-consumer waste recycled content of 20% for filament fibres and 50% for staple fibres. ○ The minimum post-industrial waste recycled content would be higher at 50% for filament fibres and 70% for staple fibres. ○ Derogations are to be permitted for micro-fibres and medical applications, and for specific colours and shades. ○ Derogations are to be permitted for parts of existing Ecolabelled product lines that cannot meet pre-defined quality criteria using recycled content.
Present criterion, Decision 2009/567	
(a) The amount of antimony in the polyester fibres shall not exceed 260 ppm. Where no antimony is used, the applicant may state '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. (b) The emissions of VOCs during polymerisation and fibre production of polyester, measured at the process steps where they occur, including fugitive emissions as well, 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.	

AHWG1 technical discussion

Here we present the initial background research and argumentation circulated in advance of the first ad-hoc working group meeting in February 2012.

Residual antimony content

There are many different types of polyester, but the type most often produced for use in textiles is polyethylene terephthalate, abbreviated PET. Used in a fabric, it is most often referred to as “polyester”.

PET production requires the use of catalysts such as antimony oxides or antimony acetate to regulate polymerisation. Antimony is therefore present as a residue in polyester. The antimony content in commercial polyester fibres is cited to be in the range of 200 to 300 ppm. The current state of the art in relation to catalysts requires further investigation if the limit value is to be varied.

Process VOC emissions

BREF lists the BAT value for PET polymerisation as up to 1.2 g/kg saleable product. VOC emissions associated with the spinning of filament fibres appear to be the most significant, with 10.3 g/kg stated at the BAT value. The extent to which either of these limit valued could be reduced is to be investigated further.

Process energy consumption

The Preliminary Report highlighted the significance of energy consumption associated with polyester production. The polymer BREF states the maximum level of process energy use for poly condensation of PET and PET processing as being 10.3 GJ/tonne for staple fibres and 32 GJ/tonne for filament fibres. This does not however take account of energy used to produce dimethyl terephthalate, its precursor p-xylene and ethylene glycol.

Plastics Europe have also produced benchmark figures for feedstock production which take into account feedstock production, suggesting 45 GJ/tonne of resin. This data suggests that for staple fibre, feedstock production is more significant than the PET polycondensation and spinning stages.

Minimum recycled content

Polyester is the synthetic fibre with the greatest market share and is the most widely recycled polymer. The preliminary report highlighted evidence for the significant environmental benefits of mechanical and chemical polyester recycling for the majority of the midpoint indicators used in the reference LCA study. Recycling would

also avoid the process energy use associated with feedstock production. Further consultation is required in order to explore the feasibility of a minimum recycled content figure based on market best practice.

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

Stakeholders highlighted a number of technical points that inform the follow-up research for this criterion:

- The criteria should reflect values given in the polymer BREF
- An energy benchmark was not supported because it would be too complex to normalise and verify.
- The VOC emissions limit value could be lowered to 0.2 g/kg based on the Blue Angel.
- The potential to reduce the antimony limit value should be investigated as evidence cited suggests that up to 175 ppm can leach out of the fibre during processing stages such as dyeing.
- Whilst manufacturing polyester using recycled PET can reduce the environmental impact of polyester, recycling systems in the EU are based on the recycling of PET drinks bottles and their availability is constrained because of demand on the global market from China.
- It may not be feasible or economic to manufacture filament fibres and microfibres from recycled feedstock. The functionality and grade of polyester should be considered when considering recycled content.
- Polyester fibres are not recovered in sufficient quantities to link the criteria to closed loop recycling.
- Any new criteria should be easily verifiable in order to avoid an additional cost burden.
- The recycling of synthetic fibres may lead to the cycling of hazardous substances.

Follow-up research and proposed approach

Reviewing the limit value for Antimony

Expert commentators suggest that Antimony catalysts are still used in 97% of global polyester manufacturing [132]. EU manufacturers consulted by CIRFS highlighted the importance of antimony for polyester products which require a high level of colour fastness in order to avoid yellowing e.g. curtains.

The optimum range used by industry is quoted as 280-350 ppm [133]. It is understood that this figure may be raised further in order to optimise the polymerisation process but that this would require additional energy use. A US carpet manufacturer claims that it may be present in levels as high as 650-700 ppm [134]. There is also scope to optimise this figure downwards through process optimisation but no technical evidence could be found that provided values.

Antimony raised concerns amongst some stakeholders because of its potentially hazardous properties. Antimony trioxide is classified with R51 (H351 Suspected of causing cancer). At a concentration in the fibre of 260 ppm (0.026%) this would be significantly below the 1.0% CLP trigger level for the fibre to be classified with H351. Antimony triacetate is not formally classified but notifications suggest that it would be classified with R51/53 (H411 Aquatic chronic toxicity 2).

Moreover, evidence suggests that exposure from finished garments is negligible because the catalysts are bound into the fibre (see proposed new Criterion 10 discussion). Other exposure pathways include leaching from fibres during high temperature dyeing, and air or solid waste emissions if fibres are incinerated. A US carpet manufacturer claims that up to 175 ppm may leach, however, no further evidence could be found to substantiate this figure [135].

[132] Thiele, U.K. *Polyester catalysts – a critical analysis of current technologies and available alternatives,,* Presentation made to the European PET conference 2006, http://www.polyester-technology.com/

[133] See footnote 130

[134] Victor Innovatex (2003) *Sustainable textile development at Victor Innovatex*, http://www.victor-innovatex.com/doc/sustainability.pdf

[135] See footnote 132

Proposal:

It is therefore proposed that antimony catalysts are still permitted by the criteria and that the limit value is retained at 260ppm.

Reviewing the VOC limit values

The main reference point for this criterion is considered to be the polymer BREF (2007) [136]. This indicates a range of 0.07 and 0.8 g/kg for the polycondensation of dimethyl terephthalic acid (DMT) and an upper limit of 1.2 g/kg for terephthalic acid (TPA). A lower limit is not provided for TPA. It is understood that DMT is used to produce PET chips and that TPA may be used to directly produce higher viscosity yarns. It is therefore possible that the criterion could distinguish between the two processes.

Proposal:

It is therefore proposed that the polymer BREF VOC limit values used in the criterion focus on the processes with the highest VOC emissions, setting limit values for polycondensation and the production of filament fibre.

Process energy benchmarking

With regard to energy benchmarking the IPPC polymer BREF document was investigated as a main point of reference. Whilst the document does provide benchmarks, for polyester the preceding stages of para-xylene, terephthalic acid and ethylene glycol are more significant, accounting for 89% of the primary energy required, excluding feedstock energy.

CO_2 (rather than primary energy) benchmarks for a number of synthetic fibre polymer feedstocks, including terephthalic acid, were proposed for inclusion within the EU Emission Trading Scheme 2013-2020. These were not developed further as they were not considered as significant relative to other bulk chemical production processes, including para-xylene.

[136] European Commission, Reference document on Best Available Techniques in the production of polymers, IPPC Bureau, August 2007

Finding:

An energy or CO_2 benchmark criteria for polyester fibre would be too complex to introduce and would not achieve a significant enough impact. A recycled content is considered to be a more effective option as it would reduce raw material and process energy use upstream of terephthalate poly-condensation.

Setting a minimum recycled content

Recycled PET (R-PET) can be used to manufacture polyester fibres using a mechanical route, in which spinning chips are remelted and extruded into fibres at around 250°C, or a chemical route, in which the PET feedstock is depolymerised before being polymerised again and extruded into fibres. The comparative LCA study of virgin PET and R-PET carried out by Shen et al (2010) highlights the environmental improvement potential of both options for seven out of eight of the midpoint indicators used, as illustrated in figure 4.1.9 [137].

However, the study also notes that recycling does introduce new impacts, such as those related to the washing of waste PET, and that there are differences in the performance of different recycling routes, with the overall conclusion being that mechanical recycling has lower impacts than chemical recycling.

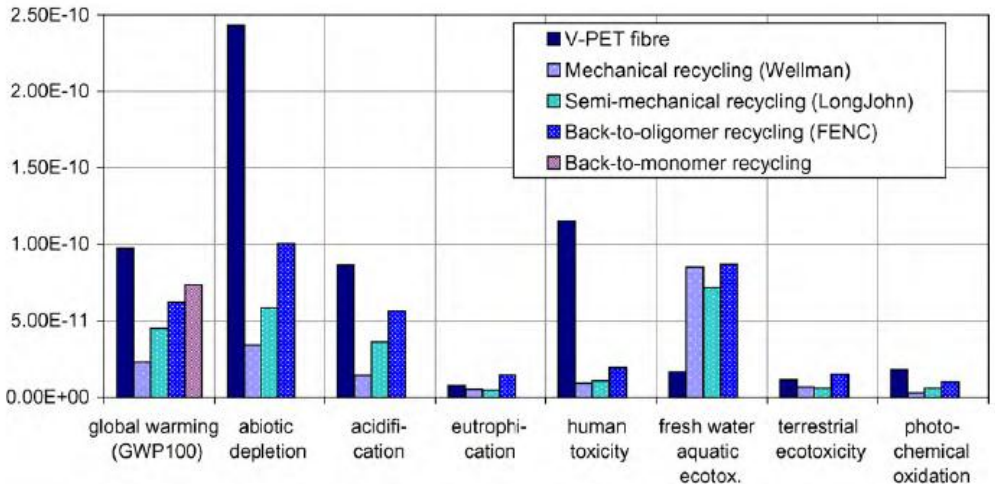


Figure 4.1.9 Normalised results for 1 ton of PET fibre using a "cut-off" approach with cradle-to-factory gate for second life. Source: Shen et al (2010)

[137] Shen L, Warrell E and Patel M.K. *Open loop recycling, an LCA case study of PET bottle to fibre recycling*, Resources, Conservation and Recycling Journal, 55 (p-34-52)

In order to consider the technical potential for introducing a recycled content is important to distinguish between staple and filament fibre. Polyester staple fibre is used to manufacture non-woven fabrics such as fleece. CIRFS suggest that 70% of EU staple polyester production, which was 600,000 tonnes in 2009 [138], is currently manufactured using 100% recycled PET feedstock. EU manufacturers include Wellman, Advansa, Miroglio, Greenfiber and Radici [139].

The technical specifications of staple fibre are close to the specifications required for PET bottles, so with adequete sorting, cleaning and drying of the R-PET feedstock it is understood that manufacturers' quality specifications can be met. Certain applications are, however, excluded such as medical devices, because of hygiene restrictions on recycled content.

Polyester filament fibre is used to manufacturer woven fabrics. It is a higher quality product than staple fibre requiring higher technical specifications than staple fibre and careful control of manufacturing processes in order to ensure qualities such as colour, tenacity, tensile strength and dyeability are within manufacturers quality specifications. The heterogenous nature of the R-PET feedstock means that consistency cannot always be assured [140].

Consultation with a number of significant EU clothing retailers that have extensive experience using both filament fibre and staple fibre with a high recycled content highlighted tensile strength, dyeability and colour matching as potential problems. In one case it has proved difficult to achieve light colours and shiney finishes but for the rest of the majority of their requirements for fashion ranges they had been able to specify 100% recycled content.In another case they had initially chosen to specify filament fibres that have been chemically recycled. This is because chemically recycling of fibres is able to provide a consistency in quality that is identical to virgin fibres.

[138] Oerlikon, *The fibre year 2009/10 – A world survey on textiles and non-wovens industry*, May 2010

[139] CIRFS full members, http://www.cirfs.org/MEMBERSHIP/CIRFSMembers/FullMembers.aspx

[140] Thiele, U.K. *Conversion of PET bottle flakes to added value products – quality and processing criteria*, Presentation made in Charlotte, USA, May 2003, http://www.polyester-technology.com/

Manufacturers of polyester with a recycled content

In order to understand the possible availability and quality specifications of filament fibre with a recycled content an attempt was made to identify EU and global manufacturers of polyester filament fibre:

- Mechanically recycled content: Two EU manufacturers are understood to manufacture filament fibre products – Filature Miroglio and Radici, both in Italy. Both claim that the fibres are suitable for a wide variety of clothing applications, including technicalwear and sportswear.
    - Filature Miroglio: The filament is manufactured with 100% recycled content and is solution dyed [141].. Production capacity is quoted as 3,000 tonnes/annum. The post consumer origin of their 'Newlife' product is second party certified by the Italia Plastics Institute's Plastic Seconda Vita scheme
    - Radici Group: The filament is manufactured with 70% recycled content and is solution dyed [142]. Data on the production capacity has been requested. The post consumer origin of their r-Starlight (POY and drawn yarn) and r-Radyarn product is third party certified.

  The US manufacturer Unifi is also understood to be used by major outdoor manufacturer Polartec who supplies fabric to brands such as Patagonia and the North Face. Their filament fibre content is manufactured with a 20% recycled content and is third party certified [143]. Production capacity is quoted as approximately 14,000 tonnes/annum [144].

  The Global Recycle Standard is a content standard that certifies fibres with a recycled content Their list of certified companies as of June 2012 includes 18 manufacturers of polyester filament together with fabric containing filament with a recycled content [145]. Locations include China, India and Taiwan. The

[141] Filature Miraglio, *Newlife product*, Accessed 2012, http://www.filaturemiroglio.com/eng/newlife.php

[142] Radici Group, *r-Starlight – Post-consumer recycled polyester*, Accessed 2012, http://www.radicigroup.com/starlightfibres/En/Products/Products_05.aspx

[143] Unifi, *REPREVE product line*, http://unifi.com/pdf/utsc_repreve_eng.pdf

[144] Textile News, *Unifi Opens REPREVE® Recycling Center*, May 2011 http://www.textileworld.com/Articles/2011/May/Unifi_Opens_Repreve_Recycling_Center.html

[145] Textile Exchange, *Companies certified to the Global Recycled Standard*, Current as of June 2012.

recycled content ranges between 10 and 100%. An example is Libolon in Taiwan which has a production capacity of 15,000 tonnes/annum [146]. Data obtained from GRS for the spread of recycled contents for GRS certified product is presented in Table 4.1.18.

- Chemically recycled content: There are understood to be only two manufacturers globally – Teijin in Japan which has pioneered the technology and Hyosung in Korea. The capacity of Teijin's plant is 10,000 tonnes. Commentators suggest that investment in new capacity has been constrained because of the economies of scale required to operate plant (>20-50,000 tonnes/annum).
    - Teijin's Eco Circle products contain 100% recycled content product manufactured from PET bottles and recovered polyester fibres [147].
    - Hyosung's MIPAN Regen product is a 100% recycled content product and is third party certified by the Global Recycled Standard (GRS) [148].

Table 4.1.18 Indicative recycled content 01/12 – 04/12 for GRS certified fibres

Recycled content	Proportion of GRS certified fibres
100%	74.1%
75 – 99%	2.1%
50 – 74%	6.7%
26 – 49%	12.6%
5 – 24%	4.5%

Source: Control Union (2012)

[146] Libolon, Polyester chips – using recycled polyester to create new polyester yarn, Accessed 2012 http://www.libolon.com/polyester.php

[147] Teijin Fibres Ltd, *Eco Circle*, http://www.teijinfiber.com/english/products/specifics/eco-circle.html

[148] Textile News, *Hyosung's Mipan Regen yarns net GRS certification*, May 2009

http://www.textileworld.com/Articles/2009/May/FW/Hyosung_Awarded_GRS_Certificate_For_Mipanx_regenx_Nylon_And_Polyester_Yarns.html

R-PET availability

The availability of recycled PET (R-PET) feedstock has been cited as a possible barrier to further use in fibre. In considering the issue of R-PET availability it is important to consider the position both in the EU and globally. This is because textile products sold in the EU may be manufactured in the EU or internationally.

In 2010 19,139 kilotonnes of PET bottles were produced internationally, a break down of which by continent is presented in Table 4.1.19. This figure reflects the value of fibres on the market and hygiene regulations which restrict the use of recycled content in food grade PET.

Table 4.1.19 Global PET bottle production capacity

PET Resin Capacity [kt/a]	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	***2010***
North America	3,685	3,745	3,923	4,595	4,595	4,595	*5,000*
South America	513	500	500	725	950	950	*1,200*
Europe	2,411	2,894	3,515	3,766	4,005	4,005	*4,205*
Africa, Middle East	308	338	499	604	843	843	*843*
Asia (ex China)	4,107	4,411	4,636	4,636	4,636	4,636	*4,636*
China	1,469	2,49	3,217	3,255	3,255	3,255	*3,255*
Total	12,493	14,378	16,29	17,581	18,284	18,284	*19,139*

Source: Thiele (2007)

The collection rate for PET bottles in the EU 27 was 51% (1.59 m tonnes) in 2011, an all time high, but with potential for further increase given that the highest recovery rates were over 70% in one third of EU countries [149]. The growth rate is 2% per

[149] Petcore, *Petcore and EuPR publish PET collection figures for 2011 - European collection rate increases to 51% of all PET bottles*, 13th July 2012, http://www.petcore.org/content/petcore-and-eupr-publish-pet-collection-figures-2011-european-collection-rate-increases-51-a

annum. Processing capacity is also understood to be greater than the recovered tonnage, as illustrated by Table 4.1.20, creating an incentive for added value processing in the EU.

Approximately 39% of recovered PET bottles in Europe are used to manufacture polyester fibres. To put this into context EU27 apparent consumption of polyester in 2007 was approximately 1.9 m tons.

Table 4.1.20 Global PET recycling capacity (2010 projected)

R-PET Capacity all in [kt/a]	**1999**	**2002**	**2003**	**2004**	**2006**	***2010***
North America	470	480	500	550	600	*800*
Europe	211	350	430	680	944	*>1200*
ME, Asia, South America, Others	218	370	470	680	1 700	*3 000*
World R-PETBottle Flakes	*899*	*1200*	*1400*	*1 900*	*3 100*	*5,000*
World PET-resin	*7 100*	*9 900*	*11 800*	*12 500*	*16 300*	*19 200*
Recycling potential	***6 201***	***8 700***	***10 400***	***10 600***	***13 200***	***14 200***

Source: Thiele (2007)

Informed estimates suggest that 25% of the 19,139 kilotonnes of PET bottle resin manufactured globally was recycled in 2010 [150]. To put this into content approximately 32 million tonnes of polyester fibres were manufactured in 2009, of which 69% was manufactured in China. Filament fibre is currently the fastest growth area.

A significant factor creating global demand for R-PET has been China's rising demand [151]. Market data highlights China as the world's largest producer of polyester, in part explaining their demand for R-PET. Export levels have remained

[150] Thiele,U.K, (2007) Polyester recycling industry

[151] Thiele, U,K, *Paradigm shift in polyester recycling, Presentation to 3rd Chinese International polyester fibre market and technical forum*, September 2007, http://www.polyester-technology.com/

strong but fell away slightly with the recession, with 16% of recovered PET exported in 2009 [152]. China's significant role as a manufacturer of EU clothing means that some exported R-PET may therefore return to the EU as polyester product.

Proposal:

On the basis of the evidence gathered it is proposed that minimum post consumer recycled contents of 50% for staple fibre and 20% for filament fibre are introduced. This would:

- Reflect the introduction of recycled content into the GPP criteria for textiles;
- Reflect the existing high recycled content of EU staple fibre, whilst encouraging an improvement in the performance and transparency of imported fibre specifications;
- Reflect the growing interest of clothing manufacturers and retailers in specifying a high recycled content, particularly in the outdoor clothing market where staple fibre appears to predominate;
- Support emerging demand for filament fibre, whilst reflecting the lower end of content claims being made for product currently available on the market;

Exemptions could be introduced for specific products for which there is evidence that quality specifications cannot currently be met, even by the most advanced fibre product.

It is also proposed that content claims should be supported by verification of traceability, either using third party certification schemes such as GRS, third party independent verification or documentary evidence from suppliers or processors.

[152] See footnote 147

Proposed revised criterion v2, September 2012
(a) The amount of antimony in the polyester fibres shall not exceed 260 ppm. Where no antimony is used, the applicant may state '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. (b) The emissions of VOCs during the polymerisation ~~and fibre production~~ of polyester from terephthalic acid (TPA), and during the production of filament fibres, measured at the process steps where they occur, including fugitive emissions as well, expressed as an annual average, shall not exceed 1.2 g/kg for PET chips and 10.3 g/kg for filament fibre *Assessment and verification:* The applicant shall provide detailed documentation and/or test reports showing compliance with this criterion, together with a declaration of compliance. VOCs are defined as 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. (c) Fibres shall be manufactured using a minimum content of PET that has been mechanically or chemically recycled from post-consumer waste. Staple fibres should have a minimum content of 50% and filament fibres 20%. *Assessment and verification:* Content shall be traceable back to the reprocessing stage. The applicant shall provided independent third party certification of the chain of custody or documentation provided by suppliers and reprocessors that enables the feedstock to be traced.

AHWG2 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

The proposal to maintain the current limit value of 260 ppm for antimony catalysts was welcomed by industry and evidence was summarised which shows that the catalyst is bound within the fibre. A Competent Body asked whether this equated to the Oeko-tex 100 limit for the final product of 30 ppm.

On balance the proposal to introduce a minimum recycled content was supported. Recycled content was, however, felt by some stakeholders to be only one possible environmental improvement and other options should be considered. These should include ISO 50001 which certifies energy management systems.

The market diffusion of recycled content was queried, with fleece in the outdoor clothing market being suggested as the only significant product. An industry stakeholder clarified that 70% of staple fibre manufactured in the EU is made from 100% recycled content.

The proposal for various exemptions from the recycled content criteria was welcomed, although they will need to be more specific and differentiated, in order to reflect industry feedback relating to the different end-uses. Problems with controls on the quality of production outside of the EU were cited as a potential problem.

A number of existing licenseholders raised concerns about the ability at the moment to incorporate recycled content into commercial textiles. This because these fabrics have much higher quality requirements than consumer fabrics. For example, abrasion resistance. Colour matching may also be a challenge to change-over existing product lines. Post-industrial content in combination with solution dyeing may be the only way of meeting the new criteria proposals for this market segment.

It was proposed that it may be too early for the proposal and that instead licenseholders should be required to carry out quality testing in time for the next revision. Industry stakeholders also asked that where specifications required by legislation or standards could not be met by recycled polyester then exemptions could be granted. Examples were cited from military contracts.

Follow-up research and proposed approach

Antimony final product concentration

A proposal was made to allow Oeko-tex 100 final product testing for Antimony catalyst as verification for this sub-criteria if it was found to be equivalent. Evidence submitted by the International Antimony Association suggests that a fibre catalyst content of 250 ppm would equate to an extractable concentration of antimony trioxide of 15ppm or less, with a peak concentration of 5ppm [153].

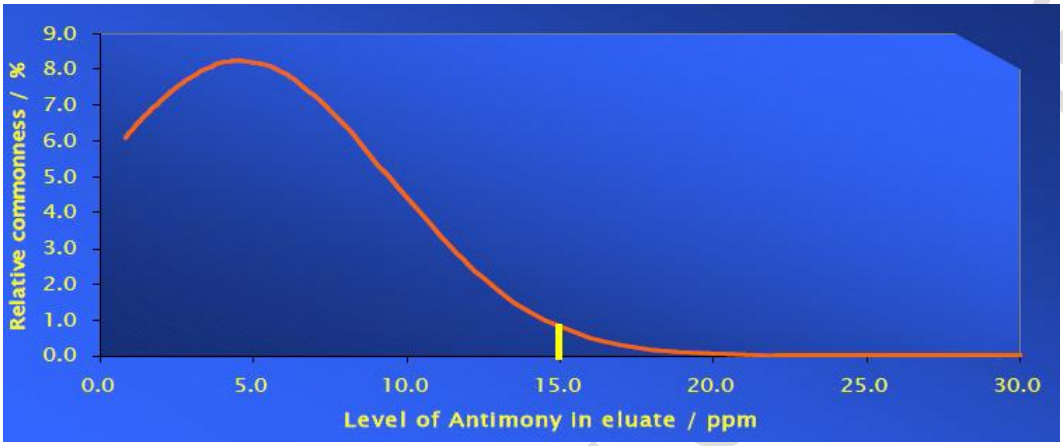


Figure 4.1.10 Extractable antimony trioxide content in polyester fibres (Oeko-tex 100 testing method). Source: Rauch, W (2008)

Proposal:

A stricter concentration limit of 15ppm would need to be stipulated if Oeko-tex 100 final product testing was to be accepted as verification.

Recycled content and quality requirements

Whilst polyester with a recycled content can be considered to have entered the mainstream textile market, there is limited literature in relation to quality issues and dyeability. Whilst some literature could be found – for example, an Ecotextile News article which highlights some of the practical challenges of using recycled PET [154]

[153] Rauch, W, *Man-made fibres – antimony from man-made fibres from polyester*, Conference presentation from 9th December 2008, Berlin

[154] Patterson, P, *Reduce, re-use, re-dye?* Ecotextile News, Issue 17, August 2008

and the results of tests for the car industry [155] – there is clearly a gap in publicly available knowledge and research by industry on this subject.

A number of industry specialists with experience in this area were therefore consulted in order to obtain a better understanding of the issues relating to quality. These included two major clothing retailers, a specialist commercial clothing manufacturer, a commercial textile manufacturer and a textile innovation consultant.

Whilst it was not possible to develop a detailed profile of the technical constraints a number of common constraints were identified:

- Lower abrasion/piling resistance and tensile strength;
- Difficulties achieving light colours, particularly white;
- Difficulties in colour matching, for example with uniforms;
- Difficulties achieving fabric finishes with a high degree of luster;

Evidence suggests that these constraints are, to some extent, being addressed by improved sorting and cleaning processes for PET bottles and by the greater use of solution dyeing to provide colour uniformity. Non-woven applications such as fleece are understood to be more tolerant of these constraints. Poor quality recycled polyester may have fluorescent whitening agents added in order to mask colour variations [156].

Whilst a major stakeholder that manufactures and retails consumer clothing was able to identify some of these constraints as having been an issue, in general they had not encountered major barriers to the use of 100% recycled content filament and staple fibre in a wide range of product lines.

Commercial textile manufacturers raised the most concerns about these constraints. Based on their feedback pre-consumer recycled polyester is understood to be required at the moment in order to manufacture filament fibres that can meet commercial abrasion and piling resistance requirements. This is because of contamination in recycled PET bottles. For example, whilst consumer fabrics would need to resist to 15-25,000 Martendale cycles (a test method defined in ISO 12947-

[155] K. Gurudatt, P. De, A. K. Rakshit and M. K. Bardhan, *Dope-dyed Polyester Fibers from Recycled PET Wastes for Use in Molded Automotive Carpets*, Journal of Industrial Textiles 2005 34: 167

[156] Thiry, M.C. (2010) Everything old is new again – Recycling, recycled and recyclable fibres, AATCC review, USA

1:1998) a commercial fabric would need to achieve at least 50,000, with customers tending to require greater.

A specific challenge identified by some, but not all, existing Ecolabel licenseholders is moving over existing commercial product lines to recycled content. This would require extensive quality testing of fibres to ensure that clients needs can be met. Colour matching and abrasion resistance were two examples cited. However, it is to be noted that some existing licenseholders do already manufacture ecolabelled commercial textiles with up to 100% recycled content which are certified as meeting appropriate abrasion resistance tests [157].

In some cases it has been noted that public procurement requirements may preclude recycled content because the quality requirements are so exacting. For example for military clothing with special camouflage patterns.

Proposal:

Existing licenseholders shall be required to test fibres with the minimum specified recycled content against pre-defined quality and colour shades from their existing Ecolabel product lines. Product lines for which the recycled content fibres do not meet these requirements may be derogated from the recycled content requirement.

Where pre-consumer recycled content is required in order to meet quality requirements then the minimum content will be higher in order to reflect the reduced environmental benefit.

Product lines would also need to be benchmarked against those of other licenseholders which contain polyester with a recycled content.

Alternative improvements options to recycled content

From a whole life cycle perspective the use of recycled content is considered to be the best available technique for reducing the impact of polyester production. However, industry has requested alternative sub-criteria alongside recycled content. To be suitable alternative options would need to be able to deliver comparable improvements across a number of LCA midpoint indicators.

The ISO 50001 energy management standard was cited as a possible alternative. Proponents of the standard claim based on case studies that savings in the range of

[157] Camira, 'Second nature' fabric range, http://www.camirafabrics.com/fabrics/all

2-30% may be achieveable, with the standard aiming to promote well recognised system of analysis and prioritisation of opportunities for energy saving [158].

The improvement potential of this option will depend on the process stage to which it is applied and the extent to which energy efficiency measures have already been adopted. This is because, as we have identified previously, the preceding stages of para-xylene, terephthalic acid and ethylene glycol production account for 89% of the primary energy required, excluding feedstock energy. It would therefore be necessary for these production stages to carry ISO 50001, raising difficulties for verification up the supply chain. A company that has already energy efficiency improvements but which does not have ISO 50001 would also be disadvantaged.

Energy efficiency improvements would be unlikely to achieve the same improvement in the abiotic depletion midpoint, which is influenced by the raw materials extracted to manufacture polyester. Other alternative improvement options could therefore relate to the end-of-life phase for polyester.

An existing licenseholder highlighted work to obtain the Cradle to Cradle certification for polyester, which requires design for recycling, and to encourage the recycling of used fabrics. A take-back service is being developed for commercial fabrics in conjunction with a manufacturer. Various clothing brands, including Patagonia [159] and Henry Lloyd [160], have also launched clothing lines in which prior commitments have been made to support the take-back and chemical recycling of polyester.

Proposal:

Product lines could also be derogated from recycled content requirements where the products are:

1. Provided as textile services, and where there is a commitment to take them back from clients for recycling.
2. Labelled as being part of a take-back scheme in which there is a prior agreement with a manufacturer and a route for consumers to return the product.

---

[158] Steele, R, *Reflections on the potential global impact of ISO 50001 and the evolution of new energy standards*, 2nd International Conference on the Global impact of Energy Management Systems, 4th May 2012

[159] Patagonia, *How to recycle Patagonia garments*, http://www.patagonia.com/us/patagonia.go?assetid=5175#recycle

[160] Henri Lloyd, Blue Eco product line, http://www.henrilloyd.com/sailing/blue-eco

AHWG3 stakeholder feedback and final proposals

Here we present a summary of feedback received following the extra-ordinary ad-hoc working group in Brussels on the 23rd April 2013, together with a brief outline of the final criteria proposal.

Stakeholder feedback

Two main points of discussion arose – the potential for recycled fibres to contain hazardous substances and how/whether existing commercial licenseholders should be derogated from the recycled content proposed requirement.

Concern was raised by a number of stakeholders that recycled fibres could contain hazardous substances restricted by other proposed criteria. It was felt that this situation should not be permitted. The clause exempting recycled content from the Ecolabel's substance restrictions should be removed.

An industry stakeholder responded stating that the main sources of feedstock for polyester are likely to be PET bottles. A stakeholder proposed that the restriction of Antimony should apply to all textiles including all recycled fibres. The level of protection for this substance shall be strict. The level of antimony from PET bottles remelted into to the fibre is not likely to increase and their production is regulated because they are a consumer product.

Industry stakeholders, including existing licenseholders, raised concerns about moving existing polyester product lines over to the new criteria because of quality concerns. They highlighted that the cost and time required to retest existing ecolabelled product lines and new feedstock will be significant and that not all lines may be able to comply.

An industry stakeholder stated that if derogations are permitted then these should be strict and clear. Derogations were proposed where specific conditions set by legislation or internationally recognised standards cannot be met and/or where there is proven evidence that quality specifications cannot be met.

Concern was raised by one Member State that derogation of existing commercial Ecolabel licenseholders would lead to there being two sets of criteria running in parallel. It was proposed to encourage existing licenseholders to renew. The Ecolabel has a 12 month transition period to allow for this.

It was proposed by a Member State that different requirements could be introduced for blended fibres, reflecting their difficulty to recycle e.g. cradle to cradle certification.

Follow-up response and final proposal

Antimony levels in recycled PET bottles

PET bottles are the predominate feedstock for recycled polyester. A comprehensive sampling/testing of PET bottles on the EU market by the Fraunhofer Institute (2011) suggests that PET bottle feedstock would meet/exceed the Ecolabel requirements with a mean concentration of 220ppm +/-32. It is therefore proposed to introduce a derogation for PET bottles in order to incentivise recycling.

Proposal:

It is proposed that recycled content is optional for commercial/publicly procured products. This avoids the need for complex derogation procedures.

Derogation of the recycled content requirement

Industry had previously highlighted the need for derogations where commercial and publicly procured products cannot meet quality requirements and procurement specifications e.g. for the military.

The derogations were also intended to assist with the transition of existing Ecolabelled product lines. A proposal to require a proportion of ecolabelled product lines to make the transition was discussed at AHWG3 but was not felt to be practical.

The general need for derogations has been accepted but Competent Bodies expressed concern relating to the verification of an open derogation placing the burden of proof for derogations on applicants. This was not felt to be practical for Competent Bodies with less technical expertise.

A specific derogation would not be required if recycled content was to be made optional for commercial and/or publicly procured textiles. Some existing licenseholders have indicated that, in the meantime, they are likely to test recycled content in their product lines.

Proposal:

It is proposed that this position is reviewed on the basis of experience at the time of the next revision process.

Hazardous substances in recycled content

Assessment/verification requiredments have been added to Article 3 requiring traceability for recycled content - 'Where required by Criteria 13 [Restricted Substance List] declarations and laboratory testing results shall be provided by fibre manufacturers and feedstock suppliers' - linking to the testing requirement in criteria 13. In addition fibre manufacturers will have to comply with Criterion 14 on hazardous substances.

Summary of final criteria proposal

The main proposal introduced by the revision is for a minimum recycled content. This would be 50% for staple fibre and 20% for filament fibre. This new criterion reflects the improvement potential identified by a number of LCA studies. The minimum content figures reflect fibre products available in the market. Traceability is required in order to provide re-assurance to consumers.

The requirements apply to textiles for sale predominantly for consumer and domestic use. Recycled content can pose quality issues for some commercial and public sector textiles. It is therefore optional for products destined for these commercial and public sector customers.

The current limit value for antimony content is to be maintained, but with a derogation added for polyester manufactured from PET bottles. This is intended to further incentivise recycled content.

The VOC criterion has been revised to reflect the significance of the polycondensation and fibre production stages, with the limit values drawn from the Polymer BREF. The assessment and verification has been updated with reference to test standard EN 12619 and the need for a monitoring data series.

CURRENT CRITERION 9: POLYPROPYLENE

Major proposed changes	○ No changes are proposed
Present criterion, Decision 2009/567	
Lead based pigments shall not be used. *Assessment and verification:* The applicant shall provide a declaration of non-use.	
Suggested criterion	
Lead based pigments shall not be used. *Assessment and verification:* The applicant shall provide a declaration of non-use.	

AHWG1 technical discussion

Here we present the initial background research and argumentation circulated in advance of the first ad-hoc working group meeting in February 2012.

Process energy consumption

It is suggest to include a criterion for process energy consumption or the content of reused material. These points were identified as being important areas of potential environmental improvement in the preliminary report. Process energy benchmarks published by Plastics Europe were presented and discussed in section 3.3.2 of the preliminary report. However, these benchmarks only address feedstock production.

Table 4.1.21 Process energy used to manufacture for polymer production

Polypropylene (resin)	14.74 MJ	PlasticsEurope 2005c, data are also available for 1999

Minimum recycled content

Further evidence is required as to the environmental benefits of polypropylene recycling to produce textile fibres and as to its technical viability and market acceptability as an option.

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Feedback from stakeholders

No specific written feedback was received on this criterion. Stakeholders were not in favour of energy benchmarks for synthetic fibres because of difficulties in their application.

Proposal:

No change is currently proposed to the criterion.

Summary of final criteria proposal

No change has been proposed to the criterion.

4.2 CHEMICALS AND PROCESS CRITERIA

~~PROPOSED NEW CRITERION 10: HAZARDOUS SUBSTANCES AND MIXTURES~~

Major proposed changes	• It is proposed that this criteria is removed. The clauses contained within it will be contained within and implemented by new proposals criteria 11 and 12
Present criterion, Decision 2009/567	
Not specifically covered by the previous criteria set.	

AHWG1 technical discussion

Here we present the initial background research and argumentation circulated in advance of the first ad-hoc working group meeting in February 2012.

The requirement for a criterion relating to hazardous substances is set out in the EU Ecolabel Regulation Articles 6(6) and 6(7). The criterion relates to the final ecolabelled product, which could be a fibre, a textile fabric or a final textile/garment. The most significant implications of this new criterion are likely to be the production processes addressed by the 'processes and chemicals criteria'.

As can be seen from table 4.2.1 the main current focus of the current criteria are on processes – either in the form of substance restrictions, emissions limit values or biodegradability requirements. In contrast, articles 6(6) and 6(7) of the Ecolabel Regulation shift the focus onto the end product.

For other product groups it has been discussed as to how such a criterion can be implemented and especially how applicants can document and verify compliance with such a criterion. For textiles it raises specific questions, such as:

- Which substances currently used by industry would be restricted?
- At what stage in the lifecycle of the product is it best to apply the criteria, given that toxic substances may be washed out of the final product?
- What proportion of these substances may subsequently remain in the final product, either as residues or as functional components?
- What is the capacity of industry to respond to restriction of all the listed classifications?

- Are all the classifications relevant given the exposure paths associated with the textile supply chain and subsequent use and disposal by the consumer?

The granting of derogations will therefore need to be carefully evaluated in light of the real need for a specific substance and the environmental and technical performance of the product (or associated process) without its presence.

This is also an area in which the cost and complexity of the verification process will need to be carefully considered. Harmonisation with existing labels could assist in this regard. Oeko-tex 100, for example, is based on the testing of finished products and has an extensive global network of affiliated testing laboratories and competent bodies.

Table 4.2.1 Grouping of the current Ecolabel criteria according to their focus

Criteria that currently apply to processes	
Criteria that restrict substances	12. Stripping or depigmentation 13. Weighting 14. All chemicals and chemical preparations 16. Bleaching agents 17. Impurities in dyes: Colour matter with fibre affinity (soluble or insoluble) 18. Impurities in pigments: Colour matter with fibre affinity (soluble or insoluble) 19. Chrome mordant dyeing 20. Azo dyes 22. Dyes that are carcinogenic, mutagenic or toxic to reproduction 23. Potentially sensitising dyes 24. Halogenated carriers for polyester 25. Printing 29. Anti felting finishes 30. Fabrics finishes 31. Fillings

Criteria that set limit values for wastewater or aerial emissions	10. Auxiliaries 15. Detergents, fabric softeners and complexing agents 20. Metal complex dyes 27. Wastewater discharges from wet processing 31. Fillings 32. Coatings, laminates and membranes 33. Energy and water use (no specific limit values)
Criteria that currently apply to end products	
Criteria that restrict substances	11. Biocidal and biostatic products 28. Flame retardants 31. Fillings 32. Coatings, laminates and membranes
Criteria that set concentration limits	26. Formaldehyde 31. Fillings

Substances restricted or requiring authorisation under REACH

REACH has consolidated EU processes for the classification, authorisation and restriction of substances formerly regulated by other separate pieces of international and EU legislation. These include substances controlled by the Biocide Directive 98/8 EC, the Azo dye Directive 2002/61/EC and Regulation 850/2004 on Persistent Organic Pollutants.

A number of substances with functions that are relevant to the textile industry are currently restricted or authorised by Annexes XIV and XVII of REACH respectively:

- Carriers: Trichlorobenzene must not be used in concentrations of more than 0.1%.
- Biocides: Textiles must not contain pentachlorophenol (PCP). The import, export, sale or use of products containing 5 ppm, or above of PCP or its salts or esters is prohibited.
- Dyes: Azo dyes are the name of the group of synthetic chemicals based on nitrogen that are commonly used in the textile industry. Azo dyes that may

cleave to produce the carcinogenic arylamines listed in Annex 8 of REACH Directive are banned from use.

- Plasticisers: DEHP (Di-(2-ethylhexyl)-phthalate), BBP (Butylbenzylphthalate) and DBP (Dibutylphthalate)
- Flame retardants: The threshold limit for the use of penta- and octabromodiphenol ethers (penta and octa-BDE) is 0,1% (w/w). Impregnants tris (2, 3-dibrompropyl) phosphate, tris (1-aziridinyl) phosphineoxide (TEPA) and polybrominated biphenyls (PBB) must not be used in textiles which are intended to come into contact with the skin, e.g. articles of clothing or linen.
- Surfactants: Nonylphenol and nonylphenol ethoxylates must not be be used as a substance or in mixtures at concentrations of more than 0.1%.
- Water repellents: PFOS (perflourooctane sulfonate and its derivatives) are prohibited in textiles if the amount of PFOS comprises >1µg/m^2 of the coated materials.

Substances that currently appear on the ECHA Candidate list

Substances that appear on the SVHC (Substances of Very High Concern) Candidate List should also be excluded from Ecolabelled products [161]. The list is dynamic and is updated with new substances as candidate substances are identified and dossiers of evidence are brought forward by Member States. The Candidate list will therefore have changed since the last revision of the textile product Ecolabel criteria.

Substances of functional relevance to textiles that currently feature on the candidate list (as of August 2012) are as follows:

Auxilliaries

- 4-(1,1,3,3-tetramethylbutyl)phenol
- 1-Methyl-2-pyrrolidone

Dyes and mordants

- Anthracene (dye precursor)
- *See also table 1.3 in the Preliminary Report*

Flame retardants

[161] ECHA, *Candidate list of Substances of Very High Concern for Authorisation*, http://echa.europa.eu/web/guest/addressing-chemicals-of-concern/authorisation/substances-of-very-high-concern-identification/candidate-list-of-substances-of-very-high-concern-for-authorisation

- HBCD – Hexabromocyclododecane
- TCEP – Tris (2,chloroethyl)phosphate
- Alkanes, C10-13, chloro (Short Chain Chlorinated Paraffins)

Plasticizers (phthalates)

- Bis(2-methoxyethyl) phthalate
- DIBP (Diisobutylphthalat)

Solvents (fibre production)

- N,N-Dimethylacetamide (DMAc)

The use of substances or mixtures which change their properties upon processing (e.g., become no longer bioavailable, undergo chemical modification) so that the identified hazard no longer applies are exempted from the Article 6(7) requirement to restrict substances that appear on the Candidate List.

Substances that are classified with risk or hazard phrases

Given the broad range of chemical substances and formulations used by the textile industry the implication of this restriction could be significant. The pre-cautionary approach taken by labels such as Oeko-tex could assist in this respect by contributing to an understanding of the typical concentrations of substances that may be found in finished products, and in seeking to harmonise testing and verification in order to reduce the burden on Competent Bodies.

Sensitising substances have been proposed for addition to the list in other product groups and given that many textile products may be worn close to the skin and that particles could potentially also be inhaled the following risk phrases are also proposed for inclusion: R42/H334 and R43/H317.

Proposed new criteria v1, February 2012
In accordance with Article 6(6) of Regulation (EC) No 66/2010 on the EU Ecolabel, the product or any component shall not contain substances that: • Are referred to in Article 57 of Regulation (EC) No 1907/2006 and of the Council of 18th December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) • Have been identified according to the procedure described in Article 59(1) which establishes the Candidate List for Substances of Very High Concern

- Meet the criteria for classification as toxic, hazardous to the environment, carcinogenic, mutagenic or toxic for reproduction (CMR) in accordance with Regulation (EC) No 1272/2008 or Directive 67/548/EC and as interpreted according to the hazard statements and risk phrases listed under this criterion

The hazard classes and risk phrases listed below generally apply to substances. However, where information on substances cannot be obtained, the classification rules for mixtures shall be applied.

The use of substances or mixtures which change their properties upon processing (e.g., become no longer bioavailable, undergo chemical modification) so that the identified hazard no longer applies are exempted from the above requirements.

No derogation shall be given concerning substances that meet the criteria of Article 57 of Regulation (EC) No 1907/2006 and that are identified according to the procedure described in Article 59(1) of that Regulation, and are present in mixtures, in an article or in any homogeneous part of a complex article in concentrations higher than 0,1 % (weight by weight).

This criterion also applies to known degradation products such as formaldehyde from formaldehyde releasers.

List of hazard statements and risk phrases:

Hazard Statement [1]	**Risk Phrase** [2]
H300 Fatal if swallowed	R28
H301 Toxic if swallowed	R25
H304 May be fatal if swallowed and enters airways	R65
H310 Fatal in contact with skin	R27
H311 Toxic in contact with skin	R24
H330 Fatal if inhaled	R23/26
H331 Toxic if inhaled	R23
H340 May cause genetic defects	R46
H341 Suspected of causing genetic defects	R68

H350 May cause cancer	R45
H350i May cause cancer by inhalation	R49
H351 Suspected of causing cancer	R40
H360F May damage fertility	R60
H360D May damage the unborn child	R61
H360FD May damage fertility. May damage the unborn child	R60/61/60-61
H360Fd May damage fertility. Suspected of damaging the unborn child	R60/63
H360Df May damage the unborn child. Suspected of damaging fertility	R61/62
H361f Suspected of damaging fertility	R62
H361d Suspected of damaging the unborn child	R63
H361fd Suspected of damaging fertility. Suspected of damaging the unborn child.	R62-63
H362 May cause harm to breast fed children	R64
H370 Causes damage to organs	R39/23/24/25/26/27/28
H371 May cause damage to organs	R68/20/21/22
H372 Causes damage to organs	R48/25/24/23
H373 May cause damage to organs	R48/20/21/22
H400 Very toxic to aquatic life	R50
H410 Very toxic to aquatic life with long-lasting effects	R50-53
H411 Toxic to aquatic life with long-lasting effects	R51-53

H412 Harmful to aquatic life with long-lasting effects	R52-53
H413 May cause long-lasting effects to aquatic life	R53
EUH059 Hazardous to the ozone layer	R59
EUH029 Contact with water liberates toxic gas	R29
EUH031 Contact with acids liberates toxic gas	R31
EUH032 Contact with acids liberates very toxic gas	R32
EUH070 Toxic by eye contact	R39-41
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled	R42
H317: May cause allergic skin reaction	R43

Notes

1. According to Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

2. According to Directive 67/548/EEC and the REACH Directive 2006/121/EC and Directive 1999/45/EC as amended

Assessment and verification: Compliance with this criterion is to be achieved by reference to Criterion 11: Restricted Substance List and 12: Substitution of hazardous substances used in dyeing, printing and finishing.

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the criteria.

Feedback from stakeholders

The new criterion raised general concerns from stakeholders about its practicality. It was felt that the criterion should be framed in a way that it does not restrict the use of important chemicals that are fundamental to certain processes. The notion of avoiding the use of hazardous substances at source was supported. The criterion and its environmental improvement objectives should be balanced against the overall complexity of the textile criteria set and the relative importance of other criteria.

The following specific feedback was also received:

- A clear distinguishment should be made between substances and preparations. GOTS was given as an example. Preparations are banned if they are classified with R51/53, R55, R56. However, substances are not banned if they are classified with R50, R50/53, R58, R59 as long as this does not trigger classification of the preparation itself.
- Manufacturers were on balance in agreement with the addition of allergen risk phrases to the list as this is perceived to be a consumer-facing issue.
- Monomers or additives could be exempted from the requirements relating to classification as long as they are reacted with and are covalently bonded to polymers e.g. water repellent coatings, and if their concentration is below the cut-off value for mixtures.
- Safety Data Sheets must meet the requirements of Annex II, Article 3 of Directive (EC) No 1907/2006 which sets out the requirements for describing the *chemical identify of the ingredients of a substance or mixture, including impurities and stabilising additives*.
- Reference should be made to industry best practice, including the development of Restricted Substance Lists (RSL's) by manufacturers and brands and by organisations such as AFIRM, industry road maps to eliminate certain substances, process management systems such as Bluesign
- Testing of the final product is proposed as a requirement for verification, for consumer safety and because often there is limited self-verification (e.g.

SDS's) by the supply chain. The industry stakeholders who manufacture clothing in volume carry out routine testing against Restricted Substance Lists. Examples were provided of how this is carried out. Given the cost of testing, samples of clothing are selected on a risk basis e.g. by age group (childrens skin contact products being the most sensitive), colour, finishing treatment.

- Air emissions from textile finishing processes are proposed as a new criterion which could complement possible derogations. A formulae approach to calculating and setting thresholds based on substance emissions factors is BAT according to the textile BREF and forms part of the Blue Angel criteria and Bluesign.
- Some of the current criteria could be addressed by the horizontal approach within the hazardous substance criteria e.g. flame retardants, biocides

A number of substances and R Phrases were also highlighted for either restriction or derogation. These have been compiled in a tabular form in Annex 1.

Follow-up research and proposed response

Identifying substances that may be present on the final product

In order to inform criteria development a number of areas were investigated in order to better understand the nature of substances, or functional groups of substances, that may remain on the final product, as well as current industry initiatives. The investigation focused on the following areas:

- Literature bringing together the results of sample testing of final textile products (see Annex 2);
- A screening of some of the most commonly used substances against the H Statements and R Phrases listed in the proposed criterion (spreadsheet to be circulated in advance of the AHWG2);
- Industry practices of using Restricted Substance Lists and screening tools (e.g. TEGEWA classification method);
- A review of the feedback from stakeholders and their proposals for derogations and new substance restrictions (see Annex 1).

The results of the literature review suggest that fixed and residual substances from the bleaching (optical brighteners), dyeing, printing and finishing stages are of most significance. Substances from earlier processing stages such as sizes and coning oils are generally washed out during the pre-treatment desizing and bleaching stages and during subsequent washing and rinsing carried out during latter stages.

Substances can be readily grouped by their function, with their presence on the final product varying according to the substrate and the specification of the final product. Indicative concentrations for substances found on final textile products are presented by function group in table 4.2.2.

It is also notable that REACH impact evaluations carried out for the European Commission highlighted the importance of critical functional groups which, because of their small production volumes, are particularly sensitive to restrictions [162]. These comprised reactive dyes, dye carriers, general formulation solvents, softeners and easy care finishes (see Annex 2 for further details).

Table 4.2.2 Indicative concentrations of functional and residual substances on final textile products

Functional group	**Concentration on finished product (% w/w)**	**Technical notes**
Dyes *Aryl amines*	0.05 – 3.0% >30 ppm	The concentration will depend on the strength and depth of colour. Aryl amines will only be present as degradation products of certain azo dyes. Printed patterns, if applied, comprise dyes and pigments.
Carriers	0.1 – 1.0%	May also include other printing and dyeing auxilliaries
Surfactants	5.5 – 26.4 mg/kg	Residual concentrations may remain from dyeing, washing and finishing

[162] Envirotex and Cast Consulting, *Analysis of the potential impacts of REACH on the European textile supply chain*, Report to DG Enterprise & Industry, 16th December 2005

Optical brighteners	Up to 0.5%	Added during pre-treatment process stages.
Softeners	up to 3%	Added during washing and rinsing before or after dyeing.
Easy care	Up to 8%	Mainly cross linking agents. May also include levelling and fixing agents.
Fluorocarbons	0.3 – 8.0%	Coatings that provide dirt or water repellency
Flame retardants	1 – 20%	Reactive coatings bonded to fibres. The % will depend on the weight of the fabric.
Biocides	5 ppm	Concentrations vary by application and can reach 100 ppm

Findings from follow-up research and literature review

The main observations and findings from our follow-up research are as follows:

- The concentrations and range of substances commonly found in final textile products generally pose minimal health risks to consumers. There are however some combinations of garments and substances that may pose higher risks e.g. tight, skin contact garments coloured with allergenic disperse dyes. Poorly regulated production can also result in greater risks of exposure because substances restricted by REACH may be used e.g. azo dyes which cleave to aryl amines.
- The hazards and risks phrases listed in the criterion are in many cases more relevant to occupational exposure during the handling of substances in factories and to wastewater and aerial emissions to the environment. For example, many dyes carry H317 (Category 1 skin allergen) which reflects hazards associated with their handling in dust form. However, not all the hazards and risks are applicable to this product group e.g. R29, 31, 32. It is notable in this respect that GOTS separates substances into those that have

potential health impacts and those that have potential impacts on the environment.

- Some existing labels provide exemptions and derogations based on the fastness or incorporation of substances on the final product. For example, the Blue Angel specifically refers to monomers and additives:

  > *Exempted from regulation b) are monomers or additives that turn into polymers during the manufacture of plastics for coatings or are chemically (covalently) bound to the plastic if their residual concentrations are below the consideration limits for mixtures.*

- The large number of substances and the high number of possible combinations in recipes used by the industry means that it is difficult to identify, within the limitations of the Ecolabel revision process, the potential for substitution. However, some hazards and risks require derogation because they would restrict commonly used substances e.g. R42 and R43 which would restrict most dyes.
- Many of the substance restrictions contained within the existing Ecolabel criteria are mirrored by industry and NGO Restricted Substance Lists, however, there are areas where restrictions within the Ecolabel could be clarified to make them more user friendly e.g. by listing dyes as well as the aryl amines into which they may cleave.
- RSL's are generally subject to due diligence which requires the sample testing of final products. Sample testing is carried out on a risk basis e.g. by colour and shade in relation to banned azo dyes, childrens clothing ranges where there is greater risk from exposure, plastic elements that may contain specific phthalates.
- There is evidence that EU Industry has successfully used screening tools to reduce the number of hazardous substances used in textile formulations and recipes e.g. TEGEWA, ETAD. It should be noted, however, that these processes took many years to implement.

Proposal:

Given the potential complexity of applying this criterion to textile products it is important that the approach proposed is practical to implement and reflects industry best practices. The environmental improvement potential must also be balanced against the relative importance of the other EU Ecolabel criteria and the capacity of industry to respond. The following approach is therefore proposed:

- Restricted Substances List: Existing substance restrictions with the Ecolabel criteria together with Candidate List SVHC's would be compiled into an RSL which would facilitate greater ease of communication to suppliers (see Criterion 11: Restricted Substance List).
- Substitution of hazardous substances: Each supplier that carries out a dyeing, printing or finishing process would be required to, as far as possible, substitute substances used in their process chemistry that are classified with the listed hazard statements (see Criterion 12: Substitution of hazardous substances used in dyeing, printing and finishing).
- The hazard statements would be differentiated by splitting them into textile hazard categories A (the most significant hazards according to CLP Guidance and those corresponding to the criteria in Article 57 of Regulation (EC) No 1907/2006) and B (lower level hazards according to CLP guidance). Textile category A hazards would be banned and a timescale would be given to find substitutes for Category A substances, with the exception of specific derogations.
- Durability of surface finishes: Surface finishes that impart a functional benefit to the textile product, including easy-care, softeners, water repellency, flame retardancy, but that may degrade and migrate from the product into the environment or expose consumers should achieve a high level of durability (see the new criteria proposal relating to Durable surface finishes).
- Due diligence: Because a manufacturer may use multiple suppliers, and the nature and concentration of substances on final products may be therefore difficult to control, products may need to be tested to ensure compliance with the criterion. However, it is recognised that testing may be a burden for smaller licenseholders.

  The extent of any requirement for testing is to be discussed further with stakeholders, with the following options available to minimise the burden:

- Testing could be required on a risk basis only e.g. specific colours or finishes, childrens clothing, plastic accessories
- Testing could be carried out randomly or on a risk basis across all licenseholders
- Testing could be exempted if suppliers carry out their own testing of intermediate products
- Suppliers that already comply with the requirements of comparable industry RSL's and independent labels could be considered to comply
- Oeko-Tex 100 labelling and/or reference to white lists of products could be accepted as contributing towards compliance

The proposals draw upon substance restrictions and hazard class restrictions from existing criteria. It is proposed that most of these criteria would then be deleted. These criteria are listed in table 4.2.3 below.

Table 4.2.3 Schedule of source criteria for hazardous substance criteria 10-12

Criteria containing specific substance restrictions	**Criteria containing hazard statement restrictions**
11. Biocidal and biostatic products (together with a clause in the Decision pre-amble) 14. All chemicals and chemical preparations 15. Detergents, fabric, softeners and complexing agents Dye criteria 17 - 23 24. Halogenated carriers for polyester 25. Printing 26. Formaldehyde 27. Flame retardants 28. Anti-felting finishes	10. Auxilliaries and finishing agents for fibres and yarns 15. Detergents, fabric softeners and complexing agents 22. Dyes that are carcinogenic, mutagenic or toxic to reproduction 28. Flame retardants 30. Fabric finishes 32. Coatings, laminates and membranes

AHWG2 and CB Forum stakeholder feedback and follow-up research

Stakeholder feedback

The consistency with REACH and the SVHC Candidate List was welcomed, including the potential for derogations, and the general approach outlined was for the most part supported. It was questioned, however, whether substances that are already restricted need to be specifically listed.

The wording "substitution as far as possible" was not felt to be clear enough. The reference to substances vs preparations (and viceversa) also required clarification.

The proposals for testing raised concerns in relation to the potential costs for applicants. It also requires greater clarification in terms of how it could be designed to minimise potential costs. It was not felt to make sense to test for everything and so a targeted approach should be used.

It was suggested that testing and declarations could be used in combination within the verification requirements. Declarations based on SDS could be allowed where good quality information is provided about the substances used. Certifications such as Oeko-Tex 100 could be accepted as long as they were equivalent in terms of the substances they tested for and the associated limit values. A read across or conversion table would be required.

The potential role of site visits was also highlighted by Competent Bodies with the most experience of verifying the textile criteria. Whilst this does require additional resourcing it was felt to be an important part of assurance for the Ecolabel. Some industry stakeholders also highlighted the role of site visits as an early warning and indication of the practices of suppliers and their ongoing ability to meet chemical criteria.

Different views were expressed about Oeko-tex 100. On one hand it was supported by a number of stakeholders as being a recognised certification that is increasingly being adopted. On the other hand some stakeholders supported the current philosophy of the EU ecolabel to restrict usage of dangerous substances in the supply chain rather than adopting the Oeko-tex 100 approach of chemical analysis of the final product. This approach does not detect materials that have been used but are washed into the environment during processing. One stakeholder shared feedback from textile mills which raised concerns about the high cost of certification.

One industry stakeholder raised the issue of sampling frequency, questioning how

representative one test could be. They proposed instead testing per lot of raw material or per production run. The issue of what would then happen if a test was failed was also raised. Guidance on accredited laboratories to use should be provided.

The pre-screening of products to determine which tests should be specified and the sampling frequency was proposed e.g. by colour, treatments, childrens/adults clothing.

Follow-up research and proposed response

Discussion of comments on the overall proposed approach

The overall approach was presented to the AHWG2 meeting on 26-27th September 2012 and then special meeting of the EU Ecolabel Competent Body Forum on 22nd November 2012. A discussion and summary response to the specific points raised by stakeholder's is presented as follows:

- **Listing of restricted substances:** Although these substances are restricted or authorised by REACH there is still felt to be value in listing them because much of the textile supply chain is located outside of the EU. Although REACH is intended to ensure disclosure of the use of these substances in imported products, in practice full implementation is not yet advanced enough. Many of these substances are also reflected in the Restricted Substance Lists of industry and independent certification schemes.

  Proposal:

  Retain listing of restricted substances carried over from the existing criteria together with specific Candidate List substances identified. This will allow for a high level of harmonisation with other certifications.

- **Substances v. preparations:** The hazardous substances criteria must apply to substances that may be contained within preparations. In doing so any change in properties can, however, be taken into account.

  Proposal:

  To be clarified within the wording of new criteria proposal 12.

- **Final product testing:** Extensive input from stakeholders suggests that declarations based on SDS for recipes and preparations should form the starting point for verification. However, evidence from industry suggests that selective laboratory testing is increasingly used to provide assurance to consumers. Recent cases involving NGO textile products highlight the inherent difficulties in trying to control the textile supply chain [163].

  It was highlighted by industry stakeholders that testing can be targeted on a risk basis in order to minimise costs i.e. where evidence suggests that risk may exist in the supply chain of non-compliance and where the nature of the processes or chemistry means that non-compliance is more likely to occur e.g. poorly controlled dyeing or finishing processes.

  A general requirement to use accredited laboratories was highlighted in discussions with stakeholders and is in fact specifically covered in Article 9(10) of Regulation (EC) No 66/2010:

  > *'Competent bodies shall preferentially recognise tests which are accredited according to ISO 17025 and verifications performed by bodies which are accredited under the EN 45011 standard or an equivalent international standard. tent body may withhold the identity of the complainant from the user. '*

  Proposal:

  SDS for recipes and preparations forms the starting point for verification, to be supplemented by accredited laboratory testing of the final product where:

  1. substances of particular concern for consumers
  2. risks are understood to exist in the supply chain
  3. the quality of SDS data is considered to be poor or incomplete.

  Testing requirements are to specified in the EU Ecolabel RSL. A matrix will be formulated identifying instances where risk-based testing should be carried out.

[163] Greenpeace International, *Dirty laundry: Reloaded*, March 2012

- **Third party certifications:** Whilst the third party verified testing-based certification Oeko-tex 100 has significant overlaps with the EU Ecolabel criteria, our analysis shows that there are some areas where additional testing or different limit values would need to specified (see Annex 3). The overall approach and objective also differs. The EU Ecolabel RSL as proposed does not only address substances on the final product but also substitution of substances at key process stages.

  Proposal:

  Oeko-tex 100 certification is to be accepted subject to the testing requirements 'reading across' from the EU Ecolabel RSL. The read across valid at the time of adoption is to be specified in an annex to the criteria. Other certifications would be accepted subject to them:

  1. Meeting the requirements of the the EU Ecolabel RSL
  2. Being third party verified using accredited laboratories

- **Product testing regime:** At present the textile criteria require compliance with the criteria upon application for a license. It is understood that some Competent Bodies do then request verifications and/or carry out site visits every 2-3 years, but this is not a formal requirement. Provision for site visits is made in Article 9(6) of Regulation (EC) No 66/2010:

  'Where appropriate, the competent body shall undertake on-site verifications or assign an authorised agent for that purpose. '

  Retailers and brands frequently change their suppliers in order to push down prices and as clothing lines change seasonally. Production sites may also change location and processes. This means that an applicants supply chain may change during the license period, raising questions about ongoing compliance. This could pose a potential risk for the Ecolabel.

  Regulation (EC) No 66/2010 requires that products meet the criteria throughout the duration of a license period. It also makes provision for where products are discovered not to meet the criteria, for example if they fail to meet testing criteria:

  'Where the competent body considers that the holder has contravened

any of the terms of use or provisions of this contract, the competent body shall be entitled to suspend or withdraw its authorisation to the holder to use the EU Ecolabel, and to take such measures as are necessary to prevent the holder from using it further…'

This could therefore imply the need for selective testing of new suppliers and product lines, or selective random testing during a license period. The former would reflect the approach taken by GOTS. Suspension or withdrawal of a license could be subject to remedial action by the licenseholder, such as a change of suppliers and testing to demonstrate compliance.

Proposal:

That the testing specified within the EU Ecolabel RSL is required:

1. For product lines that can be distinguished according to their distinct fibre, dyeing and finishing requirements.
2. On a periodic, unspecified basis during the license period for each distinct production line.

This would serve to provide assurance that compliance with the criteria is being maintained, regardless of changes in processes, production sites or suppliers.

If a test is failed then a period of time would be given to take remedial action and to subject new test results, accompanied by an evaluation of the reasons for non-compliance. This could be accompanied by a site visit.

The technical aspects of these points are addressed further under new criteria proposals 11 and 12.

Incorporation of Article 6(6) requirements into Criteria 11 and 12

It is proposed that in order to streamline the proposed new hazardous substances criteria, the proposal for criteria 10 is removed. Criteria 11 and 12 will therefore implement the requirements of the Articles 6(6) and 6(7) of the Ecolabel Regulation (EC) No 66/2010 which are currently contained within the standard legal text used in the criteria 10 proposal. The existing criteria listed in table 4.2.3 (above) would then be deleted.

Proposed New Criterion 11: Restricted Substance List

Major proposed changes	• A new criteria which would support implementation of Articles 6(6) and 6(7) of the Ecolabel Regulation • A Restricted Substance List (RSL) would be compiled from existing criteria and new proposals for restrictions and would become a master list of substances that are either completely restricted or are subject to concentration limits. • The RSL would need to be communicated to suppliers at the dyeing, printing, finishing and cut/make/trim stages. • Verification would be through a combination of safety data sheets for recipes and formulations and final product laboratory testing.
Present criterion, Decision 2009/567	
Not specifically covered by the previous criteria set.	

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Feedback from stakeholders

Stakeholders at the first AHWG highlighted the need to refer to current industry practice in the use of Restricted Substance Lists (RSL's) which are communicated to suppliers. Examples such as AFIRM were highlighted for further investigation. The discussions also suggested that many of the current criteria could be brought together under the new hazardous substances criteria – a so-called 'horizontal approach'. The success of Oeko-Tex 100 and due diligence by large clothing manufacturers means that final product testing is readily available.

Follow-up research and proposed response

A number of RSL's published by industry, independent testing certifications and NGO's were reviewed in order to compile the Ecolabel RSL. They included the following:

- AFFA (the American Footwear and Apparel Association)
- AFIRM (the Apparel and Footwear International RSL Management Group)
- Bluesign BSSL v3.1
- Hugo Boss (as advised by their stakeholder group representative)
- Marks & Spencers
- NICE (Nordic Initiative, Clean and Ethical)
- Oeko-Tex 100 (01/2011)
- C&A

Feedback was also obtained from selected manufacturers and the Oeko-Tex Institute as to how the restrictions are developed and applied in practice.

The existing Ecolabel criteria were then screened in order to identify all existing substance restrictions. These were then compiled into a draft EU Ecolabel Restricted Substance List (RSL). The RSL can be found in Appendix 1 of the criteria proposal. In some cases modifications and improvements were made. These are intended to align the RSL with other RSL's and labels, and to make the RSL clearer and easier to communicate to suppliers.

New criteria proposal v1, September 2012
Final products should not contain substances listed in the the Restricted Substance List (RSL) or at or above the specified concentration limits in RSL which can be found in the Appendix to the Decision. The RSL should be communicated to suppliers and agents at the dyeing, printing, finishing and the cut/make/trim stages. *Assessment and verification:* The applicant shall demonstrate compliance through selective testing of the final product. Samples of product should be selected on a risk basis by reference to the RSL. The applicant shall provide documentation and test reports showing compliance with the RSL.

AHWG2 and CB Forum stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback on the overall approach

Overall the decision to move towards a single RSL for substances was welcomed.

A differentiation of the requirements was requested by one stakeholder, in order to reflect the different risks of exposure and the period of time that the consumer is in contact with the textiles e.g. baby clothes and bed linen.

The RSL needs to be clearer in stating whether an applicant can make a self-declaration or whether they must carry out testing. A number of stakeholders commented that the test methods should be better specified, with the reference to the specific legislation and/or method to be used.

Some form of screening process or decision tree was proposed by various stakeholders which would enable applicants to determine whether testing would be required. Safety Data Sheets should be accepted as a form of declaration, for example for dyestuffs used, but if these are of a poor standard or not made available then testing may be required.

One stakeholder was concerned that the focus on the individual process stages might be lost by moving to the RSL format. They asked that explanations and guidance for applicants be introduced for each category within the RSL.

Specific comments were received in relation to the substance groups included within the RSL. These comments are summarised in table 4.2.4 which also presents the associated proposed revisions to the RSL.

Follow-up research and proposed approach

In new criteria proposal 10 we discussed the overall comments on the approach to hazardous substances, including the proposed new EU Ecolabel Restricted Substance List (RSL). The proposals made have been incorporated into the revised draft criteria text (see below).

The specific points raised by stakeholder in relation to the RSL are briefly discussed below and the proposed approach outlined:

- **Differentiation based on risk:** The differentiation of limit values based on sensitivity of the user to exposure currently forms the basis for the Oeko-tex 100 certification and also forms part of the Bluesign BSSL.

  Proposal:

  Where possible differentiate limit values based on the sensitivity of the end user and possible exposure paths.

- **Clearer definition of verification requirements:** In the discussion under new criteria 10 the proposal was made to accept SDS for recipes and formulations before laboratory testing. In some cases, however, testing might be required because of risks in the supply chain or if the quality of SDS verification is not sufficient.

  Proposal:

  Clear definition of verification requirements and test methods in the RSL. Test methods will be defined for all substances covered but the need for testing will depend on the quality of SDS submitted by the applicant and risks associated with the substance group.

- **Testing decision tree/risk matrix:** Following consultation with a number of industry experts that advise leading clothing retailers on their RSL's a risk matrix has been drafted that is intended to identify where testing will always be required.

  Proposal:

  Applicants are to use the risk matrix to self-assess where testing will be required.

Detailed points raised by stakeholders are presented and discussed based on follow-up research in table 4.2.4 below. All the points have been used to revise the RSL which can be found in the draft criteria document.

Revised criteria proposal v2, February 2013
Final products should not contain substances listed in the the Restricted Substance

List (RSL) or at or above the specified concentration limits in RSL which can be found in the Appendix to the Decision.

The RSL should be communicated to suppliers and agents at the dyeing, printing, finishing and the cut/make/trim stages.

Assessment and verification: The applicant shall demonstrate compliance through selective testing of the final product. Samples of product should be selected on a risk basis by reference to the RSL. The applicant shall provide documentation and test reports showing compliance with the RSL.

Table 4.2.4 Schedule of stakeholder comments by substance group and the resulting proposed revisions to the EU Ecolabel RSL

Substance group	Stakeholder comment	Proposed response
Candidate list SVHC's	Derogated substances are not currently listed, with prospective substances appearing only in a separate annex.	Addition of a requirement for applicants to consult the most current Candidate List for substances that may appear in the final product.
	DMAc is proposed for derogation. Supporting evidence was submitted.	DMAc is proposed for derogation but with conditions to apply to its production and the concentrations on fibres and the final product. DMAc has now been added to Oeko-Tex 100 (01/2013) and Bluesign BSSL v3.1. The limit value from Oeko-Tex is proposed for fibres and the limit value from Bluesign for final products on the basis that they correspond with concentrations ranges submitted in documentary evidence by industry.
Biocides	The restrictions which apply require clarifications – are all biocides applied to intermediate/final products restricted? The biocides authorised should be specified if possible to make the restriction more specific. A listing of biocides that are currently authorised for use could be provided.	The text has been revised to clarify that all biocides are restricted, with examples of common substances listed for reference. A weblink has been added which will allow applicants to consult the most current list of authorised biocides.
	The chlorinated phenols limit value of 0.05 ppm is a factor ten stricter than a stakeholder's RSL The organotin limit value is 1.0 ppm which is two times stricter than a	The detection limit for products has been revised in line with the Bluesign consumer safety limits. The detection limit for transportation and storage has been revised in line with Oeko-Tex 100 to 0.05 ppm. The limit

	stakeholder's RSL.	value for intermediate and final products has been revised to 1.0 ppm
	The DMFu limit value should be 0.1 ppm in order to reflect EU the legal limit	The addition of DMFu reflects a European ban 164 which is now also reflected by Oeko-Tex 100.
Auxilliaries and surfactants	Addition of reference to derivatives of APEO's	This has now been added with a number of specific substances also now listed.
	The limit of detection should be reviewed as APEO's can be detected down to 1ppm. The limit value is 1,000 ppm in a stakeholder's RSL.and derived from Oeko-Tex 100	Reference to Oeko-Tex 100 as well as RSL's that ban their use, including those of C&A and Bluesign, confirm an individual limit value of 100 ppm as being appropriate for APEO's and a sum limit value of 50 ppm for alkylphenols. A number of recent high profile cases of high street retail clothing products testing positive for APEO's [165] means that these substances have achieved a high public profile. It is therefore proposed that final product testing is carried out in order to verify compliance. The individual substances to be tested for have now therefore been listed in the RSL, having been taken from Bluesign BSSL v.3.1

[164] Commission decision of 17 March 2009 *requiring Member States to ensure that products containing the biocide dimethylfumarate are not placed or made available on the market*, 2009/251/EC

[165] See footnote 163

Dyes and carriers	The verification requirement should be clarified – can self-declaration be accepted and when would testing be required? One stakeholder proposed SDS as the basis for checking followed by testing if information was inadequate.	The verification requirements and test methods, where required, have been clarified. SDS forms the basis for dye verification.
	The fibres restricted for metal complex dyes should be clarified – are cellulose fibres permitted? Metal complex dyes can be restricted to wool and polyamide fibres, but blends with viscose should also be permitted. The method stipulated to verify the exhaustion rate is very expensive, which in practice leads to reactive dyes being used instead.	The use of metal complex dyes for blends of wool and polyamide with man-made cellulose fibres shall be permitted. The transposition of the former criteria are to be reviewed further.
	Heavy metals can be present in intermediate and final products, not only in the dyestuff as impurities. A list of restricted heavy metals could added to the Ecolabel RSL.	It is proposed to harmonise with Oeko-Tex 100, the Blue Angel and Bluesign v.3.1 by replacing the dye impurity list with final product analysis for extractable heavy metals. This would require testing but would result in a simpler verification process – particularly where manufacturers and retailers are already monitoring heavy metals. Following a review of these and other RSL's (see the listing under proposed criteria 11) the metals barium, copper, iron, manganese, selenium, silver, tin and zinc are proposed for deletion in order to minimise the burden for applicants and focus attention only on the most significant metals.

		A two part testing method is specified by Bluesign v.3.1 – the first part to extract the metals if present and the second to detect the metals present.
Printing	It was proposed that an example list of VOC's to be minimized be provided.	An indicative list of hydrocarbons that are typically released from printers in aerial emissions has been added. The list is taken from the AFIRM Group's Chemical Guidance document 166.
	An industry stakeholder currently tests for VOC's on the final product instead of the printer's formulations.	The equivalence of the Oeko-tex 100 testing for sum total phthalates and sum total organic volatiles is to be checked.
Finishes	Some stakeholders would not support a weakening of the limit values for formaldehyde residues. Oeko-tex 100 has changed to the Japanese Law Method 112. It is essential that harmonisation extends to the test methods used and the EU ecolabel should consider switching to the Japanese Law 112 method.	It is proposed to harmonise the limit values with Oeko-tex 100 and, in part, with the Blue Angel. A change to Japanese Law Method 112 is to be consulted on.
	The treatment of flame retardants that not added as finishes but as additives or co-polymers should be clarified. Reference could be made to existing authorisation procedures.	The substance group is to be changed to 'Functional finishes, treatments and additives' in order to reflect the different ways function can be imparted.

[166] AFIRM Group (2011) *Chemical guidance document*

	The restrictions on the water repellents PFOA and PFOS require clarification. Is testing required or not? PFOA may shortly be proposed as an SVHC by a Member State.	It is proposed that PFAS substances are restricted and that PFCA substances are subject to limit values for residues that may remain on the final product. It is understood that C6 technology is not yet widely available but that with the use of substitutes and efficient processing very strict limit values can be imposed – as evidenced by Gore-Tex's new laminate series which is able to meet Bluesign's BSSL v.3.1 which restricts PFAS and PFOA residues.
	An industry stakeholder noted that not all of the phthalates listed are restricted or authorised by REACH – specifically the high molecular weight phthalates DINP, DIDP and DNOP. They are currently only restricted in Europe based on the precautionary principle for use in goods where a risk of them being placed in a child's mouth. Is testing required for the phthalates listed under coatings, laminates and membranes?	Following a review of evidence from REACH [167] on restrictions relating to the high molecular weight phthalates DINP and DIDP for the RSL has been amended so that they are only restricted in accessories where there is a risk that they can be placed in a child's mouth. On the basis of its limited commercial use DNOP is not understood to be relevant to these criteria and so has been removed. For coatings, laminates and membranes it is proposed that SDS are required for the polymer formulation in order to verify that the specified substances have not been used.

[167] ECHA, *Evaluation of new scientific evidence concerning the restrictions contained in Annex XVII to Regulation (EC) No 1907/2006 – Review of available information for di-'isodecyl' phthalate (DIDP), di-'isononyl' (DINP) and di-n-octyl' phthalate (DNOP),* Separate reports for each phthalate published July 2010

Accessories	This addition of accessories was supported. One stakeholder proposed that supplier declarations be accepted.	The review of final product testing reports highlighted the potential significance of accessories in childrens clothing that may contain phthalates [168]. These could pose a risk if the accessory is placed in the mouth e.g. zip handle of jackets and gloves.

[168] Consumer Council at the Austrian Standards Institute (2010) *Chemical requirements for consumer products*.

AHWG3 stakeholder feedback and final proposals

Here we present a summary of feedback received during and after the extra-ordinary ad-hoc working group in Brussels on the 23rd April 2013, together with a brief outline of the final criteria proposal.

Stakeholder feedback

Whilst the overall approach was welcomed by stakeholders the overall clarity of how it is to be communicated along the supply chain and who is required to provide verifications requires improvement.

Particularly important is the need to clarify whether it is the applicant, production stages or chemical suppliers that should provide declarations and/or SDS. It should be for the applicant to explain why each substance group is not relevant to their product.

There was significant discussion in relation to the balance between final product testing and verification by SDS or chemical supplier declarations. Concern was raised about the proposal for risk-based testing not being enough. Whilst it was accepted that not everything could be tested it was felt that consumers look to the Ecolabel as having a hazard-based approach and some element of random testing would therefore be appropriate.

A Member State felt that it was difficult to leave it up to the applicant as most brands did not know what was in their product. An industry representative emphasised that this is particularly the case for manufacturing that takes place outside of the EU. Minimum testing was therefore a 'usual requirement'.

On the other hand it was felt that testing went against the principles of REACH. Guidance from ECHA emphasises the need to minimise testing, preferring disclosure by suppliers instead. Testing if carried out should be targeted and a quota set for the minimum amount required. Twice per year on a random basis was proposed by a manufacturer. The costs should be taken into account.

A Member State emphasised the importance of chemical supplier declarations given the difficulties already in obtaining information in the form of SDS from textile supply chains. Some stakeholders felt that this was not enough and that detailed verification should support declarations. It was highlighted that risks relating to the final product will not appear on an SDS.

It was clarified that Oeko-Tex 100 certification is based on the testing of the product

fibres and does also include accessories. Concern was raised as to how a read across to Oeko-Tex 100 would be maintained.

Follow-up response and final proposal

Clarifying the production stages and their verification requirements

The RSL has been restructured in order to clearly group restrictions into the production stages to which they apply. Restrictions that are common to all products and which may apply to the final product are also identified.

A common format has been used for each restriction (see below). This identifies the products to which the restriction shall apply, the scope of the restrictions, any associated limit values and the verification requirements, including relevant testing standards (if required).

In the first example (halogenated carriers) verification is on the basis of a declaration from the chemical supplier to be obtained by the dye house, being the relevant product stage. In the second example final product testing is required in all cases listed under 'applicability' and according to the relevant EN test series.

In response to concerns raised at the AHWG3 declarations by chemical suppliers are to be accepted supported, where possible, by SDS for chemical formulations. Testing is only specified for substance groups that are of high concern, reflecting their potential hazard and their inclusion within other certification schemes and RSL's.

Figure 4.2.1 Examples of RSL substance restrictions

(c) Restrictions applying to dye houses

Substance group	**Scope of restriction**	**Limit values**	***Verification requirements***
(a) Halogenated carriers *Applicability:* Polyester, acrylic, polyamide	Halogenated dyeing accelerants (carriers) shall not be used to dye polyester fibres and fabrics containing polyester. *Examples of carriers include1,2-dichlorobenzene, 1,2,4-trichlorobenzene, chlorophenoxyethanol.*	n/a	*Verification:* Declaration from the chemical supplier supported by SDS.

(b) Azo dyes *Applicability:* Application of colours from Appendix 2 to acrylic, cotton, polyamide, wool fibres, knits and fabrics.	Azo dyes shall not be used that may cleave to aromatic amines that are known to be carcinogenic. *Appendix 2 contains a list of restricted aryl amines and an indicative list of azo dyes that may cleave to these aryl amines. This should be used a guide to dyes that should not be used. The limit value for aryl amines shall be applied to the final product.*	30 mg/kg for each amine	*Verification:* *Final product testing to be carried out as specified.* *Test method:* *EN 14362-1:2012 and 3:2012*

Discussions relating to specific substance groups and restrictions

In addition to comments received on how the RSL is proposed to work comments were also received during the AHWG3 and in writing in relation to substance restrictions within the RSL. The comments and the proposed response in the final proposal are presented in table 4.2.5 below.

Table 4.2.5 Schedule of stakeholder comments by substance group and the resulting proposed revisions to the EU Ecolabel RSL

Substance group	Stakeholder comments	Proposed response
Substances of Very High Concern (SVHC)	The wording of the concentration limits and process of verification requires clarification.	The wording has been revised to clearly place a complete restriction on Candidate List SVHC's, which is stricter than current REACH requirements. Derogations are only possible at concentrations less than 0.1% as stated in Articles 6(6) and 6(7) of the Ecolabel Regulation.
	A stakeholder highlighted the potential to make reference to various independent listings of substances that should be considered on a precautionary basis as meeting the criteria in Article 57 of the REACH Regulation e.g. the Chemsec 'Sin list'.	The only reference point for the restriction is the published Candidate List of SVHC's.
	The consequence of the sentence "at the time of application" was felt to be unclear – especially that "*the holder shall ensure that the product to be labelled complies throughout the duration of this contact with all the terms of use and provisions set out in Article 9 of the EU regulation, at all times.*"	Introducing a new requirement to maintain compliance with a transition period to make appropriate susbtitutions is beyond the scope of the revision process as it is a Horizontal issue for discussion by the EUEB.

Biocides	Application of the criteria to final or intermediate products requires clarification. The potential for overlap/confusion between the two biocide applications covered by the RSL requires addressing as a stakeholder in favour of restricting their use was unclear as to how the restrictions worked.	The text has been amended to clarify accordingly – *'Biocides shall not be incorporated into fibres, fabrics or the final product in order to impart biocidal properties. '*
	The test method(s) for biocides used in transport and storage is not appropriate. The test methods muct be differentiated.	Declarations by suppliers and/or shippers are now proposed instead of testing.
Water, stain and oil repellents	It is proposed that the OECD definitions of long chain perfluorinated carbons are used as the basis for the restriction of PFOS and PFCA families of substances with chain lengths of >C4 and >C6 respectively. Leading manufacturers highlighted the investment by industry to make the transition to C4 and C6 chain length chemistry and the scientific evidence of the associated environmental improvements.	This proposal is supported by JRC-IPTS. The OECD definition would reflect the latest scientific knowedge on the environmental improvement potential for perfluorinated compounds and a major shift in product chemistry as a result of the US EPA's stewardship programme. The new C4 and C6 chemistries are currently in the process of being adopted by the outdoor clothing industry. Comparisons with non-fluorinated products suggest that there are no suitable alternatives that also provided oil resistance, a function that is sought in combination with water repellency in high performance jackets [169].

[169] Zero Discharge Coalition, *Durable Water and Soil Repellent Chemistry in the Textile Industry – A Research Report*, November 2012

	Even the new C4 and C6 chemistries are persistent in the environment and are more mobile so are a cause for ongoing concern. Alternatives exist on the market already based on, for example, silicon and dendromer treatments. It was also considered that some outdoor products are 'overengineered' for water repellent properties.	Technical reports suggest that C4 and C6 perfluorinated substances are understood to be the only water repellents currently able to match the performance of industry standard perfluorinated substances for high performance applications, particularly for synthetic fibres (Zero Discharge Coalition 2012). Whilst a number of new non-fluorinated water repellents have been released in the last 12-18 months (e.g. by Clariant, Dow Corning, Schoeller) and a number of outdoor brands such as Fjällraven have developed/are developing products, their performance, particularly in relation to dirt/stain repellency, their uptake by the market and their hazard profile are uncertain. A complete restriction could significantly restrict the Ecolabels potential in the outdoor clothing market and would not be in line with the Ecolabel Regulation. In the event that the EUEB takes the decision to restrict all fluorinated water repellents then it is proposed that any substitute water repellent would need to demonstrate an improved hazard profile, particularly with regards to persistence in the environment and the CLP criteria for rapid degradability in surface waters and in aquatic sediment. Moreover it is also proposed that PTFE membranes are still permitted as a core component of high performance technical outdoor wear. Such membranes provide inherent

		function and are understood to perform 25-30% better than water repellents as well as being breathable [170].
	Perfluorobutane sulfonate (C4) has been shown to be non-bioaccumulative and of a low ecotoxicological hazard.	PFBS (375-73-5) is a substitute for water/dirt/stain repellents currently used in the market. It is understood that C4 and C6 alternatives are being phased in by outdoor clothing manufacturers. Although PFBS does not have a harmonised CLP classification, self-classifications indicate that it would not be classified with hazards restricted by the Ecolabel. Concern has been expressed by some Member States about the persistency/mobility of substitute short chain compounds. This evidence mainly relates to PFCA's. More information is required on potential degradation products.
	Testing requirements require careful attention as there can be a high level of variation in the results, as evidenced by recent NGO studies which have shown different results upon retesting by leading outdoor brands [171].	The testing requirements, where relevant, have been amended to require declarations base on DWR formulations. Testing is proposed still to be required for fluoropolymer membranes and the test methods have been updated based on feedback received from industry.

[170] Go Outdoors, *Guide to waterproofing*, Accessed July 2013, http://www.gooutdoors.co.uk/expert-advice/guide-to-waterproofing-

[171] The North Face, *Water repellency and Perfluorinated Chemicals (PFC's)*, Accessed July 2013, http://eu.thenorthface.com/blog/eu/en/water-repellency-and-perfluorinated-chemicals-pfcs

Auxilliaries and surfactants	Differing views were submitted in relation to the sum total limit value. On one hand 50 ppm was seen as very difficult to achieve because, outside of the EU, these substances may be used to clean equipment. On the other hand these are substances of significant concern for this product group and evidence from Danish licenseholders and recent NGO studies [172] shows that 10-20 ppm can routinely be achieved. Limit values of 10 and 25 ppm were proposed.	A limit value of 20-100 ppm would represent industry best practice for the restriction of NPEO/APEO's. It is proposed to set the limit value at the low end of this range. This would signal that contamination must be minimised through better operating practices.
Dyes	A Member State considered testing for aryl amines to be important for all products. The same opinion was expressed by an industry stakeholder for sensitising dyes.	Avoidance of blanket testing is preferred where possible. The applicability of testing has been broadened to the following: *'Application of colours from Appendix 2 [indicative list of dyes that may cleave to carcinogenic aryl amines] to acrylic, cotton, polyamide, wool fibres, knits and fabrics.'*
Metals	A Member State queried why chromium VI was not tested for.	Chromium is understood to be addressed by the restriction on chrome mordant dyes and metal complex dyes. The chromophore in metal complex dyes is in the chromium III oxidation state.

[172] See footnote 163

Easy care	The name given to this finish should be checked and/or alternative names listed.	Reference has also now been made to 'non-crease or permanent press' as alternative definitions.
	Apply the strictest limits for formaldehyde (1.7.b) and to all textiles.	Following the opinion of ECHA's RAC on the 7th December 2012 formaldehyde is to be reclassified as H350 (Carcinogen 1B). On this basis it is proposed to adopt stricter limit values. The proposal now consists of limit of detection values (16 ppm) for all direct skin contact clothing and a limit value for all other clothing and interior textiles of 75 ppm.
	Reference to EN-ISO can be retained as this refers to Japanese standards.	Reference to ISO 14184-1 has been retained accordingly.
Flame retardants	DecaBDE should be added to the list of substances in the RSL as it has been added to the Candidate List.	DecaBDE was added to the Candidate List on 19th December 2013. It has therefore been entered into the RSL.
	The wording requires checking as there may be a contradiction between the RSL and the hazard class derogation framework.	The wording has been checked and the two restrictions clearly differentiated between the RSL, which restricts specific listed flame retardants, and the derogation framework which provides conditional derogations for flame retardants with specific hazard classifications.
	The restriction should not be as limiting. Industry standards and public bodies may require there use.	The wording has been modified in order to include public bodies that may wish to specify their use. The proposed approach is a compromise as a number of Member States have requested a complete restriction on their use.

Phthalates	The listing could be expanded to reflect the listing contained within Oeko-Tex 100.	The phthalates contained within the RSL are those identified from REACH dossiers as being likely to be of relevance to textile products.
	It was questioned as to whether it would be possible to obtain SDS for the formulation of plastics as stated in the verification requirements. This information may, for example, be confidential.	The text has been updated to require 'a declaration by polymer manufacturer supported by SDS for the plasticisers used in the formulation.' It is proposed that where the quality of information is insufficient that testing may be requested. Applicants are able to provide information on a confidential basis to Competent Bodies.
Extractable metals	Apply the strictest limits for extractable metals to all textiles.	The proposal harmonises with the Oeko-tex certificate, which differentiates between baby products and all other textile products. This is understood to reflect the different risk factors.
Metal components	There is a real risk of components containing heavy metals, as evidenced by high profile recent cases e.g. >1000 ppm lead in brass buttons in childrens wear.	Testing for trace metals is proposed to be extended to metal components, with reference to Oeko-Tex 100 test methods.
	Reference should be made to regulatory standards already existing in REACH for lead and cadmium.	Cadmium and lead are regulated by REACH Annex XVII and as amended by Regulations (EC) 835/2012 and (EC) 836/2012 respectively. The proposed cadmium restriction of 100 mg/kg reflects a 0.01% restriction. The proposed lead restriction of 90 mg/kg is lower than the 0.05% restriction introduced in Regulation 836/2012.

Specifying the testing frequency

The need for testing to take place during the license period was identified earlier in the revision process and would reflect the current practices of retailers and leading brands, as well as certifications such as Oeko-Tex 100, which carries out random inspections of certified products [173].

Proposals discussed at the AHWG3 ranged from random testing twice per year to every second year. Oeko-Tex 100 has a license duration of 12 months. The burden of testing was, however, also a key concern. Research by MADE-BY claims that the minimum cost for Oeko-Tex 100 certification, which was identified as having a comparable range of testing requirements (see the February 2013 read-across proposal), can cost from upwards of €1,500/annum but can be significantly more expensive for complex licenses [174]. Example costs were also obtained from an EU Oeko-Tex 100 testing institute which suggested a basic cost of approximately €738/annum per product tested.

In order to improve the level of assurance and to reflect potential changes in suppliers it is proposed that testing is carried out annually on a random basis for each product line that is licensed. This is a compromise between the proposals put forward. The RSL stipulates where testing is required. CB's may stipulate additional testing but this would be subject to a separate arrangement with the applicant.

Acceptance of Oeko-Tex 100 certifications

Specific reference to Oeko-Tex 100 has been removed and instead the assessment and verification text now state that *'Test data obtained for the purposes of compliance with industry RSL's and other textile certification schemes shall be accepted where the test methods are equivalent and have been carried out on a representative sample of the final product'.* This is intended to reduce the burden of testing where possible.

[173] MADE-BY, *Oeko-Tex 100 certification*, Accessed July 2013, http://www.made-by.org/wet-processing-standard/374/oeko-tex-100/certification

[174] See footnote 171

Summary of final criteria proposal

The final proposal brings together a series of current criteria which contain substance restrictions (see Table 4.2.3) into one Restricted Substance List (RSL). The EU Ecolabel RSL consists of restrictions that apply to the following production stages in the textile supply chain:

(a) Fibre and yarn spinning
(b) Bleaching and pre-treatment
(c) Dye houses
(d) Printing processes
(e) Finishing processes
(f) All production stages
(g) The final product

A number of restrictions under (g) also apply to the final product. The restrictions are contained within Appendix 1 of the criteria document. New substance group restrictions introduced on the basis of their relevance comprise the following:

- Water, oil and stain repellents,
- Non-ionic and cationic surfactants,
- Fluorinated surfactants,
- Alkylphenolethoxylates (APEOs) and their derivatives,
- DMAc (N,N-Dimethylacetamide)
- Extractable metals,
- Phthalates,
- Fluoropolymer membranes and laminates,
- Accessories, such as buttons, rivets and zips

Tightened restrictions apply to the following currently addressed substance groups:

- Formaldehyde: A limit value for all skin contact clothing of 16ppm;
- Azo dyes: A limit value of 30mg/kg for each azo dye;
- Metal complex dyes: Now only permitted for polyamide and wool;
- Biocides: The additional restriction of dimethyl fumarate (DMFu) use;

Applicants will be required to identify from the RSL the relevant verifications required for each product line. The restrictions are either to be verified by declarations and SDS obtained from suppliers or by laboratory testing of the final product. Testing already carried out in support of other certifications shall be accepted in order to

reduce the burden.

Where testing is required it is to be carried out at the time of application and then on a random basis every year for each product line. This is intended to provide consumers with greater assurance by ensuring continued compliance. Evidence suggests that suppliers and production sites may deviate from agreed limit values or may change frequently.

Proposed New Criterion 12: Subsitution Of Hazardous Substances Used In Dyeing, Printing And Finishing

Major proposed changes	○ A new criteria which supports implementation of Articles 6(6) and 6(7) of the Ecolabel Regulation. ○ It would require the substitution of substances used in dyeing, printing and finishing recipes that may end up on the final product and which are classified according to the list of textile hazard classes, which are grouped into categories A and B. ○ The aim of the criterion is to encourage manufacturers to identify potentially hazardous substances at source and to avoid and/or minimise their occurance on the final product. ○ Derogations are proposed for groups of substances that are essential for textile manufacturing but which are classified with certain hazard classes from textile hazard category B.
Proposed new criteria v1, September 2012	
Substances and preparations applied to fibres, fabrics or yarns during dyeing, printing or top finishing processes meeting the criteria for classification with the hazard statements or risk phrases specified below in accordance with Regulation (EC) No 1272/2008 or Directive 67/548/EC or that referred to in Article 57 of Regulation (EC) No 1907/2006 are subject to the restrictions explained below. For the purpose of this criteria only, the hazard statements listed in the table below have been split into Category A and Category B. The following restrictions apply: ○ Substances or preparations which meet criteria for classification with the hazard statements listed under Category A cannot be used during dyeing, printing or top finishing processes and cannot be present in the product at any concentration. ○ Substances or preparations which meet criteria for classification with the hazard statements listed under Category B cannot be used during dyeing, printing or top finishing processes if they may be present on the product at or above the generic concentrations provided in the CLP	

guidance, or the specific concentrations listed in Annex 1 of the Regulation (EC) No 790/2009,.

- Substances or preparations which meet criteria for classification with the hazard statements listed under Category B that may be present on the product below the generic concentrations provided in the CLP guidance, or the specific concentrations listed in Annex 1 of the Regulation (EC) No 790/2009 may be used in dyeing, printing or top finishing processes until 2 years of commencement of this version of the criteria, date after which they have to be substituted.

Categorisation of hazard statements restricted by the criterion

Category A	Category B
H350i May cause cancer by inhalation (R49)	
	EUH070 Toxic by eye contact (R39/41)
H300 Fatal if swallowed (R28)	H301 Toxic if swallowed (R25)
H310 Fatal in contact with skin (R27)	H311 Toxic in contact with skin (R24)
H330 Fatal if inhaled (R23/26)	H331 Toxic if inhaled (R23)
H304 May be fatal if swallowed and enters airways (R65)	
H370 Causes damage to organs (R39/23/24/25/26/27/28)	H371 May cause damage to organs (R68/20/21/22)
H372 Causes damage to organs (R48/25/24/23)	H373 May cause damage to organs (R48/20/21/22)
	H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled (R42)
	H317: May cause allergic skin reaction

	(R43)
H340 May cause genetic defects (R46)	H341 Suspected of causing genetic defects (R68)
H350 May cause cancer (R45)	H351 Suspected of causing cancer (R49)
H360F May damage fertility (R60)	H361f Suspected of damaging fertility (R62)
H360D May damage the unborn child (R61)	H361d Suspected of damaging the unborn child (R63)
H360FD May damage fertility. May damage the unborn child (R60/61/60-61)	H361fd Suspected of damaging fertility. Suspected of damaging the unborn child (R62/63)
H360Fd May damage fertility. Suspected of damaging the unborn child (R60/63)	H362 May cause harm to breast fed children (R64)
H360Df May damage the unborn child. Suspected of damaging fertility (R61/62)	
H400 Very toxic to aquatic life (R50)	H411 Toxic to aquatic life with long-lasting effects (R51/53)
H410 Very toxic to aquatic life with long-lasting effects (R50/53)	H412 Harmful to aquatic life with long-lasting effects (R52/53)
H413 May cause long-lasting effects to aquatic life (R53) [1]	H413 May cause long-lasting effects to aquatic life (R53)
EUH059 Hazardous to the ozone layer (R59)	
	EUH031 Contact with acids liberates toxic gas (R31)

	EUH032 Contact with acids liberates very toxic gas (R32)
	EUH070 Toxic by eye contact (R39-41)

Notes:

1. Where a substance that is classified with H413 is both non-biodegradable and bioacumulative.

Derogations

The following substances are specifically exempted from the requirements above in accordance with the conditions described below if they are present on the product at or below the generic concentrations provided in the CLP guidance, or the specific concentrations listed in Annex 1 of the Regulation (EC) No 790/2009. Hazards EUH023, EUH 031 and EUH 032 are derogated for all substances.

Functional substances Functional substances are derogated from the sunset timescale for Category B substances given above.		
Function group	**Derogated classifications**	**Derogation conditions**
Dyes	Category B, H412, H413, H300-331, H317 and H334	• EU BAT measures shall be used to minimise worker exposure to dyes in powder form; • Wastewater shall be treated according to the additional requirements in Criteria 27
Optical brighteners	Category B, H412 or H413	• No specific additional requirements
Softeners	Category B	• Must not be classified with H334 or H317

Cross linking agents	Category B	• Must not be classified with H334 or H317
Flame retardants	Category B	• Should be required by fire legislation and/or ISO, EN or Member State standards for specific end-uses.
Water and stain repellents	Category B	• Should not be classified with H410 – 413
Membranes and laminates	Category B	• Plasticizers and solvents should not be classified with H410 - 413

Other residual substances		
All functional groups	Category B, EUH023, EUH 031, EUH 032	• EU BAT measures are used to minimise the exposure of workers during the handling of substances; • That wastewater effluent from manufacturing sites is treated according to the additional requirements described in Criteria 27;

Assessment and verification: The applicant shall demonstrate compliance with this criterion by providing a declaration of the classification and/or non-classifications of each substance that forms part of a dyeing, printing or finishing preparations according to the hazard categories referred to above and, as far as this can be determined, as a minimum, based on information meeting the requirements listed in Annex VII of REACH Regulation (EC) 1907/2006.

This declaration shall be supported by a technical report which identifies the

substances and preparations used for dyeing, printing and finishing and the predicted concentrations on the final product. Substances and preparations should be characterised in accordance with the level of detail specified in section 10, 11 and 12 of Annex II of Regulation (EC) 1907/2006 (Requirements for the Compilation of Safety Data Sheets). The technical report should also identify substances that are proposed for derogation by the applicant, accompanied by justifications for how the derogation requirements are met.

The final product or intermediate products should be randomly tested in order to validate predicted concentrations of substances on the final product. Final product testing may be exempted if testing data can be provided for each process stage.

AHWG1 Follow-up research and proposed approach

Screening of R Phrases and H Statements

The application of the R Phrase and H Statement listing to textile products poses a significant challenge. In order to test the practicality of the criterion as it is written over 200 commonly used substances identified by textile chemists [175] as potentially being present on a final product were entered into the CLP database. The significant number of substances means that it is beyond the scope of this product revision to identify the scope for substitutes

The substances screened reflect those identified by the hazardous substance background research to Criterion 10 – optical brighteners, dyeing and printing auxiliaries, finishing auxiliaries, softeners, easy care treatments and flame retardants. Derogations proposed by stakeholders were also taken into consideration (see Annex 1). The following observations can be made from the screening:

- Dyes: A range of CMR, carcinogenic or allergenic dyes already form part of the proposed RSL. Two areas of possible derogation have been identified by stakeholders:
    - H334,317 : Dyes carry these classifications because of their characteristics in dust form. Given the minimal risk that in most cases

[175] Lacasse, K and W, Bauman (2004) *Textile chemicals*, Springer-Verlag *and* Swedish National Chemicals Inspectorate, Chemicals in textiles – report of a Government Commission, Report No.5/97

properly dyed garments pose to consumers (as identified by the testing studies reviewed), the most relevant exposure pathway may therefore be their handling by workers.

- H412,413: The Blue Angel has derogated dyes from these classifications because it would exclude most common dyes. Dye fastness and efficient rinsing off of fabrics to avoid the wash out of dyes during use of textile products, coupled with the degradation of residual dyes by wastewater treatment works at the manufacturing stage therefore appear to be the most practical ways of minimising exposure risks.

- Carriers and levelling agents: These substances are used to assist with the dyeing of polyester fabric. They can be classified with a significant number of H Statements, including H Statements H300-362. Consumer risk can be minimised by careful dosing and the efficient rinsing off of fabrics. Carriers can be avoided by dyeing polyester at higher temperature and pressures, but this increases other environmental impacts through greater energy use.
- Finishes: Some easycare, softeners, water repellents and flame retardants are classified with acutely toxic, CMR and aquatic environment hazards that may lead to exposure of workers from VOC emissions in the factory, the environment from the rinsing off of fabrics and consumers as a result of leaching from a fabric during use. Many of these hazard statements are identified in the current EU Ecolabel criteria. Exposure can therefore be minimised at source in the factory through adequate health and safety measures, process control to ensure fixation, and through the selection of finishes with a high level of fastness.
- Coatings, laminates and membranes: Some of these additional elements of a fabric or product may, depending on their content, contain phthalates and perfluorocarbons. Relevant acute toxicity, CMR and aquatic environment hazard statements are identified in the current criteria. Specific restricted substances are now contained within the proposed RSL.
- EUH 029, 031, 032: Industry stakeholders stated that use of substances carrying these classifications would not permit the operation of textile processes. The hazardous substance screening we carried out against the CLP database did not identify any substances with these classifications;

Critical to interpretation of Hazard classifications are the generic concentration levels that trigger classification, as well as specific concentration limits and M factors that may be listed in Annex 1 of the CLP Regulation (EC) No 790/2009. These are important in that they allow for the level of potential exposure to be determined.

Approaches to the screening of textile chemicals

A number of precedents exist for the screening of textile chemicals and preparations in order to reduce exposure of the workforce, the environment and consumers. These include:

- TEGEWA classification scheme: This scheme has been successfully used in Germany to screen textile auxiliaries into three categories according to their hazard to wastewater [176]. Between 1997 and 2000 it led to a 33% reduction in the use of auxiliaries in the highest category III of hazard (see Table 3.2.4).
- Air Emissions Factor method: The German Government working with the textile industry developed a method for calculating harmful emissions from thermal finishing processes [177]. Manufacturers can therefore attempt to minimise emissions at source by selecting new recipes.
- Global Organic Textile Standard (GOTS): The current criteria v3 distinguishes between hazards to health and the environment [178]. Furthermore it distinguishes between input substances and preparations. Classified substances may be derogated as long they do not trigger classification of a preparation.

Variations on these approaches to screening form part of the Bluesign system [179] and Oeko-Tex 1000 criteria [180]. Bluesign in particular places a strong emphasis on 'input stream management' to reduce risks.

[176] See p-260 of European Commission, *Reference document on Best Available Techniques for the textile industry*, IPPC Bureau, July 2003

[177] See p 262 of European Commission, *Reference document on Best Available Techniques for the textile industry*, IPPC Bureau, July 2003

[178] International Working Group on Global Organic Textile Standards, *Global Organic Textile Standard (GOTS)*, Version 3.0, March 2011, http://www.global-standard.org/the-standard.html

[179] Bluesign Technologies, *Bluesign criteria for textile manufacturers*, Version 1.3, March 2010

[180] Oeko-tex International, *Oeko-tex Standard 1000*, Edition 01/2012

Table 4.2.6 Textile auxiliaries sold in Germany from 1997 to 2000: number, quantity and percentage of textile auxiliaries in classes I, II, III

Class	Number				Quantity (t/yr)				Quantity (%)			
	1997	1998	1999	2000	1997	1998	1999	2000	1997	1998	1999	2000
I	2821	3020	3242	3164	98446	105983	102578	104406	63	67	75	77
II	1499	1485	1358	1258	29972	29422	23321	22103	19	18	17	16
III	460	417	358	297	27574	23830	10231	9206	18	15	8	7
Total	*4780*	*4922*	*4958*	*4719*	*155992*	*159235*	*136130*	*135715*	*100*	*100*	*100*	*100*

Source: European Commission (2003)

Proposal:

It is proposed that hazardous substances used in dyeing, printing and finishing processes which may be present on the final product and which meet the criteria for classification with specified hazard statements or risk phrases should, as far as possible, be substituted by manufacturers according to sunset timescales which would afford applicants time to change processes and recipes.

Because of the number of possible combinations of substances in preparations and recipes, and the imprecise nature of textile manufacturing, no specific concentration thresholds are proposed. Instead concentration limits should be taken from the generic concentrations in CLP guidance or the specific concentrations listed in Annex 1 of the Regulation (EC) No 790/2009

In order to make the criterion easier to understand for industry, substances have been considered in two broad groups:

1. Functional substances that are required to be present on the final product in order to achieve colour, luster or finish,
2. Residual substances that may be present at varying concentrations depending on the process chemistry and how well the product has been washed and rinsed.

In order to ensure that the criterion is practical and hazard based the Criterion 10 hazard listing has been split into into categories A and B. This approach reflects the techniques used by TEGEWA and GOTS, in which the most significant health and environmental hazards are prioritised. The category prioritisation has been developed using the CLP guidance with itself categorises hazards based on concentration thresholds.

It is proposed that Category A hazards shall not used. Category B hazards can be used as long as certain derogation conditions are met but must be substituted within 2 years of the new criterion commencing.

In the case of functional substances the derogation conditions recognise that these substances must be present on the final product in order to meet customer needs, but that in doing so the risk to consumers and the environment must be minimised. It is considered that a number of existing EU Ecolabel criteria already work to minimise this risk – for example, the dye fastness criterion – and the proposed new criterion addressing the durability of finishes is intended to further complement this approach.

In the case of residual substances the derogation conditions have been related to workforce exposure and environmental hazards at manufacturing sites, as this is where the hazards are likely to be expressed if concentrations are minimised on the final product.

AHWG2 and CB Forum stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

The overall approach was seen as being workable. However, an industry stakeholder felt that the proposed lists of derogations would lead to a high complexity which many smaller producers are unlikely to be able to control or manage.

Clarification was requested on the rationale behind categorisations A and B. There was also concern expressed by one competent body that Category B contains among others following categories:

- H311 toxic in contact with skin (R24)
- H317 may cause allergic skin reaction (R43)
- H351 suspected of causing cancer (R49)
- H361f suspected of damaging fertility (R62)
- H361d suspected of damaging the unborn child (R63)

The new classifications for allergens should also be taken into account. Sensitisers of subcategory 1A (high sensitisation rate) should be put in textile hazard category A.

The two year phase out period was not seen as being compatible with the licensing process for the Ecolabel as licenses would need to be re-issued. Industry stakeholders also considered this period insufficient in which to achieve substitution of the wide range of auxilliaries used to assist textile chemistry.

Mills are extremely reluctant to change dyeing and finishing recipes because of the potential for shade changes, reduction in dyeing quality, reduction in product quality and unforeseen changes in downstream operations. For wool in particular, alternative agents may simply not be available. An informal survey of SDS for process formulations from a selection of Chinese mills that one industry stakeholder assists to obtain the EU Ecolabel suggested that the majority fell into Category B.

The practicalities of ensuring that a product complies with the requirements needs to be carefully thought through – what happens if Hazard Class is updated, how will this affect the eco-label, and how would Competent Bodies ensure we get this information? Greater clarity is needed as to how suppliers will report to the applicant. The explanations provided in the User Manual will be very important.

Preparations containing a substance classified as H412 should be classified H412 as a preparation if the concentration of the substance (or sum of substances) exceeds 25%. This is in disagreement with Ecolabel proposals whereby the cut off is at 1%. Harmonisation of rules should be considered with CLP legislation. It is not made sufficiently clear for normal users if the proposed restrictions are based on components (point 3 of MSDS) or overall evaluation (point 2 of MSDS).

An industry stakeholder felt that greater flexibility should be introduced into how the Hazard Statements are considered so as to ensure that their overall environmental profile is taken into account. For example, a product with R50 (fish toxicity 1mg/l – OECD 204 rainbow trout 96hrs) there should also be consideration of its biodegradability 62% OECD 301F and more relevant its removal by wastewater treatment 93% by OECD 302B. It should be the intention of a responsible producer that waste water is suitably treated and it is this part that has to be assured. The derogation conditions relating to BAT techniques will require more detailed specification so that they can be verified by Competent Bodies.

Follow-up research and proposed approach

Phase out and substitution period

Whilst this proposal was originally based on successful industry precedents such as TEGEWA in Germany the way in which Ecolabel licenses are granted would appear to make a phase-out period during license periods impractical. The range of possible chemicals and their substitutes is also, in the opinion of industry stakeholders, too complex to impose a blanket phase-out period.

Proposal:

Omit the phase-out period from the proposed new criteria.

Categorisation and derogation of the hazard classes

As was presented at the AHWG2 and EU Ecolabel Competent Body Forum a hazard-based categorisation of the hazard class list is proposed into 'textile hazard class categories' notionally referred to as A and B. This distinguishment is based upon the different categories of hazards in the CLP Guidance and also reflects an overlap between Category A hazards and the criteria in Article 57 of Regulation (EC) 1907/2006.

Criteria and methodologies specific to each hazard classification are used in CLP to create different categories of hazard. This therefore forms the main basis for the two categories, as they reflect the differentiation made by CLP.

Moreover, this approach also allows hazard classes that reflect REACH Article 57 criteria and that are restricted by the existing Ecolabel criteria, which largely fall into Category A, to be grouped together so that stricter conditions can be applied. In terms of industry precedents this approach also broadly reflects the screening approach adopted by German industry association TEGEWA. Grouping by types of hazard reflects the approach taken by textile labeling scheme GOTS.

Concern has been raised by some Member States that even taking into account the stricter restrictions on textile hazard category A the treatment of certain hazard classes in category B should be considered further. The following were highlighted as being of specific concern:

- H351 suspected of causing cancer (R49)
- H361f suspected of damaging fertility (R62)
- H361d suspected of damaging the unborn child (R63)

It is possible therefore that stricter derogation conditions could be applied where these hazard classes are relevant. These conditions would need to be defined by the exposure paths relevant to the hazard.

Proposal

Introduce a requirement that for hazard classes H351, H361f and H361d specific derogation conditions must be applied that minimise exposure.

Ensuring that the Hazard Classes are dynamic

It was highlighted by stakeholders that the criteria must be able to accommodate future changes in the hazard classifications. A good case in point are the new classifications for allergens which split the classifications into 1A and 1B.

The reference point for the criteria is Article 6(6) of the Ecolabel Regulation (EC) No 66/2010 which in turn refers to the CLP Regulations (EC) No 1271/2008 and 790/2009. Any changes to the classifications would need to be communicated to both applicants and Competent Bodies. This would ensure that the most up to date set of hazard classes form the common reference point for the criteria.

Proposal:

Wording is to be added to the criteria stating that the most up to date classifications should be used. The issue of communicating any updates is to be discussed with Competent Bodies.

Preparations versus individual substances

Article 6(6) of Regulation (EC) No 66/2010 refers to goods containing hazardous substances or preparations/mixtures. The recipes used in textile chemistry do not directly relate to the final composition on the product. This is because of changes to the composition during reactions and subsequent washing-off. Substances may therefore be more appropriate to the final product.

Proposal:

The wording of the criteria is to be updated in order to clarify that substances on the final product are the main consideration.

Table 4.2.7 Schedule of stakeholder comments by hazard class and the proposed revisions to new criteria 12

Substance group	Stakeholder comment	Proposed revisions
Dyes	Many hazard classes relating to aquatic pollution are have been grouped into category A, meaning they shall not be used. These hazard phrases are found on many substances used for dyeing, and restricting these will have consequences industries ability to fulfil the eco-label requirements. Especially R-phrases R51 (H411) and R52 (H412) are critical. It must be investigated whether there are alternatives available to ensure the full colour scales. From industries point of view they are not risk in terms of the finished textile, and the risks could be handled at the manufacturing plant by ensuring a good chemical management and waste water cleaning.	Hazard Classes H411 and H412 are proposed as falling within textile hazard category B. A derogation of these hazard classes is proposed for dyestuffs. The following derogation conditions are proposed: - EU BAT measures be used minimise worker exposure when handling dyes in powder form; - Wastewater shall be treated according to the additional requirements in Criteria 16 which specify colour removal for dye houses.

Anti-felting finishes	The halogenated substances used to treat wool meet the criteria for classification in Category A under R50 and R50/53 as well as Category B under R51/53, R52/53. The usage of these substances is essential for anti-felting treatment and is the best available technology.	Textile chemical literature validates this comment, highlighting the importance of a single chlorine-polymer treatment chemistry to 80% of wool. Alternatives have, however, been developed which avoid the use of chlorine and the generation of AOX in wastewater [181]. Limited information is available about the OX levels that might be expected on the final product.
Flame retardants	A request was made in relation to flame retardants for R40 (H351) to be considered as Category B.	Hazard Class H351 is proposed as falling within textile hazard category B. A derogation of this hazard class is proposed for flame retardants.

[181] See Lacasse and Bauman (2004) *and* European Commission (2003) Textile BREF

AHWG3 stakeholder feedback and final proposals

Here we present a summary of feedback received following the extra-ordinary ad-hoc working group in Brussels on the 23rd April 2013, together with a brief outline of the final criteria proposal.

Stakeholder feedback

The proposal overall was viewed as being complex and would need to be adequently supported by information in the user manual.

There were differing views as to whether compliance could be obtained on the basis of Safety Data Sheets, particularly from non-EU suppliers. The ability to obtain this information may be limited. One Member State felt that declarations of compliance would be needed from chemical suppliers and process steps. A chemical list would be required for each process step to support these declarations.

A concern was raised by one Member State that a broad derogation framework may allow some substances to be used where substitutes exist. A stakeholder also questioned whether some of the functions derogated were actually needed (e.g. optical brighteners) and as to whether the derogations were actually fully in line with hazard class restrictions in the old criteria.

A concern was raised by a stakeholder that if the derogation framework was not precise then there was a risk that verification would not be harmonised across Member States. There would also be variations due to different Member State legislation e.g. fire regulations.

Based on feedback from an industry representative the derogation conditions should be workable, but may require site visits and/or much clearer specification of the conditions and the requirements for evidence so that Competent Bodies can make the verification.

The most significant area of concern related to the concentration limits for each substance group. It was not clear to a number of Member States whether these referred to the final product or to the formulations used at the relevant process stage. A general view was expressed that it would not be possible to verify a concentration limit that applied to the final product. There were differing views and examples from stakeholders as to whether this was possible.

Follow-up response and final proposal

Substance group concentration limits

The concentration limits were identified from literature as an indicative guide to the substances likely to be found on the final product. Following the discussion at the AHWG3 it is proposed to delete reference to the substance group concentration limits. This was considered too complex to verify and that verification of the substance groups that have been identified as remaining on the final product should be the main focus of the criteria.

Verification on the basis of SDS

The minimum requirements are information according to REACH Annex VII. The reference to SDS forms part of all Ecolabel hazardous substance criteria and provides a standardised reference point for the information required. The reference to SDS in the RSL has been modified so that the requirement is for declarations supported where possible by SDS and/or analytical testing.

Reference is made to REACH registration requirements for substances (Annex VII, 1 tonne threshold) as a minimum requirement. The reference to Annex II requirements on SDS is intended to provide a common reference point for the quality of SDS. It was queried why only 10,11 and 12 are identified when other Sections may be relevant. A review of Annex II suggests that 2, 3 and 9 are also directly relevant, covering as they do basic information requirements that will assist in verification and, moreover, are identified in the assessment and verification. New text has also been introduced into the criteria with verification options reflecting the different potential status of substances given that many substances are yet to pass through the REACH process.

Derogation of only core functions of the product

The functions derogated have been agreed by stakeholders during several rounds of consultation as being those required for the product group. Where possible the derogations have been made more specific on the basis of stakeholder comments (e.g. optical brighteners) or removed where new evidence suggests that they are not required (e.g. softeners). Changes made are discussed and summarised in Table 4.2.8.

Table 4.2.8 Summary of stakeholder comments on the hazardous substance group derogations

Substance group	Stakeholder comment	Proposed response
Dyes and pigments	Differentiate between dyes and pigments as evidence from licenseholders is that the hazard profile is different. There was also concern about derogating H317 and H334 as the pigment remains on the product.	Subject to further information forthcoming from stakeholders no specific derogation is proposed for pigments. Dyes are increasingly used for printing and will be addressed by the dyestuff derogation.
	It is not clear how the list of derogation conditions works and whether certain techniques would minimise the hazards. Reject rates were highlighted as being important.	The proposal has been modified - for dyes known to have lower fixation rates a BAT technique must be selected from a number of options that maximise fixation/optimise process control and/or minimise wastewater pollution. A target reject rate has been added, with a figure of 3% being drawn from earlier research. Solution dyeing and digital printing are now recognised and are exempted because of their inherent efficiency.

Softeners	Derogation of H317/R43 and H334/R42 should be reviewed because evidence from licenseholders suggests that it is not justified (10 out of a sample of 14 softeners used are without hazard classifications).	The comment has been cross referenced with the draft final version of a report from the European Commission *'regarding possible new labelling requirements of textile products and on a study on allergenic substances in textile products'.* This included the screening of softeners for H317 and H334. Only a limited number of softeners were highlighted as being classified with these hazards.
Water, oil and stain repellents	*It has been proposed that in Criteria 13 perfluorinated substances are restricted.*	The hazard profile of two of what are understood to be the currently available water repellent substitutes were checked using the ECHA C&L Inventory. The first is silicone based - dimethylsilicone (9016-00-6). The substance does not have a harmonised classification. 128 notifications were not classified. 64 notifications were classified with H413. The second is paraffin based – Ecorepel, a water repellent produced by Schoeller. No information could be found confirming its classification/non-classification although paraffin wax (8002-74-2) appears based on notifications not to be classified. A product information sheet from Schoeller states that it passes OECD inherent biodegradability test 302B. On this basis, and in order to ensure that alternatives are available, it is proposed to retain the derogation for H413 together with a requirement that, as a minimum repellents are inherently biodegradable i.e. eliminable in wastewater treatment plants.

Optical brighteners	A complete ban on optical brighteners would exclude around 30% of all products and nearly all fabric prints. If the EU Ecolabel criteria are to be used for public procurement then white uniforms must be permitted to use brighteners.	It is proposed that the derogation is made much more specific to permit only:1) white coloured printing 2) enhanced brightness in uniforms and workwear 3) additives during the production of polyamide and, polyester with a recycled content and acrylic fibres (reflecting GOTS).
Flame retardants	The derogation conditions should not be as limiting. Industry standards and public bodies may require there use.	The proposed approach is a compromise as a number of Member States have requested a complete restriction on their use. The wording has been modified in order to include public bodies that may wish to specify their use.
	The derogation of H351 for antimony trioxide synergist raises concerns and may be subsequently promoting the use of brominated flame retardants in Ecolabelled products. The derogation should be made specific.	The synergist is required in combination with substitutes for decaBDE and the alternatives (such as zinc borate) are understood to only provide partial substitutes and not in all applications. The derogation has been made more specific and a condition applies to the area of greatest exposure - i.e. the workforce applying the flame retardant to the textile.
	Auxiliaries which are toxic in contact with skin (H311) should be banned in any case as skin contact for apparel fabrics is intended.	The intention of the derogation is to encompass auxilliaries that may be present as a process carry-over. Concentrations are likely to be present at trace levels. In response to the concerns raised a concentration limit of 1.0% has been added as a condition for H317, H311 and H331, in-line with CLP rules. This would need to be verified if production formulas include these substances with these hazard classifications.

Summary of final criteria proposal

The final proposal interprets Articles 6(6) and 6(7) of the Ecolabel Regulation 2010 for the textile product group. The main focus for the criteria is a list of hazard statements. The final product shall not contain hazardous substances that are classified with these hazards.

Because the substances present on a final textile product are the result of a series of product stages reference is made in the criteria to substance groups that are required to achieve function (e.g. colour, softness) and which may remain as residues on the final product (e.g. auxiliaries). The classification or non-classification of the principle substances contained within the production formulas used must therefore be verified. The following substance groups are required to be verified:

- Dyestuffs and pigments
- Auxilliary carriers, leveling agents and dispersing agents
- Optical brighteners
- Print thickeners, binders and plasticizers
- Cross-linking agents (from easy care finishes and printing)
- Flame retardants and synergists
- Water, dirt and stain repellents
- Fabric softeners

The verification wording reflects that used in the rinse off cosmetics product group, which underwent Interservice Consultation earlier in 2013.

Early in the revision process it was identified that blanket implementation of the hazard list would not permit mainstream textile chemistry. A derogation framework has therefore been developed for required substance groups and functions that derogates specific hazards and under certain conditions.

Derogation conditions have been developed relating to where in the production chain and lifecycle the hazard may arise. The conditions are selected to mitigate the relevant hazards. They include:

- Textile production BAT techniques,
- Workplace Occupational Exposure Limit Values,
- Final product concentration limits,
- Durability of function.

PROPOSED NEW CRITERION 13: DYEING, PRINTING AND FINISHING PROCESS EFFICIENCY

Major proposed changes	○ This criteria would update and replace existing Criteria 33 ○ The aim of the criteria is to encourage the implementation of BAT process efficiency measures identified has having significant environmental improvement potential along the supply chain ○ Introduction of a requirement for applicants dyeing, printing and finishing suppliers to implement a minimum number of BAT techniques selected from the list provided. ○ New techniques may be accepted subject to verification that they deliver improvements compared to BAT and conventional techniques.

Feedback from stakeholders

At the first AHWG stakeholders indicated that the textile BREF should be a reference point for the revision. Some concern was raised about the age of the document, which dates from 2003, but the general feeling was that it was still felt to be valid. The need to consider systems such as Bluesign was also highlighted.

Follow-up research and proposed approach

Cross-referencing IMPRO Textiles to the textile BREF

The IMPRO Textile study highlights the significance of the dyeing, printing and finishing process stages to the LCA midpoint indicators. The study was not, however, conclusive on process improvement options, recognising the difficulty in accurately assessing the improvement potential of single or multiple combinations of actions that could reduce modelled environmental impacts. Moreover, the study recognised that EU practices were used as the basis for the modelling whereas in practice the efficiency of global practices, which the study identifies as the source for around 60% of EU textiles, may vary considerably.

Many of the improvement options identified by the study were not modelled in detail because of gaps in data availability and/or views on their time horizon for adoption. To inform the EU Ecolabel revision the decision was therefore taken to re-review the long list of IMPRO improvement options against the textile BREF and, where necessary, the current state of the art according to industry guidance and expert literature. The latter were drawn upon in order to check the current status of BAT techniques that the BREF, which dates from 2003, may have identified as emerging e.g. digital printing.

Characterising the main parameters for improvement

The textile BREF, expert literature and industry guidance were used to characterise the most important parameters which influence the process efficiency of dyeing, printing and finishing. Over 20 BAT techniques selected from the textile BREF were reviewed in detail in order to identify and categorise the most relevant techniques. A summary of the BAT techniques can be found in Annex 4.

We have defined process efficiency is defined in terms of energy, water and chemical use, but it can also be defined in terms of product quality control, as this in turn can influence these parameters. Finishing processes comprise the application of functional coatings or treatments to the fabric, including softeners, easy care, anti-felting, water repellents and flame retardants.

The following key improvement measures and parameters were identified:

- Dyeing
  - Benchmarking studies suggest that substantial savings in energy, water and chemical use can be obtained by moving to more efficient process technology, with savings in the range of 60% for energy consumption, 70% for water consumption and 20-70% for chemical consumption [182];
  - Some processes are inherently less efficient because of their design and/or non-continuous nature which can, for example, mean that the dye baths cannot be prepared in-line (instead of manually) and water and chemicals are more difficult to recycle;

[182] Schramm. W and J, Jantschgi, *Comparative assessment of textile dyeing technologies from a preventative environmental protection point of view*, Journal of the Society of Dyers and Colourists, Vol 115, p 113-135, April 1999

- Dyeing without colour instrumentation and automated dosing of dyes and auxilliaries is imprecise, which can lead to higher environmental impacts because dye baths may need to be kept at temperature longer [183]. Fabrics may also be rejected by clients because they are not 'right first time'. Reject rates can be reduced from more than 7-8% to less than 2-3%;
- Colour fastness is strongly influenced by the dyes selected, how the process is controlled and how well the fabric is subsequently rinsed off [184] . Without careful control dye may remain unfixed on the fabric, which can subsequently be rinsed out in domestic washing machines or leach onto skin;
- Washing and rinsing is common to all dyeing processes and consumes significantly greater quantities of energy and water than dyeing itself. Water savings of between 50-75% can be achieved using efficient processes [185].

o Printing

- Industry standard printing processes such as screen printing are inherently limited as to how efficiently they use printing pastes, with approximately 50% generally wasted during the process, before then contributing to significant effluent COD levels [186]. Sample runs are particularly wasteful as they require the complete setup of a machine for a production run;
- Printing paste residues and waste can be reduced by 40-60% by investment in simple recovery systems and routines [187];
- Digital inkjet printing is the BAT, as it is significantly more efficient, for example using 80% less energy and avoiding nearly all print residues

[183] Marks & Spencers, Environmental and chemical policy for textile processing – Modules 3 and 4: Minimum standards and best practices, Version 1, May 2011

[184] Lacasse, K and W, Bauman (2004) *Textile chemicals*, Springer-Verlag

[185] European Commission, *Reference document on Best Available Techniques for the textile industry*, IPPC Bureau, July 2003

[186] See footnote 183

[187] See footnote 183

[188]. However, although its use is growing fast, with 300% growth reported between 2005 and 2000, it is still considered an emerging technology. It accounted for just 1% of the market in 2007 but with projections of 10% within a few years [189]. From a technical point of view it cannot replace all standard printing requirements e.g. discharge/etch printing.

- Fixing, washing and drying are process stages common to all print finishing with the exception of transfer and pigment printing. These processes consume significant quantities of energy and water, and more so than printing itself.

- Finishing
  - Energy use associated with drying and curing in so-called stenter frames is generic to most finishing processes, with an improvement potential of 15-30% [190].
  - A range of options exist that can make stenter frames more efficient, including optimised exhaust air flow, heat recovery, insulation, heating systems and burner technology [191];
  - Air emissions of volatile active substances from finishing formulations can be carried over and volatilised into the exhaust air from stenter frames [192]. This is therefore a potential area of improvement, both in terms of finish application efficiency and pollution control.

The areas of potential improvement that were identified can be seen to fall into three broad categories:

1. Production management:

[188] European Commission, Tieprint - Technology transfer of low environmental impact ink jet printing for the production of textile products, LIFE Programme LIFE99 ENV/IT/000122

[189] Just Style, Digital textile printing on growth trajectory, April 2007, http://www.just-style.com/analysis/digital-textile-printing-on-growth-trajectory_id97071.aspx *see also* Textile Digest, *World textile printing industry*, December 2010, http://www.ttistextiledigest.com/inter-articles/inter-textile-insighttrend/item/3085-world-textile-printing-industry.html

[190] See footnote 183

[191] See footnote 183

[192] See footnote 183

a. Engagement of the workforce: A combination of environmental awareness training, good practices for maintenance and cleaning, and process input/output monitoring.
b. Design and colour instrumentation: Systems which enable the accurate reproduction of customers designs and colours;
c. Automatic dosing and dispensing: Installation of automatic systems which meter the exact amounts of chemicals, auxiliaries and water required.
d. Process control and optimisation: A combination of monitoring, flow control and timing, well-documented production procedures, optimised production scheduling and efficient machinery.

2. Process specific measures: BAT techniques have been identified which contribute to improvements in the use of energy, water and chemicals. These techniques are specific to each process and can be grouped into those that require specific technology (e.g. jet dyeing, digital printing) and those that require changes in how the process is managed by the workforce (e.g. dye selection, print paste recovery).
3. Generic energy and water efficiency measures: Washing and drying processes are common to dyeing, printing and finishing. Efficiency can be optimised through a combination of metering, process monitoring and efficient machinery. These measures in part rely on the engagement of the workforce.

Based on these measures and parameters it can be seen that there exists significant potential for improvements based on BAT techniques. Moreover, the assumptions used for the IMPRO Textiles LCA were derived from European textile manufacturers who must comply with IPPC requirements to follow BAT techniques. In contrast, retailers and brands using foreign manufacturers cannot be sure that BAT techniques have been used.

Review of process efficiency initiatives

As we have highlighted process efficiency is a complex subject, with many different combinations of improvement options being possible. In order to explore whether/how process efficiency is practically being addressed by industry a number of initiatives were selected as case studies.

The case studies are examples of the 'state of the art' when considering process improvements at manufacturing sites. The initiatives reviewed comprise:

- Case study 1: Retailer supply chain policy – Since 1998 UK retailer Marks & Spencer have operated strict policies and standards for the performance of wet production processes and the management of quality along its supply chain [193]. They are applied to dyeing, finishing and printing processes – those with which the company has the most direct commercial influence and greatest 'visibility' down the supply chain. The Company has initiated an 'eco-factory' programme in the UK and Sri Lanka. This focuses on basic energy management practices, with reference to work by the NRDC (see below).
- Case study 2: Industry-led process certification - Bluesign is an independent certification system for all production processes associated with a final fabric product [194]. It was established in 2000 and over 200 manufacturers are system partners. Partners include Helly Hansen, Patagonia, the North Face, Polartec and Schoeller. It has recently been independently assessed by the Oeko-Institute as providing as high a level of assurance as the EU Ecolabel and the Blue Angel. The system is based on the concept of 'intelligent input stream management' which focuses on the avoidance at source of chemical inputs which pose risks to health and the environment based on their toxicological properties. Bluesign also benchmarks processes against Best Available Techniques (BAT) in order to improve and optimise resource efficiency.
- Case study 3: Consumer-focussed certification - Oeko-Tex 1000 is an independent certification system for textile manufacturing sites [195]. It is intended to work alongside Oeko-tex 100 which is a certification for products. Manufacturing sites can be certified against the Oeko-tex 1000 criteria Part A. In May 2012 a total of 57 production sites were certified, including spinners (22 %), yarn dyers (7 %), weavers (20 %), knitters (5 %), finishers (32 %) and final products (14 %).

[193] Marks & Spencer, *Environmental and Chemical Policy for textile processing*, May 2011

[194] MADE-BY, *Bluesign certification*, http://www.made-by.org/wet-processing-standard/368/bluesign-standard/summary

[195] MADE-BY, *Oeko-Tex 1000 certification*, http://www.made-by.org/wet-processing-standard/360/oeko-tex-1000/summary

- Case study 4: Industry-led voluntary reporting: The HIGG Index has been developed by the Sustainable Apparel Coalition [196], which is a grouping of leading apparel and footwear companies. The Index is a self-assesment tool designed to allow manufacturers to measure and evaluate the environmental performance of any product along its supply chain. It can be used for a brand, a product and for production facilities. It is based on the Outdoor Industry Associaton's Eco Index tool and Nike's Apparel Environmental Design Tool.
- Case study 5: Industry-led guidance - MADE-BY is a non-profit industry association established in 2004 with the aim to improve environmental and social performance of the fashion industry [197]. Members include Ted Baker, Komodo and G-Star Raw. The association has sought to assist its members in understanding how they can influence wet processors in their supply chain. This is particularly challenging given that their members tend to have less resources and influence than larger retailers and brands;
- Case study 6: Industry-led benchmarking – The Association of Italian Textile Machinery Manufacturers have established a labelling system to report the performance of efficient process machinery [198]. The project has established normatives for the measuring and comparing the energy performance of process equipment, with certification of the data for publication.
- Case study 7: NGO guidance - The National Resource Defence Council (NRDC) is a US NGO that has developed guidance for textile mills [199]. Working with major brands such as GAP, their 'Clean by Design' initiative has audited 17 textile dyeing and finishing mills in China in order to identify practical measures that could be taken to reduce water, energy and chemical use.

[196] Sustainable Apparel Coalition, *the Higg Index*, http://www.apparelcoalition.org/higgindex/

[197] Moor, A (2010) *The environmental impact of wet processing and how to improve sustainability: written for MADE-BY*, Amsterdam Fashion Institute

[198] ACIMIT, *Sustainable technologies – ACIMIT Green Label*, Accessed January 2013, http://www.acimit.it/pub/E-sustainable1.htm

[199] National Resource Defence Council, *Ten best practices for textile mills to save money and reduce pollution*, Clean by Design initiative, February 2010 *see also* National Resource Defence Council, *Dyehouse selection a major opportunity to reduce environmental impact*, Clean by Design initiative, April 2012

For each initiative we have identified the production stages they address, the verification systems used and the main technical criteria areas or guidance they provide. The comparative results are presented in the table below and more detailed summarises can be found in Annex 5.

The findings broadly accord with the three main areas of potential improvement highlighted in the previous section, although it is notable that production management and energy/water efficiency receive the strongest emphasis.

The aim of improving communication along the supply chain is common to all the initiatives. Marks & Spencers, Bluesign, the Higg Index and MADE-BY both recognise the need to engage suppliers in a process of continuous improvement, whilst Oeko-Tex 1000 and NRDC focus on specific improvement measures and limit values. Bluesign and the Higg Index rely on confidential dialogue with partners, including technical advice on BAT. Marks & Spencer's self-audit questionnaire is a good example of a relatively simple technique which could suit the Ecolabel. It's impact has been to raise awareness along the supply chain of the clients' expectations. The Higg Index works in a similar way, but is more general in its focus on overall environmental management. ACIMIT aims to improve differentiation of efficient process machinery in the textile market.

Verification of performance is required by Marks & Spencers, Bluesign,Oeko-Tex 1000 and ACIMIT (for machinery). Site visits are carried out by Marks & Spencers to verify self-audits every 2-3 years to verify performance, although product quality is also a important indicator, with reject rates used as a proxy for how efficiently processes are operated . Site visits and contact with partners form an intrinsic part of Bluesign. Site visits form part of the audit process for Oeko-Tex 1000. ACIMIT certifies the tested performance of process machinery.

Table 4.2.9 Comparison of process efficiency initiatives

BREF Best Available Techniques (BAT)		EU Ecolabel	Marks & Spencers	Bluesign	Oeko-Tex 1000	NDRC
Generic BAT	Generic BAT: Environmental management		✓	✓	✓	✓
	Generic BAT: Dosing and dispensing of chemicals		✓			
	Generic BAT: Selection and use of chemicals	✓	✓	✓	✓	✓
	Generic BAT: Selection of fibre raw material		✓			
	Generic BAT: Water & energy management		✓	✓	✓	✓
	Generic BAT: Waste management			✓		
Dyeing	Equipment optimisation (low liquor ratio and dye machine controllers)		✓			+
	Optimised water consumption					+
	Water re-use/recycling					+
	Avoidance of batch softening					
	Automatic preparation and dispensing of chemicals		✓			+

	High-fixation dyestuffs	+	✓			✓
Printing	Ink-jet digital printing for flat fabric (p-371)					
	Recycling of residual printing pastes		✓			
Wastewater	60% water recycling		+			+
	100% water recycling					+
	Low food-to-micro organisms ratio (F/M) treatment	+	+	+	+	
	Selection of dyes and auxiliaries according to wastewater relevance	+	+	✓	+	✓
Washing and rinsing	Enzymatic after soaping in reactive dyeing					✓
	Water & energy conservation in batch processes		✓			✓
	Water & energy conservation in continuous processes					✓
Drying	Minimisation of stenter frame energy consumption				+	✓
	Emissions factor concept			✓	✓	✓

Key:

✓ Addressed fully by the initiative

\+ Addressed only partly by the initiative

Proposal:

Based on the need highlighted by IMPRO Textiles to more fully address process energy, water and chemical use associated with the dyeing, printing and top finishing stages, and the findings of a review of the textile BREF and current industry practices, it is proposed that a criterion is introduced that encourages process efficiency.

This would address life cycle issues identified by LCA and reflect industry best practice and an increasing focus by large brands and retailers on supplier auditing. The criterion must however be designed to assist smaller brands, retailers and manufacturers to improve their supply chain.

The combinations of possible improvement options are too complex to define process-specific limit values. However, there does appear to be scope to encourage a greater focus on the implementation of recognised BAT measures. These measures are understood to already be commonplace in the EU textile industry but this may not be the case where production has been outsourced to developing countries.

The criterion would require that each dye house, printer or top finisher completes a short self-audit checklist covering the following BAT themes:

1. Production management systems;
2. Process specific measures;
3. Energy and water efficiency measures.

An outline of the proposed format for the checklist is presented in table 4.2.9. Three possible options for meeting the criterion are suggested:

- Option 1: Applicants would be required to obtain completed checklists from their suppliers;
- Option 2: A simple scoring system could be introduced, with applicants being required to show that their suppliers meet a minimum score;
- Option 3: Applicants would be required to show that they have used the checklist to inform their selection of suppliers.

The possibility of a site inspection may be desirable as part of the verification requirements, but it must be recognised that not all Competent Bodies will have sufficient resourcing.

Table 4.2.9 Outline format for BAT self-audit

BAT theme	Proposed self-audit criteria
1. Production management	a. Engagement of the workforce: i. Environmental awareness training, ii. Good practices for maintenance and cleaning, b. Automatic dosing and dispensing i. Installation of automatic systems which meter chemicals, auxiliaries and water. c. Process control and optimisation i. Process monitoring, flow control and timing, ii. Well-documented production procedures.
2. Process-specific measures	Dyeing a. Design and colour instrumentation i. Systems enabling accurate reproduction of customer designs and colours; b. Right first time dyeing results i. Reject rates of less than <2-3% c. Specification of high-fixation dyestuffs d. Use of low liquor ratio dyeing machines e. Water re-use/recycling in batch processes Printing a. Print paste waste recovery systems and routines i. Recovery from preparation and production b. Use of digital printing for: i. Sample runs ii. Small to medium sized production runs Top finishing a. Control of VOC emissions from drying processes i. Optimised application of finishes ii. Installation of pollution control equipment
3. Water and energy efficiency	a. Energy and water management i. Sub-metering, ii. Process energy monitoring, iii. Insulation of pipework, valves and flanges iv. Heat recovery e.g. rinse water, steam condensate b. Washing and rinsing i. Smart rinsing technologies, c. Drying and curing (including stenter frames) i. Insulated enclosures ii. Efficiency burner systems

Proposed criterion v1, September 2012
The applicant shall demonstrate that all suppliers of dyeing, printing and top finishing processes have completed a self-audit questionnaire identifying process improvements they have implemented. Suppliers must score more than xx points. The questionnaire to be used is provided as an annex to the textile criteria. *Assessment and verification:* The applicant shall provide a list of suppliers of dyeing, printing and top finishing services. Fully completed self-audit questionnaires should be provided for each supplier. Suppliers shall be requested to update their self-audit responses each year of the license period. Equivalent self-audit formats, as well as certifications which address process efficiency - such as Oeko-Tex 1000 and Bluesign - will be accepted as proof of compliance. Site visits may be requested by Competent Bodies at any time in order to verify compliance.

AHWG2 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

In general the rationale behind the criteria proposal was supported, however, a further revision was considered to be needed to see if it could be made workable. With the textile BREF to be revised and publication of the Sustainable Apparel Coalition's HIGG index it was felt that this criterion will become more relevant and important in the future.

Industry stakeholders identified further examples of improvements that they had had experience with e.g. bleaching/dyeing in a continuous process, maximising dye machine loads, digital colour matching. Requirements for a continuous energy and water use improvement plan should be put in place.

It was commented by one industry stakeholder that most companies have already reacted to economic signals and have taken steps to operate as efficiently as possible within the constraints of their existing equipment and the quality demands of their customers. It is important therefore that the criterion does not set specific improvement targets that will disadvantage the mills that are already operating efficiently. The example of China was cited, where the government has restricted the import of inefficient equipment.

Industry stakeholders felt that there are an increasing number of checklists for manufacturers covering energy and water use e.g. CPI2 carbon footprinting training tool. These tools tend not only to suggest technologies but also to quantify possible advantages e.g. energy and financial savings. Tools which include this information are more convincing as a result.

One opinion given was that checklists are difficult to receive back from suppliers if there is not a clear advantage for them or the obligation to provide the data. The checklist should therefore highlight the savings and the benefits. Using the checklist as a vendor management tool could be a good option. The data quality from any questionnaire is crucial, qualitative questions may lead to unreliable evaluations of the supplier environmental performance.

A general concern was raised about the additional burden of the criteria. It was highlighted that the application of BAT Techniques under the IED Directive is limited to certain production capacity thresholds. This is to minimise the burden for SME's of investment in expensive BAT techniques.

It was questioned as to why a manufacturer would want to hold both Oeko-Tex 1000 and the Ecolabel. They might instead choose labels according to their market.

Follow-up research and proposed approach

As we highlighted in our background research for the AHWG2 there are a range of precedents for how this criteria could work. Each approach has strengths and weaknesses in their attempts to tackle this complex area and in terms of their suitability for Ecolabel criteria.

Specific technical issues noted by stakeholders included:

- The overarching need for energy and water management plans: Whilst plans on their own would not be a guarantee of improvements stakeholders highlighted their importance in terms of driving and monitoring energy and water saving. This can be illustrated by Pakistan where the Government has sought to require accreditation of all textile manufacturers to energy management standard ISO 50001 [200].
- Different ambition levels based on size of the supplier: The ambition level could be graded to reflect the scale of the textile operation, as per the IED

[200] Fibre 2 Fashion, *ISO 50001 to become mandatory for Pakistan's textile industry*, 3rd November 2011, http://www.fibre2fashion.com/news/textile-news/newsdetails.aspx?news_id=104766

Directive threshold of 10 tonnes/day [201]. It could also be reflected in the ambition level and relative costs of the different BAT techniques.

The need to ensure thatsuppliers that have already implemented basic measures aren't disadvantaged: This can be illustrated by the NRDC Clean by Design initiative which sets out a range of measures, ranging from low cost 'easy wins' to more costly process improvements. A selection of these low cost measures have been incorporated into the proposed BAT list, allowing for more advanced suppliers' achievements to be recognised. An further issue not specifically commented on by stakeholders is how to recognise new techniques that have the potential to deliver comparable or greater improvement. A good example is dyeing using supercritical CO_2. It is listed as an emerging technique in the textile BREF but is now being piloted by mainstream manufacturers such as Adidas and Nike [202].

In table 4.2.10 we compare and contrast the different possible options for formulation of the criteria, drawing upon the case studies and stakeholder feedback. For option we weigh up their potential as criteria with clear pass/fail characteristics for which there is clear evidence of the environmental improvement potential.

The evaluation suggests that Options 2 and 4 may be more suited to the Ecolabel because they require implementation of BAT techniques, this in turn could be verified and the resulting improvement could be monitored. Option 5 could be considered as it would encourage innovation but the assessment and verification would need to be clearly defined.

[201] The Industrial Emissions Directive 2010/75/EU, http://ec.europa.eu/environment/air/pollutants/stationary/ied/legislation.htm

[202] Ecotextile news, *Adidas launches waterless dyeing range*, 1st August 2012 *and* Just Style, *Nike backs waterless fabric dyeing process*, 8th February 2012, http://www.just-style.com/news/nike-backs-waterless-fabric-dyeing-process_id113431.aspx

Table 4.2.10 Comparison of options for formulation of the criteria

Option	Strength	Weakness
Option 1: Self audit questionnaire. Applicants shall evidence that their suppliers have completed a BAT self-audit questionnaire. Case studies: 1	Successfully used by at least one leading EU retailer. Encourages dialogue and greater awareness amongst suppliers.	It requires backing up with a requirement for periodic follow-up to evaluate progress and site visits to verify implementation. Does not ensure implementation of BAT measures.
Option 2: Minimum implementation. Applicants shall demonstrate that suppliers have implemented at least one BAT technique from each theme. Case studies: 7	Forms the basis for best practice programmes promoting mill energy and water efficiency. Promotes achievement of the minimum by all mills, whilst providing options for innovators to go further.	Improvement potential of each BAT measure may vary depending on how they implemented.
Option 3: Audit and action plan. Applicants shall demonstrate that suppliers have audited the opportunities for BAT implementation and have put an action plan in place. Case studies: 2,4	Used by major self-audit schemes to identify areas for improvement. External audit schemes incorporate BAT benchmarking. Supports continuous improvement.	Relies on expert judgement to identify site-specific options for improvement. Does not ensure implementation of BAT measures.
Option 4: Vendor selection criteria. Applicants shall demonstate that they have used a BAT checklist as part of the selection criteria for new suppliers. Case studies: 1	Enhances the prospect of suppliers that have implemented BAT measures being pro-actively selected.	Succesful selection of BAT compliant suppliers depends on the weighting of environmental issues alongside other factors, as well as the response of the market.

Option 5: Recognition of breakthrough techniques. Applicants shall demonstrate the savings potential of new techniques benchmarked against other options. Case studies: 6	Encourages and recognises process innovation. Requires that applicants monitor/quantify the improvement potential.	Benchmarking may be difficult if the BREF does not provide specific data for other techniques. Benchmarking may be reliant on a comparison of manufacturers claims.

Proposal:

That the criteria is reformulated based on a combination of options 2,4 and 5.

A new BAT 'minimum requirement' category will be added (see table 4.2.11 below). Applicants will be required to have implemented a minimum number of techniques from the four BAT categories, with the ambition level varying according to production site capacity with reference to IED thresholds.

New techniques could be submitted by applicants. Acceptance would be on the basis of certified performance data benchmarked against the performance of conventional and BAT techniques.

Third party verification of compliance will be accepted from other schemes (e.g. Bluesign, Oeko-tex 1000), provided that they refer to specific BAT techniques and/or comply with the requirements for new techniques.

Table 4.2.11 Process efficiency BAT measures

BAT category	Proposed self-audit criteria
1. Minimum requirement	**Engagement of the workforce** 1. Environmental management and awareness training 2. Good practices for maintenance and cleaning (p-227)
2, Production management	**Automatic dosing and dispensing** 1. Automatic dispensing of chemicals, auxiliaries and water (p-236) **Process control and optimisation** 2. Well-documented production procedures 3. Process monitoring, flow control and timing 4. Input and output stream management (p-231)
3. Process-specific measures	**Dyeing** Design and colour instrumentation 1. Digital colour matching of customer designs and colours Right first time dyeing results 2. Reject rates of less than <2-3% 3. Specification of high-fixation dyestuffs (p-320) Optimising the dyeing process 4. Use of low liquor ratio dyeing machines (p-343) 5. Water re-use/recycling in batch processes (p-355) **Printing** Print paste waste recovery systems and routines 1. Recovery from preparation and production (p-364) Digital printing (p-371) 2. Use for sample runs 3. Use for small to medium sized production runs **Finishing** Control of VOC emissions from drying processes 4. Optimised application of finishes 5. Installation of pollution control equipment 6. Use of emissions factor concept to minimise emissions (p-262)
4. Energy and water efficiency	**Energy and water management** (p-229 and p-239) 1. Sub-metering, 2. Process energy monitoring, 3. Insulation of pipework, valves and flanges 4. Heat recovery e.g. rinse water, steam condensate **Washing and rinsing** (p-394) 5. Smart rinsing technologies **Drying and curing (including stenter frames)** (p-273) 6. Insulated enclosures 7. Efficiency burner systems

AHWG3 stakeholder feedback and final proposals

Here we present a summary of feedback received following the extra-ordinary ad-hoc working group in Brussels on the 23rd April 2013, together with a brief outline of the final criteria proposal.

Stakeholder feedback

A general concern was expressed about the potential difficulty in verifying the criteria. The prospect of self-declaration was also raised as a concern by a Member State. A stakeholder raised a related concern about how consistency of verification could be achieved given the different levels of technical expertise that Competent Bodies may have. The verification requirements would need to be very specific to avoid this happening.

It was questioned whether some of the presented verification routes such as ISO 50001 and ISO 14001 would provide sufficient information as they don't contain specific requirements. Another Member State questioned to what extent Competent Bodies were qualified to determine BAT or to verify it.

An industry stakeholder considered that process energy benchmarks would be more effective than techniques because the latter are reliant on operator practices. This approach is being reviewed by GOTS.

A discussion took place about the source for BAT techniques listed in the annex to the criteria. A Member State stated that the list could be expanded and updated. An industry representative strongly emphasised the need for these techniques to reflect the 2003 textile BREF and references to more recent work by the German UBA to update this list of BAT techniques, together with other industry and independent sources of BAT, was rejected. It was, however, emphasised by a Member State that the textile BREF is only intended to be an indicative reference point and is not definitive. Given advances by industry any criteria on BAT would need to reflect the most current BAT techniques.

A view was expressed that site audits would be required and should therefore be mandatory in the criteria document. Concern was, however, raised that this would not be possible for all Competent Bodies.

Follow-up response and final proposal

Selection of the BAT techniques

The specific techniques are the result of a comprehensive screening of the BREF document (see Annex 4). The techniques were identified by cross-referencing improvement areas identified by the IMPRO LCA study with the textile BREF supplemented by techniques addressed by the case studies in Annex 5 (e.g. NRDC on energy and water use, which have been developed in conjunction with Chinese textile mills).

The techniques were mainly selected for their energy savings potential in the production stages highlighted in the IMPRO LCA results. Some of these techniques also deliver combined savings in water and chemical use.

Proposal

Following feedback the proposal has been revised to focus only on washing and drying processes, as these are generic to many process stages. It is considered that this would make the criteria easier to verify.

Reference to energy benchmarks

Benchmarks were explored earlier in the revision process but were found to be too complex to implement. A benchmarking tool being explored by GOTS was briefly investigated. The tool is base on monitoring data from over 80 mills globally. Whilst this could be a valuable tool it was considered to require substantial discussion and validation.

An alternative approach would be to require energy use to be measured and benchmarked as part of an energy management system. This would provide a context for the implementation of BAT techniques.

Summary of final criteria proposal

This new criteria is intended to achieve greater energy efficiency in dyeing, printing and finishing process stages. These stages were identified by the IMPRO LCA study as being significant hot spots for energy use.

A range of industry literature, including the EU textile BREF, identify significant improvement potential from the implementation of a range of BAT techniques. In order to provide a focus for the criteria the generic processes of washing, drying and curing have been identified as they are significant consumers of energy. The criteria consists of two elements which work to encourage more energy efficient washing, drying and curing processes:

1. Energy management: Production sites shall measure and benchmark their energy use as part of an energy management system. Verification based on ISO 50001 or equivalent audit systems shall be accepted.
2. Implementation of BAT techniques: Production sites shall implement a minimum number of techniques, to be selected from Appendix 3 of the criteria document. Verification shall be based on evidence from production sites.

~~**Current criterion 10: Auxiliaries and finishing agents for fibres and yarns**~~

Fibre and yarn spinning

Major proposed changes	• Renaming of the criteria to clearly identify the process stage • Re-ordering of the wording in order to make it clearer and more concise.
Present criterion, Decision 2009/567	
Size: At least 95% (by dry weight) of the component substances of any sizeing preparation applied to yarns shall be sufficiently biodegradable, or else shall be recycled. The sum of each component is taken into account. *Assessment and verification:* In this context, a substance is considered as 'sufficiently biodegradable: 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 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. (b) 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 oils, waxes, knitting oils, silicone oils and inorganic substances. The sum of each component is taken into account**.**

Assessment and verification: ‘*:* In this context, a substance is considered as ‘sufficiently biodegradable or eliminable in waste water treatment plants’:

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 such additives or preparation agents used.

(c) The content of polycyclic aromatic hydrocarbons (PAH) in the mineral oil proportion of a product shall be less than 3% 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.

AHWG1 technical discussion

The most common fibre used in ecolabelled products is cotton. Before spinning a wax is normally applied to the fibre in order to protect it against mechanical stress. This is normally a paraffin wax that is biodegradable. 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 textile BREF 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 their special viscose qualities in loads of about 5 mg/kg fibres. They mainly consist of polyethylene glycol ethers with molecular weights of 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:

1. lubricants (slippery agents)
2. emulsifiers
3. wetting agents
4. antistatic agents
5. additives (e.g. biocides and antioxidants).

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

- highly refined mineral oils, so-called white oils (mixture of hydrocarbons with C12 – C50 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 being used as substitutes for 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 in the same way 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 (elastane). 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 (alkyl phenol ethoxylates) have previously been used to remove them but a quite high percentage (approximately 40 %) could remain 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.

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.

AHWG1 stakeholder feedback and follow-up research

Feedback from stakeholders

No feedback was received in relation to this criteria.

Proposal:

No revisions are proposed for this criterion. Some stakeholders have proposed that processes could apply for the ecolabel, reflecting the success of GOTS. It is therefore proposed that the criterion is renamed so that the process stage can be clearly identified. The biodegradability definition should be aligned with that used in the CLP guidance as this forms the basis for Criterion 12.

Proposed criterion revision v1, September 2012

At least 95% (by dry weight) of the component substances of any sizeing preparation applied to yarns shall be readily biodegradable, or else shall be recycled.

At least 90% (by dry weight) of spinning solution additives, spinning additives and preparation agents for primary spinning (including carding oils, spin finishes and lubricants) 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 oils, waxes, knitting oils, silicone oils and inorganic substances.

In all cases the sum of each component shall be taken into account.

Assessment and verification: In this context, a substance is considered as 'readily biodegradable':

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.

~~*Assessment and verification: ': In this context, a substance is considered as 'sufficiently biodegradable or eliminable in waste water treatment plants':*~~

~~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 such additives or preparation agents used.~~

The content of polycyclic aromatic hydrocarbons (PAH) in the mineral oil proportion of a product shall be less than 3% 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.

Summary of the final proposal

The final criteria has been restructured and included within the Appendix 1: Restricted Substance List (RSL).

~~CURRENT CRITERION 11: BIOCIDAL OR BIOSTATIC PRODUCTS~~

Major proposed changes	○ The substances identified would form part of the Criterion 11 Restricted Substance List ○ Nanosilver will be covered by the existing restriction that applies to all biocides in the final product.
Present criterion, Decision 2009/567	
a) 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. *Assessment and verification:* The applicant shall provide a declaration of non-use.	

AHWG1 technical discussion

Chlorophenol, PCB and organotin compounds

This part of the criteria has not been changed since 2002. Typical biocides used for conservation during transport are: methylbromide, phosphin, Prussic acid gas derived from formaldehyde, benzen, toluen, styren etc

Information from several licenseholders indicates that the use of biocides can be avoided if the transport time is less than 3 weeks. This short supply time is possible for textiles that are imported from the Far East.

Nanosilver biocidal and biostatic treatments

Silver is one of the most widely used nanoparticles in consumer products [Wijnhoven et al., 2009]. Its use in textiles and personal care products may lead to human and environmental exposures.

Nanosilver in textiles is used in all kinds of clothes from socks and shirts to caps, gloves and underwear. In all cases it is the antimicrobial activity of nano-silver that is the reason for incorporating it into textiles. Sports wear etc. labelled as "antibacterial", "free of odour" etc. have been registered to contain nanosilver or triclosan [Poulsen et al 2011]. These substances stop or reduce bacterial activity and thereby "reduce" the need for washing.

There is some limited evidence of the whole life benefits of nano-silver coatings. An LCA study carried out by scientists from the UK, Germany and Switzerland has highlighted a beneficial reduction in energy and detergent use during the use phase of garments. However, the study did note that the environmental burdens from the mining of silver may outweigh these benefits if consumer behaviour does not lead to reduced clothes washing. The study was not able address emerging evidence of the downstream environmental impacts of the release of anti-bacterial agents.

The environmental releases of nanosilver from textiles has been investigated in some theoretical studies and a few laboratory based ones. In the study by Luoma (2008) it was estimated that mass release from silver containing socks in the USA would be in the range of 6-930 kg or 180-2790 kg assuming that 10% and 30%, respectively, of the population would use these kinds of socks.

The release of nanosilver from socks upon contact with water showed that for some socks almost all silver leached to water whereas for others no leaching was detected [Benn & Westerhoff, 2008].[Benn et al. 2010] measured the content of silver in textiles (in a shirt, a medical mask, a towel and a cloth), personal care products (toothpaste, shampoo), a detergent, a toy (teddy bear), and two humidifiers. They found silver concentrations from 1.4 to 270,000 ìg/g product–1. Upon washing in tap water they estimated the potential release of silver into aqueous environmental matrices in quantities up to 45 ìg/g per product.

Quantification of the extent of nanosilver application in clothing and home furnishings was not possible at this stage in the study. A manufacturer of nanosilver yarn presents the fields of application as active, casual, sports and outdoor wear, under wear and home furnishing and bedding [Everest 2010]. A request for information has been made to dominant international suppliers of sports equipment. While some companies Nike [Nike 2010; Intersport 2010] have informed us that nanosilver is not used in sports equipment, other companies (e.g. Adidas) had not at the time of writing responded. It is also noted that the use of antibacterial agents is currently prohibited by Oeko-tex certification.

Nanosilver toxicological profile

From Mikkelsen et al (2011) [203].

It has been shown that silver nanoparticles can be absorbed via all routes of exposure (oral dermal and inhalation). However, it is unclear in which form (as particles, free ions, silver ions or complexes) nanosilver is absorbed and distributed to target organs. At least for uptake via the oral route it is likely that at least some of the uptake occurs as ions. It appears that smaller particles exhibit higher toxicity as compared to larger particles; and if silver is absorbed as particles then the surface area is relevant.

Should silver uptake occur solely as ions, the already rich database for silver could be applied to assess systemic silver nanoparticle toxicity. For that exercise, it would need to be considered whether and how the dramatically increased surface area and possibly increased solubility of silver nanoparticles would need to be taken into account.

A number of studies, mainly in vitro, have shown that the main mechanism of silver nanoparticle toxicity seems to be mediated by an increase in ROS production, stimulating inflammation and genotoxic events and apoptosis or necrosis. The concentration of the administered nanoparticles is able to influence the toxicity, specifically, and at low levels of oxidative stress a protective response is initiated which progresses to a damaging response with increasing particle concentration, and therefore oxidant levels. It is thus relevant to consider the toxicity threshold of silver nanoparticles.

Silver is known to be an ecotoxic metal and tests with silver nanoparticles (AgNP) do also reveal very low effect concentrations. Thus, for algae EC50-values as low as 4 µg/l have been found and also for crustaceans values far below 1 mg/l has been reported. This ranks AgNP as very toxic towards aquatic organisms. It is also important to note that at concentrations below 1 mg/l inhibition of nitrifying bacteria can occur and thus the function of wastewater treatment plants may be affected by the presence of AgNP. Possibly significant environmental effects arising from interactions with symbiotic bacteria present in organisms and in soil have also been documented.

---

[203] Mikkelsen, S.H.; Hansen, E.; Christensen, T.B.; Baun, A.; Hansen, S.F.; Binderup, M.-L.; 2011. *Survey on basic knowledge about exposure and potential environmental and health risks for selected nanomaterials*. Environmental Project No. 1370, The Danish Environmental Protection Agency, Copenhagen.

The environmental concentration resulting from the use of AgNP in consumer products are at present uncertain, even though a number of different estimates have been proposed. It is evident that even though silver nanoparticles are incorporated in textiles, they can be released upon washing. Concentrations in the low ng/l range have been observed and even at such low concentrations it may constitute an environmental risk due to the high toxicity of silver.

It is debated today whether silver nanoparticles are in fact more toxic that their bulk counterpart, since effects in many cases can be ascribed to the ionic form of silver (Ag+). Some studies have documented a higher toxic effect from AgNP, but it is the widespread and disperse use of silver in consumer products that poses the greatest risk to the aquatic and terrestrial environment. Even if AgNP are “only” as toxic as larger silver particles, silver is still a very ecotoxic metal.

AHWG1 stakeholder feedback and follow-up research

Stakeholder feedback
The restriction of the three existing substances was supported by stakeholders and forms part of a number of stakeholders' Restricted Substance Lists. It was suggested that reference should be made to the existing Biocide Directive. Nano silver was on balance strongly favoured for restriction on a precautionary basis.

Proposal:

It is proposed that only biocides that are authorised under Biocide Directive 98/8/EC and Biocide Regulation (EC) No 528/2012 are permitted for transport and storage purposes.

Biocides applied to the final product in order to impart functional properties are already restricted by the ecolabel and are not permitted in ecolabelled products. This restriction would therefore include the use of nanosilver.

An further additional substance that is currently restricted by an industry RSL is proposed for addition to the new EU Ecolabel RSL - DMFu (dimethyl fumarate) [204]. This substance is understood to commonly be used as a fungicide in silica gel sachets to stop mould growth during transport. It can cause severe irritation upon human skin contact, with notifications classifying it with H317, and on this basis is considered a risk to consumers.

Proposed revised criterion v1, September 2012
Criterion to be incorporated into Restricted Substance List – Criterion 11

[204] Marks & Spencers, Environmental and chemical policy for textile processing – Module 1: Restricted Substance List, Version 1.0, May 2011

AHWG2 stakeholder feedback and follow-up research

Stakeholder feedback

The feedback has been compiled and analysed under new criteria proposal 11: Restricted Substance List (RSL).

Follow-up research and proposed approach

See new criteria proposal 11: Restricted Substance List (RSL).

~~CURRENT CRITERION 12: STRIPPING OR DEPIGMENTATION~~

Major proposed changes	○ Deletion of the criterion

Present criterion, Decision 2009/567
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.

AHWG1 technical discussion

The relevance of this criterion was questioned in the last revision (2009). To the knowledge of the authors no metal salt or formaldehyde is or has been used in stripping or depigmentation, at least in Europe. No justification is given in the revision in 2002.

Since with reference to the LCA findings in the preliminary report this criterion clearly does not have a significant environmental impact the criteria could be either be deleted or kept. Removing it will not lower the work for the applicant or Competent Body very much but it can help improve the readability of the document by making it simpler and shorter.

Proposed revised criterion v1, February 2012
Deletion of the criterion

AHWG1 stakeholder feedback and follow-up research

Feedback from stakeholders
No feedback was received on deletion of this criterion

~~CURRENT CRITERION 13: WEIGHTING~~

Major proposed changes	○ Deletion of the criterion
Present criterion, Decision 2009/567	
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.	

AHWG1 technical discussion

The relevance of this criterion was also discussed in the last revision (2009). To the knowledge of the authors cerium is not used in weighting of yarn or fabric in Europe, but may be used in some developing countries. Lacasse and Bauman (2004) suggest that weighting mainly relates to silk, which is not presently covered by the EU Ecolabel criteria.

Proposed revised criterion v1, February 2012
Deletion of the criterion

AHWG1 stakeholder feedback and follow-up research

Feedback from stakeholders
No feedback was received on deletion of this criterion

CURRENT CRITERION 14: ~~ALL CHEMICALS AND CHEMICAL PREPARATIONS~~

Major proposed changes	○ Criterion to be incorporated into the new Criterion 11 Restricted Substance List ○ The restriction of NTA (nitrilotriacetic acid) is proposed ○ Linear alkylbenzene sulfonates (LAS) is to be removed from the restricted substance list ○ A triviality limit of 50 mg/kg is proposed for APEOs if testing is required.
Present criterion, Decision 2009/567	
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), 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.	

AHWG1 technical discussion

Cationic detergents and surfactants

The cationic detergents distearyl-dimethyl ammonium chloride (DSDMAC), di(tallow)dimethyl ammonium chloride (DTDMAC) and di(hardened tallow) dimethyl ammonium chloride (DHTDMAC) are substances with toxic and persistent properties. Their discharges to water have been reduced considerably in the past. The remaining concern is their use in fabric softeners through which they can reach surface waters via direct discharges, sewer systems or sewage treatment plants.

These three surfactants have been phased out in many countries according to the PARCOM Recommendation 93/4 on the Phasing Out of Cationic Detergents DTDMAC, DSDMAC and DHTDMAC in Fabric Softeners. Since they might still be used in other counties their exclusion is still relevant.

Alkylphenol ethoxylates

APEOs (Alkylphenolethoxylates) have been voluntary phased out by TEGEWA (Industrial Association for Textile and Leather Aids, Tanning Materials, and Raw Materials for Detergents) by the end of 2001. This commitment covers all European TEGEWA members but not necessary manufacturers in other parts of the world. A ban on APEO is therefore still relevant.

The European Union has regulated the industrial use of nonylphenol ethoxylates and nonylphenol since 2003. The EU's REACH Directive incorporated these regulations in Annex XVII and limits the amount of nonylphenol ethoxylate and nonylphenol as a substance or component in preparations to 0.1% by mass.

Öko-Tex 100 has recently (October 2011) decided also to include nonyl- and octylphenol and their ethoxylated compounds in their standard. The limiting values are:

- nonylphenol: 100 ppm
- octylphenol: 100 ppm
- total nonylphenol(1-9) ethoxylates: 1000 ppm
- total octylphenol(1-2) ethoxylates: 1000 ppm

The EU Ecolabel has no limiting values because there is a general restriction on these substances in the production which mean that we have a zero tolerance. However it might be useful to have triviality limit if very small amounts are found in the product. The Danish Competent body has previously tested a number of eco labeled textile and did find very small amounts in 7 out of 7 tested textiles. The concentrations of APEO were between 1-4 ppm so a triviality limit of 5 ppm is proposed when testing is required.

Nitrilotriacetic acid (NTA) toxicology

At earlier revisions a ban against NTA was discussed. Evidence suggests that the strong complexing capacity of NTA can result in adverse effects upon heavy metal removal during sewage treatment and upon mobilisation of metals from sediments in receiving waters. Moreover, NTA is notified with hazard statements H351.

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 [205].

AHWG1 stakeholder feedback and proposed approach

Stakeholder feedback

Those stakeholders that provided written feedback in relation to NTA supported its restriction. The triviality limit for APEO's was also supported.

Detailed information was provided by industry stakeholders in relation to linear alkylbenzene sulfonates (LAS). It was requested that LAS be removed from the list on the basis that it is not classified under CLP, has been extensively researched under REACH without being restricted, and that restrictions on its use have been relaxed in EU countries such as Denmark.

Follow-up research and proposed approach

Evidence submitted by industry

Information provided by industry stakeholders in relation to LAS was reviewed. This highlighted the following points:

- LAS fully complies with the Detergent Regulation.
- Testing results by industry suggest that LAS is readily biodegradable, as evidenced by a self-classification Chemical Safety Report;

[205] See footnote 26

- The HERA Project (Human and Environmental Risk Assessment) project is a European voluntary initiative launched in 1999 to provide a common risk assessment framework for the household cleaning products industry [206]. It has assessed LAS as posing no risk to human health and environment.
- LAS is not tested for by Oeko-Tex 100 and Oeko-Tex 1000.

It is noted that LAS is not formally classified. Notifications suggest classification with H302, H315 and H318.

Concerns relating to biodegradation

Concerns relating to LAS have been extensively discussed in the Soaps and Shampoos product group. The toxicity of surfactants is linked to their affect on surface tension and the length of their molecular chains. Their biodegradability is linked to the degree of chain branching, with linear chains being more readily degradable.

The main concerns about LAS in the past have related to evidence of its limited biodegradation under anaerobic conditions. The Nordic Swan and the Swedish Good Environmental Choice labels require that surfactants are degradable under both aerobic and anaerobic conditions. The new EU Ecolabel criteria for Industrial and Institutional laundry detergents for professional use derogates surfactants that are not anaerobically degradable as long as they are not classified with H400.

Stakeholders raised concerns that poor treatment in aerobic wastewater treatment plant could lead to the accumulation of LAS in biosolids which may then be spread on agricultural land and leach into water coarses. Research in Denmark suggests that concentrations of LAS found in biosolids pose minimal risk to the soil or ecology [207]. 98-99% degradation is achieved within one year. Uptake from biosolids was very limited.

Anaerobic degradation is not specifically required by the Detergents Regulation (Regulation 648/2004/EC) and a 2009 study commissioned by the European

[206] HERA project, http://www.heraproject.com/

[207] Jensen J, Løkke H, Holmstrup M, Krogh PH and L Elsgaard, *Effects and risk assessment of linear alkylbenzene sulfonates in agricultural soil - Probabilistic risk assessment of linear alkylbenzene sulfonates in sludge-amended soils*, Journal of Environmental Toxicology and Chemistry, August 2001, 20(8):1690-7

Commission concluded that anaerobic degradation should not be used as a criteria for determining the acceptability of surfactants [208].

Anaerobic degradation is not currently required by other textile criteria such as 11: Auxilliaries and finishing agents for fibres and yarns and Criterion 15: Detergents, fabric softeners and complexing agents. The latter requires surfactants to be ultimately aerobically biodegradable as defined by Regulation (EC) No 645/2004 on Detergents.

Proposal:

On the basis of evidence the use of LAS shall be permitted by the Ecolabel and the use of Nitrilotriacetic acid (NTA) shall be restricted.

If derogation conditions are required by stakeholders it is proposed that wastewater treatment plant comply with revised requirements for hardly degradable substances or ultimate aerobically biodegradation proposed under Criterion 27.

Proposed revised criterion v1, September 2012
Criterion to be incorporated into Restricted Substance List – Criterion 11

[208] Report from the Commission to the European Parliament and the Council. *Pursuant to Article 16 of Regulation (EC) N° 648/2004 of the European Parliament and of the Council of 31 March 2004 on detergents, concerning anaerobic biodegradation*. Brussels, 2009.

AHWG2 stakeholder feedback and follow-up research

Stakeholder feedback

The feedback has been compiled and analysed under new criteria proposal 11: Restricted Substance List (RSL).

Follow-up research and proposed approach

See new criteria proposal 11: Restricted Substance List (RSL).

CURRENT CRITERION 15: DETERGENTS, FABRIC SOFTENERS AND COMPLEXING AGENTS

Major proposed changes	○ Changes to biodegradability requirements are to be made in-line with the EU Ecolabel criteria for Industrial and Institutional laundry detergents for professional use ○ Cross referencing to the EU Ecolabel Detergents Ingredients Database (DID) is to be considered.
Present criterion, Decision 2009/567	
At each wet-processing site, at least 95 % by weight of fabric softeners, complexing agents and detergents by weight shall be sufficiently degradable or eliminable in wastewater treatment plants. This is with the exception of surfactants in detergents and fabric softeners at each wet processing site, which shall be ultimately aerobically biodegradable. *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. 'Ultimate aerobic biodegradation' has to be interpreted as laid down in Annex III to Regulation (EC) No 648/2004 of the European Parliament and of the Council (1). 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 surfactants in detergents and fabric softeners used.	

AHWG 1 technical discussion

This criterion was changed during the 2009 revision. The change meant that the surfactants in detergents and fabric softeners shall be ultimately aerobically biodegradable. This criterion is harmonization with Regulation (EC) No 648/2004 and does not affect products regulated by this regulation.

For detergents and fabric softeners produced in countries outside Europe the new criterion meant that some products no longer could be used in the production of ecolabelled textiles.

The criterion is harder than the corresponding criterion from GOTS (Global organic textile standard) which only requires that the surfactants are inherently biodegradable.

AHWG1 stakeholder feedback and proposed approach

Feedback from stakeholders

No feedback was received in relation to this criterion.

Proposal:

It is proposed that softeners are considered alongside other finishes as part of Criterion 12.

The biodegradability requirements shall be updated in-line with the EU Ecolabel criteria for Industrial and Institutional laundry detergents for professional use, which distinguishes between aerobic and anaerobic biodegradation.

Proposed revised criterion v1, September 2012

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

This is with the exception of surfactants in detergents and fabric softeners at each wet processing site, which must be biodegradable under aerobic conditions. All non-ionic and cationic surfactants must also be biodegradable under anaerobic conditions.

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.

~~'Ultimate aerobic biodegradation' has to be interpreted as laid down in Annex III to~~

~~Regulation (EC) No 648/2004 of the European Parliament and of the Council (1).~~

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 surfactants in detergents and fabric softeners used.

Summary of the final proposal

The final criteria has been restructured and included within the Appendix 1: Restricted Substance List (RSL).

CURRENT CRITERION 16: ~~BLEACHING AGENTS: CHLORINE AGENTS ARE EXCLUDED FOR~~ BLEACHING YARNS, FABRICS AND END PRODUCTS

Major proposed changes	○ No change to the criterion
Present criterion, Decision 2009/567	
This requirement does not apply to the production of man-made cellulose fibres (see criterion 6.1) *Assessment and verification* The applicant shall provide a declaration of non-use of chlorinated bleaching agents	

AHWG1 technical discussion

The exclusion of chlorine bleaching agents was introduced in the revision in 2009. It did not cover man-made cellulose fibres which were covered by criterion 6.1.

Since chlorine bleaching is still used the criterion is still considered to be relevant. In order to simplify the criterion it is to be discussed whether the clause excluding man-made cellulose fibres could be removed. Industry best practice suggests that man-made cellulose fibres can be bleached using alternative agents.

AHWG1 stakeholder feedback and proposed approach

Stakeholder feedback
Stakeholders confirmed that the clause excluding man-made fibres should be retained because the industry requires chlorinated bleach in order to meet customer requirements.

Follow-up research and proposed approach

Follow-up discussions with an existing licenseholder are reported under Criterion 6: Man-made cellulose fibres. These confirmed the feedback from stakeholders with regard to the need to exclude man-made cellulose fibres.

Proposal:

The exclusion for cellulose fibres should be maintained.

Proposed revised criterion v2, September 2012
Chlorine agents shall not be used for the bleaching of any yarns, fabrics or end-products with the exception of man-made cellulose fibres (see criterion 6.1) *Assessment and verification:* The applicant shall provide a declaration of non-use of chlorinated bleaching agents

Summary of the final proposal

The final criteria has been restructured and included within the Appendix 1: Restricted Substance List (RSL).

CURRENT CRITERION 17: ~~, 21, 22 AND 23:~~ DYES

Major proposed changes	○ Incorporation of this criterion into new Criterion 11: Restricted Substance List ○ Potentially sensitizing dyes: Two new dyes have been added to harmonise with Ökotex: C.I. Disperse Blue 1 and C.I. Disperse yellow 3 ○ Azo Dyes: A listing of specific dyes that are restricted has been compiled in order to aid applicants. One new aryl amine has been added to the list order to harmonise with Ökotex: 4,4'-Methylene-bis-(2-chloroaniline) (CAS 101-14-4). ○ Dyes classified with R43 (H317), R52/53 (H412) and R53 (H413) are to be derogated under Criterion 12
Present criterion, Decision 2009/567	
See the full text in the criteria document criteria 17, 21, 22 and 23.	

AHWG1 technical discussion

Historically the criteria for dyes have been divided into several criteria where each one covered a specific aspect. This group of criterion have more or less remained unchanged sinces 2002. In this version it has been the intention to group the different criteria in one single criterion which covers all the relevant criteria.

During the last revision we discussed the possibility of excluding the use of dyes and chemicals that were classified as environmentally hazardous but it was decided not to do it at that time. According to major dye manufactures the trend is for dyes and chemicals are becoming less and less harmful so it is now proposed to exclude dyes that are classified as environmental hazardous.

The new requirements under the Ecolabel Regulation also require that hazardous substances are restricted and these restrictions will apply to the majority of the dyes addressed by the current criteria. However, industry experience suggests that the

restricted dyes should still be listed for clarity as the majority of production is situated outside the EU.

Old criterion 17 Impurities in dyes:

The criterion is unchanged.

Old criterion 21 – Azo dyes

Refering to the Preliminary report most of the azo dyes are not allowed to be used in the EU because of REACH. Since the majority of production is situated outside the EU it is suggested to keep the criteria but to make it clear in the User Manual which azo dyes are covered by REACH.

The list of aryl amines have been removed to an appendix. The list contains aryl amines that have carcinogenic properties according to MAK III category 1 and 2. This is the same requirement that Öko-tex has.

Since the last revision in 2006-7 4,4'-Methylene-bis-(2-chloroaniline) have been added to MAK category 2 and has been added to the list in the appendix. GOTS have also listed aryl amines classified according to MAK III category 3. These are to be cross referenced with the Ecolabel restrictions.

Old criterion 22 - Dyes that are carcinogenic, mutagenic or toxic to reproduction

The criterion is unchanged.

Old criterion 23 - Potentially sensitizing dyes

The list of restricted dyes has been removed to an appendix. C.I. Disperse Blue 1 and C.I. Disperse yellow 3 have been added to the list in order to harmonize with Öko-tex.

MAK III category 3 dyes

GOTS have also listed aryl amines classified according to MAK III category 3. No justification for this is public available. These are not currently listed by the Oeko-tex label. It is to be discussed if this classification should also be added to the EU Ecolabel criteria. These substances are also to be cross referenced with the Ecolabel restrictions.

AHWG2 stakeholder feedback and follow-up research

Stakeholder feedback

There was general support for the proposed change in the format of the dye criteria. Opinions were mixed on whether to add MAKIII dyes. Specific dyes proposed for addition were: Disperse Yellow 23 and Disperse Orange 149 because they can cleave to aryl amines, Disperse Orange 149 and Disperse Yellow 23 because they are CMR, and Disperse Blue 1 and Disperse Yellow 3 because they are sensitising. Comments were provided in relation to the risk phrases carried by dyes – these were discussed under Criterion 10 and 11.

Follow-up research and proposed approach

Investigation of dye classifications

The Danish Competent body, which has the greatest number of licenses, has checked the classification of more than 50 dyestuffs on the market today from different suppliers and concluded that the most common risk phrases are R43 (May cause sensitization by skin contact) and R52/53 (Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment).

The quality of the material safety data sheets was generally good but some of the data sheets from India and China did not contain much information and the dyestuffs from these suppliers were not classified at all or did not claim to contain any classified substances according to the safety data sheets. Some of the data sheets from an Indian supplier had information that indicated that the dyestuffs should have been classified as R52/53.

Proposed allergen dye additions

Disperse dyes are used to dye polyester and occasionally acrylic and polyamide. Because these dyes are not covalently bonded their colour fastness under certain conditions can be lower. The German Federal Institute for Risk Assessment (BfR) highlight specific instances of higher risk such as tight fitting garments made from

synthetic fibres [209]. Disperse dyes classified as allergens are therefore more likely to pose a risk to consumers.

Moving from listing aryl amines to listing dyes

A review of industry RSL's highlighted the potential to list specific dyes available on the world market that may cleave to aryl amines. This would have the benefit of being clearer to industry and easier to apply. Listings used by industry are derived from the opinions of the EU Scientific Committee on Health and Environmental Risks (SCHER) on the use of azo dyes in cosmetic and non-food products. The listing is understood to cover all of the Aryl Amines currently banned under REACH, including 4-Amino-3-fluorophenol (CAS 399-95-1) and 6-Amino-2-ethoxynaphthaline (CAS 293733-21-8) which are not currently contained within the Ecolabel list of aryl amines.

Proposal:

It is proposed that the list of potentially sensitizing dyes is updated and that a list of azo dyes that may cleave to carcinogenic aryl amines is provided. The criterion are proposed to be incorporated into the Criterion 11 RSL. Stakeholder input is required to check whether the listing is comprehensive and whether the listing of aryl amines is still required.

Proposed revised criterion v1, September 2012
Criterion to be incorporated into Restricted Substance List – Criterion 11

[209] German Federal Institute for Risk Assessment (BFR) (2007*) Introduction to the problems surrounding textile garments*, Germany.

AHWG2 stakeholder feedback and follow-up research

Stakeholder feedback

The feedback has been compiled and analysed under new criteria proposal 11: Restricted Substance List (RSL).

Follow-up research and proposed approach

See new criteria proposal 11: Restricted Substance List (RSL).

~~CURRENT CRITERION 18: IMPURITIES IN PIGMENTS: INSOLUBLE COLOUR MATTER WITHOUT FIBRE AFFINITY~~

Major proposed changes	○ Criterion to be incorporated into the new Criterion 11 Restricted Substance List
Present criterion, Decision 2009/567	
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 2 500 ppm; Hg 4 ppm; Mn 1 000 ppm; Ni 200 ppm; Pb 100 ppm; Se 20 ppm; Sb 50 ppm; Sn 250 ppm; Zn 1 500 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.	

AHWG 1 technical discussion

No change has been suggested for this criterion. It has not been possible to find evidence that the listed impurities are not still present in pigments.

Proposal:

The criterion are to be incorporated into the Criterion 11 RSL

Proposed revised criterion v1, September 2012
Criterion to be incorporated into Restricted Substance List – Criterion 11

AHWG2 stakeholder feedback and follow-up research

Stakeholder feedback

The feedback has been compiled and analysed under new criteria proposal 11: Restricted Substance List (RSL).

Follow-up research and proposed approach

See new criteria proposal 11: Restricted Substance List (RSL).

~~CURRENT CRITERION 19: CHROME MORDANT DYING~~

Major proposed changes	○ Criterion to be incorporated into new Criterion 11 Restricted Substance List
Present criterion, Decision 2009/567	
Chrome mordant dying is not allowed. *Assessment and verification:* The applicant shall provide a declaration or non-use.	

AHWG 1 technical discussion

Chrome mordant dyes can be used with wool. It is not clear how much they are used any more so this criterion may no longer be relevant.

Proposal:

The criterion are to be incorporated into the Criterion 11 RSL

Proposed revised criterion v1, September 2012
Criterion to be incorporated into Restricted Substance List – new Criterion 11

AHWG2 stakeholder feedback and follow-up research

Stakeholder feedback

The feedback has been compiled and analysed under new criteria proposal 11: Restricted Substance List (RSL).

Follow-up research and proposed approach

See new criteria proposal 11: Restricted Substance List (RSL).

~~CURRENT CRITERION 20: METAL COMPLEX DYES~~

Major proposed changes	○ The criterion is to be incorporated into Criterion 11: Restricted Substance List ○ Metal complex dyes are only to be allowed when dying wool and polyamide.
Present criterion, Decision 2009/567	
If metal complex dyes based on copper, chromium or nickel are used: 20.1. 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 waste water 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 waste water 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; EN 1233 for Cr. 20.2. 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. *Assessment and verification:* 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; EN 1233 for Cr.	

AHWG1 technical discussion

Metal complex dyes are proposed only to be allowed when dyeing wool or polyamide. During the last revision metal complex dyes were debated since they contain heavy metal complexes that often are more toxic for the aquatic environment compared to other dyes.

It has been argued that for fibers like wool and polyamide it is difficult to obtain a good colour fastness if metal complex dyes are not permitted.

By contrast, when dyeing cotton it can be difficult to obtain a high colour fastness when dyeing light colours and so only some colours can be difficult to obtain without metal complex dyes (e.g. turquoise).

A restriction on metal complex dyes would make it difficult to dye wool or polyamide but will only have minor influence when dyeing cotton. It is therefore proposed only to permit metal complex dyes when dying wool or polyamide.

AHWG1 stakeholder feedback and follow-up research

Stakeholder feedback
Limited written feedback was received. Those that commented agreed that metal complex dyes should be permitted for dyeing wool and polyamide .

Proposal:

Metal complex dyes shall be restricted with the exception of wool and polyamide. The criterion are to be incorporated into the Criterion 11 RSL

Proposed criterion revision v1, September 2012
Criterion to be incorporated into new Criterion 11: Restricted Substance List

AHWG2 stakeholder feedback and follow-up research

Stakeholder feedback

The feedback has been compiled and analysed under new criteria proposal 11: Restricted Substance List (RSL).

Follow-up research and proposed approach

See new criteria proposal 11: Restricted Substance List (RSL).

~~***CURRENT CRITERION 21: AZO DYES***~~

It is proposed that the criterion is incorporated into new criterion 11: Restricted Substance List

~~***CURRENT CRITERION 22: DYES THAT ARE CARCINOGENIC, MUTAGENIC OR TOXIC TO REPRODUCTION***~~

It is proposed that the criterion is incorporated into new criterion 11: Restricted Substance List

~~***CURRENT CRITERION 23: POTENTIALLY SENSITISING DYES***~~

It is proposed that the criterion is incorporated into new criterion 11: Restricted Substance List

~~CURRENT CRITERION 24: HALOGENATED CARRIERS FOR POLYESTER~~

Major proposed changes	○ Criterion to be incorporated into new Criterion 11 Restricted Substance List
Present criterion, Decision 2009/567	
Halogenated carriers shall not be used. *Assessment and verification:* The applicant shall provide a declaration of non-use.	

AHWG1 technical discussion

At this stage it has not been possible to gain evidence as to whether halogenated carriers for polyester are still being used and if they will be restricted by the new criterion on hazardous substances.

Proposal:

The criterion are to be incorporated into the Criterion 11 RSL.

Proposed revised criterion v1, September 2012
Criterion to be incorporated into Restricted Substance List – new Criterion 11

AHWG2 stakeholder feedback and follow-up research

Stakeholder feedback

The feedback has been compiled and analysed under new criteria proposal 11: Restricted Substance List (RSL).

Follow-up research and proposed approach

See new criteria proposal 11: Restricted Substance List (RSL).

~~CURRENT CRITERION 25: PRINTING~~

Major proposed changes	○ The criterion are to be incorporated into the new Criterion 11 Restricted Substance List ○ Specification of VOC's that may be found in printing paste with a proposed test method.
Present criterion, Decision 2009/567	
25.1. Printing pastes used shall not contain more than 5 % volatile organic compounds such as white spirit (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. 25.2. 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.	

AHWG1 technical discussion

This criteria was identified in the preliminary report as an area of significant in relation to process energy use. Information on the content of VOC in the printing past is to be investigated further.

The energy use associated with printing processes was highlighted as a potential area of improvement in the preliminary report – although more data is required to substantiate its significance.

AHWG1 stakeholder feedback and proposed approach

Stakeholder feedback

No feedback was received on this criterion.

Proposal:

The current VOC sub-criterion is mirrored by the Blue Angel so it is proposed to retain the current limit value. The plastisol exclusion is to be incorporated into the Criterion 11 RSL. Process efficiency options for printing are discussed under proposed new Criterion 13.

Proposed revised criterion v1, September 2012

25.1. Printing pastes used shall not contain more than 5 % volatile organic compounds such as white spirit (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.

Sub-criterion 25.2 is to be incorporated into Restricted Substance List – Criterion 11

AHWG2 stakeholder feedback and follow-up research

Stakeholder feedback

The feedback has been compiled and analysed under new criteria proposal 11: Restricted Substance List (RSL).

Follow-up research and proposed approach

See new criteria proposal 11: Restricted Substance List (RSL).

~~CURRENT CRITERION 26: FORMALDEHYDE~~

Major proposed changes	○ Incorporation into new Criterion 11 Restricted Substance List ○ Harmonisation of the limit values with Oeko-Tex 100. ○ Easy care finishes are proposed to be addressed by proposed new Criterion 25: Durability of function
Present criterion, Decision 2009	
The amount of free and partly hydrolysable formaldehyde in the final fabric shall not exceed 20 ppm for babies and young children under 3 years old, 30 ppm for products that come into direct contact with the skin, and 75 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.	

AHWG1 technical discussion

Formaldehyde is released by some textiles finishes, such as those conferring crease resistance, while the garment is new. These finishes are most likely to be used on fabrics that otherwise crease easily, such as cotton or wool.

Skin contact with formaldehyde can cause skin rashes and allergic skin reactions. The levels of exposure which may cause these allergic reactions will vary between individuals, and will depend in part on the individuals previous allergy history. Instances of dermatitis arising from wearing clothing containing high levels of formaldehyde have been documented [210].

Formaldehyde is also a potential problem for the indoor climate, where the sources are mainly understood to be fibre boards used in furniture but also emissions from textiles on furniture or decorations can also contribute.

[210] NICNAS (National industrial chemicals notification and assessment scheme, Australia) Existing chemicals information sheet, October 2007

According to textile BREF (2003) the best available technology is to use formaldehyde-free or formaldehyde-poor cross-linking agent (<0,1 % formaldehyde content in the formulation). Substitute products such as glyoxals can be used [211]. These enable levels of less than 75 ppm to be achieved.

In the label Ökotex there are 4 classes of limit values on formaldehyde depending on the degree of skin exposure and sensitivity [Okotex 100, version 1 2011]:

- Class 1 (baby): 16 ppm (i.e. no formaldehyde)
- Class 2 (contact with skin): 75 ppm
- Class 3 (without contact with skin): 300 ppm
- Class 4 (decoration material): 300 ppm

Two standard methods are available for measuring the release of formaldehyde from textiles: the water extraction method (EN ISO 14184-1) and the vapor absorption method (EN ISO 14184-2) for testing air emissions of formaldehyde. The detection limit for both methods is 20 mg/kg.

Oeko-tex certification (baby-level) requires that formaldehyde cannot be detected in final products. Not detected is assumed to correspond to a level of < 16 ppm. The Eco-label requires that the concentration of formaldehyde must not exceed 20 ppm in products for babies and young children under 3 years old, 30 ppm for products in direct contact with the skin and 75 ppm for all other products.

A European survey on the release of formaldehyde showed that 11% of the samples intended to be in direct contact with the skin exceeded 30 mg/kg. For textiles for babies under the age of two 11% of the garments released more than 20 mg/kg [EU Ecolabel, 2007].

There are two possible ways for setting the new criteria:

- The first is a harmonisation with Ökotex 100. This means no strengthening of the criteria and referring to the survey the majority of the products on the market should fulfil these criteria.
- The second is to harmonise with GOTS and to not accept any release of formaldehyde – with a detection limit is 16 mg/kg. This would be a clear strengthening of the criteria and yet it would still be possible for the

[211] Asqual (2007) *Revision of the textile Eco-label – final report*

producers to achieve. From a communication or sales point of view “zero formaldehyde” is a clear improvement compared to the present criteria.

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

The majority of stakeholders who responded on this criterion favoured a harmonisation with Oeko-Tex 100. One industry stakeholder stated that it was sometimes difficult for small suppliers to achieve these levels.

Follow-up research and proposed response

Surveys which have tested products suggest that the limit values specified by Oeko-Tex can readily be met by using alternative easy care finishes. Care must be taken, however, because some common low or no formaldehyde alternatives, such as dihydroxyethylene urea (DMDHEU), are self-classified with H351 (suspected of causing cancer) and H317 (Allergen skin reactions).

In terms of consumer exposure a study by the Danish EPA which tested final products for levels of formaldehyde suggests that after a single domestic wash cycle the level of formaldehyde on garments is reduced substantially [212]. This finding is supported by a more recent literature survey of final product testing carried out by the Danish EPA [213]. They survey suggests that between 57% to 81% may be washed out. It appears therefore to be the case that final product testing reflects the highest potential exposure but that the risk may quickly diminish.

Proposal:

It is proposed that the limits values are adjusted as follows:

- childrens clothing up to the age of 3 years are retained at 20 ppm,
- all other clothing products are harmonised at 75 ppm
- interior textiles are harmonised with Oeko-Tex at 300 ppm

[212] Danish Environmental Protection Agency (2003) *Survey of chemical compounds in textile fabrics*, Report No.23

[213] Danish Environmental Protection Agency (2011) *Survey of chemical substances in textiles,*, Report No.113

Proposed revised criterion v1, September 2012
The amount of free and partly hydrolysable formaldehyde in the final fabric shall not exceed 20 ppm for products used for babies and young children under 3 years old, ~~30 ppm~~ 75 ppm for all other clothing products and 300 ppm for interior textile 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.

AHWG2 stakeholder feedback and follow-up research

Stakeholder feedback

The feedback has been compiled and analysed under new criteria proposal 11: Restricted Substance List (RSL).

Follow-up research and proposed approach

See new criteria proposal 11: Restricted Substance List (RSL).

CURRENT CRITERION 27: WASTE WATER ~~FROM~~ DISCHARGES FROM WET-PROCESSING

Major proposed changes	○ Addition of a 85% COD reduction as an additional option, supporting harmonisation with Oeko-Tex and Bluesign. ○ Introduction of specific requirements for hardly biodegradable or non-biodegradable substances in support of derogation requirements in Criterion 12 on the substitution of hazardous substances.
Present criterion, Decision 2009/567	
(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 20 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.	

AHWG1 technical discussion

Here we present the initial background research and argumentation circulated in advance of the first ad-hoc working group meeting in February 2012.

In the present criteria the COD of discharges from the scouring of greasy wool is exempted from this criteria. Proposals for these discharges to be addressed by this criterion were discussed under criterion 5.5.

Comments from stakeholders, (see Preliminary report) suggest that the two options listed in criteria 5.5 are inconsistent. It was suggested by stakeholders to delete the criteria 5.5 and include it in this criterion and only to have a limit for the emission after final treatment, whether this is on side, off side or a combination. It was also suggested to harmonise the emissions limit to 20 g COD/kg.

The limit for other production sites was suggested to be 20 g COD /kg in the last revision (2009) – based on input from 19 Danish license holders (just under a quarter of the current textile product Ecolabel licenses). It is therefore suggested to harmonise the emissions requirement for the different processes at 20 mg COD/m^3.

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

At the 1st AHWG stakeholders supported proposals to review the relevance of BAT techniques to the criterion. No written feedback was received from stakeholders. Separate feedback in relation to the wool criteria suggested that scouring wastewater treatment should continue to dealt within by Criterion 5 because of process-specific issues.

Follow-up research and proposed approach*Introducing flexibility into the criteria*

The textile BREF highlights the varying combinations of production processes and operating conditions that characterise the textile industry. This makes the application of a single COD value potentially difficult to apply as a criteria. Previous consultations with Danish industry does, however, suggests that the current 20 g/kg of finished fabric is workable.

Whilst this limit value is shared by GOTS, both Bluesign (v.3.1) and Oeko-Tex 1000 (01/2012) refer to an 85% COD reduction target as a minimum achievement level for wastewaters discharged to sewer as trade waste. Oeko-Tex 1000 refers to a 180 mg/l COD reduction target for wastewaters discharged to surface waters.

The textile BREF suggests that 85% would represent BAT performance for COD removal. This suggests that some flexibility could be introduced into the criteria, which would also allow for harmonisation with these schemes.

Derogation requirements for hardly and non-biodegradable substances

The proposed new Criterion 12 requires substances and formulations to, as far as possible, be specified to be biodegradable. It also raised the possibility that potentially hazardous and hardly degradable substances (e.g. Nitrilotriacetic acid) or non-degradable substances (e.g. some forms of dye) could be derogated if they are

removed by wastewater treatment plant. Ultimate biodegradability is currently also required by the EU Ecolabel for surfactants.

The textile BREF identifies BAT techniques for the degradation of hardly biodegradable and non-biodegradable substances. Hardly biodegradability is described by the OECD as 'having potential for biodegradation under favourable conditions' which are defined as greater than 20% biodegradability under the specific testing conditions of standard 301b on 'inherent' biodegradability [214].

BAT techniques relating to the treatment of substances defined as hardly (inherently) or non-biodegradable include:

- Treatment of textile waste water in activated sludge system with low food-to-micro organisms ratio (p-405) – Suitable for degradation of effluents such as those which contain *hardly* biodegradable substances.
- Anaerobic removal of residual dyestuff from padding liquors and printing paste residues (p-426) – Suitable in particular for *non-biodegradable* dye colour removal, sometimes in combination with activated carbon.
- Treatment of selected and segregated, non-biodegradable waste water stream by chemical oxidation (p-428) – Suitable for effluents with very high levels of COD and non-biodegradable substances e.g. desizing baths, dye baths.

This suggests that whilst a range of BAT techniques exist, the criterion should be flexible so that manufacturers can choose the most appropriate treatment solution.

Proposal:

Based on the textile BREF and the Bluesign and Oeko-Tex 1000 schemes it is proposed that an alternative target of 85% COD removal is introduced.

Based on BREF findings any Criterion 12 derogations requiring the removal of hardly biodegradable or non-biodegradable substances should be supported by a 90% removal target that specifically addresses mineralisation and dye removal.

[214] OECD,

Proposed criteria revision v1, September 2012
Waste water from wet-processing sites shall, when discharged to surface waters after treatment (whether on-site or off-site), have a COD content of less than 20 mg/kg, or a reduction of COD by at least 85%, expressed as an annual average. In order to derogate substances that are hardly biodegradable or non-biodegradable, or to achieve ultimate aerobic biodegradation, additional treatment systems shall be introduced. In this case mineralisation and/or colour removal should be at least 90%. *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. 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.

AHWG2 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

There was a consensus view from stakeholders that responded not to include a volumetric limit value (mg/l). This was because it would allow processing sites to comply by diluting effluent. It may also not treat fairly those producers who had made water savings. Harmonisation with existing schemes such as Oeko-tex 1000 and Bluesign were welcomed.

A Member State submitted a proposal for the creation of a new criteria addressing aerial emissions. An 'emissions factor' methodology is currently successfully used by the Blue Angel and Bluesign, and is listed by the textile BREF as BAT. The criteria would apply to printing and finishing stages.

Follow-up research and proposed approach

Wastewater limit values

Reference to Oeko-tex 1000 confirms that two targets are set. The first for a minimum 85% removal of COD prior to any discharges as trade waste (ie. to a municipal sewage works) and the second a minimum volumetric target for discharge to surface waters.

Given the wide variety of wet processes that may be addressed by the criteria this could provide a useful framework for the criteria, on one hand requiring that a production sites always achieves a minimum level of COD removal, whilst also setting a minimum COD level for discharges to the environment.

Proposal:

Introduction of a minimum COD removal of 85% for trade waste discharges and retention of an absolute COD limit value of 20 g/kg for final discharge to the environment.

Proposal to introduce an aerial emissions criteria

Heat-setting, thermosol processes, impregnation and fixation of finishing agents create significant potential for airborne emissions of VOC's and hazardous substances. The textile BREF lists a BAT technique which aims to minimise these emissions. The BREF describes the 'emissions factor' method for calculating the cumulative emissions under specific process conditions from both the process itself and from carry over on the textile from prior processes [215]. The latter can include a significant range of different volatile softeners, carriers, leveling agents, cross linking compounds and wetting agents. The methodology also includes weightings for hazardous substances.

The BREF cites the main benefit of the methodology being the prevention of emissions at source, enabling the emissions from alternative process recipes to be compared. This can aid in minimising exposure of both the workforce and the environment. In this respect a criteria on aerial emissions control would contribute to minimising exposure from classified substances (see new criteria proposal 12). In this respect it is noteable that Bluesign introduces a specific limit of 0.4 g C/kg for hazardous VOC emissions of comparable classification to formaldehyde [216].

The methodology is understood to be widely implemented by the textile industry in Germany and feedback from the Bluesign scheme is that suppliers in the far east have been able to implement it. The BREF states that a 0.8 g C/kg emissions limit is achieveable by most modern finishing processes.

Proposal:

Introduction of new criteria addressing aerial emissions alongside the existing criteria for wastewater discharges.

The criteria could reflect the the Blue Angel criteria 3.3.5 which sets a limit for the predicted emissions of organic substances from recipes of 0.8 g C/kg textile substrate, being a value highlighted as being achieveable by the textile BREF. In order to keep the criteria simple it is proposed only to apply the limit value for the recipe itself as opposed to carry over.

[215] See textile BREF, p-262

[216] Bluesign Technologies, *Bluesign criteria for textile manufacturers*, Version 1.3, March 2010

Where hazardous substances comparable in hazard classification to formaldehyde are used (textile hazard category B) these are proposed as being subject to a stricter limit value of 0.4 g C/kg textile substrate.

AHWG3 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 23rd April 2013, together with follow-up research and the resulting proposals for the final criteria proposal.

Stakeholder feedback

The COD limit prior to discharge to the environment should be removed. This is because in some countries major investment has been made in centralised wastewater treatment infrastructure e.g. China. On-site works are now used to recover and recycle rinse liquors. Moreover the effectiveness of an 85% reduction will depend on the COD of the wastewater.

The proposal for 90% mineralisation is considered to be unmeasurable. Colour removal would act to also remove textile auxilliaries. The effectiveness of a % limit value is questioned as it will be dependant on the fixation/exhaustion achieved by the dyeing process.

Industry stakeholders commented that the emissions to air proposal should be aligned to the VOC Directive 99/13. The current proposal would represent a new approach for the industry. Clarification was also requested as to the process stages to which it would apply. Feedback from Bluesign certifications was cited as evidence that it was workable.

A query was raised for both sub-criterion over what time period and for which production sites shall the criteria be measured?

COD reduction limits

Based on the arguments put forward by stakeholders the percentage reduction in COD has been deleted and only the 20g/kg limit value retained. Case studies in the textile BREF suggest that 20g COD/kg will achieve a high level of mineralisation of textile auxilliaries, a separate requirement will therefore be deleted.

Proposal:

Colour removal is proposed to be retained as a requirement linked to the derogation of dyes. A percentage reduction in colour has been replaced by absolute values taken from the Blue Angel criteria for textiles.

VOC emissions from finishing processes

The criteria relates to VOC emissions from finishing processes, including thermosetting, thermosoling, coating, impregnating or finishing of textiles and the respective drying facilities.

The approach was originally proposed was based on the textile BREF and is also used by Bluesign, with evidence to successful compliance by the industry. However, following a review the criteria have been aligned with the provisions for textile finishing contained within the VOC Directive. Moreover, it is proposed to standardise verification by requiring testing according to EN 12619:2013 *'Stationary source emissions. Determination of the mass concentration of total gaseous organic carbon'*.

Sampling frequency for emissions

Monthly averages for production at the site for the six months preceding the application are proposed. This requirement has also been clarified for wool scouring.

Summary of the final criteria proposal

The current criteria addressing emissions to water has been expanded to also address emissions to air.

The emissions to wastewater sub-criterion has been simplified to a single COD requirement at the point of discharge of 20g/kg. This limit value assures a high standard of effluent treatment and addresses the significant of wastewater emissions as identified by the IMPRO LCA study. Specific limit values for colour removal have been included with reference to derogation conditions for dye use in Criteria 14.

The emissions to air sub-criterion is new and has been adapted from provisions within the VOC Directive. Emissions from finishing processes were identified by Member States as a major source of emissions.

~~CURRENT CRITERION 28: FLAME RETARDANTS~~

Major proposed changes	○ Listing of specific restricted or SVHC substances within proposed new criterion 11: Restricted Substance List ○ Conditional derogation of flame retardants under Criterion 12 where the product in which they are incorporated is required to meet fire regulations or product-related ISO, EN or Member State standards ○ Flame retardant treatments must be semi-durable or durable (see proposed new Criterion 40).

Present criterion, Decision 2009/567

No use is allowed of flame retardant substances or of flame retardant preparations containing more than 0.1% be weight of substances that are assigned or may be assigned at the time of application any of the following risk phrases (or combination of 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.

Flame retardants which are only physically mixed into the polymer fibre or into a textile coating are excluded (additive flame retardants).

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

AHWG1 technical discussion

Here we present the initial background research and argumentation circulated in advance of the first ad-hoc working group meeting in February 2012.

Feedback from the stakeholder questionnaire argued that flame retardants are necessary in some textile applications and should be regulated like other chemicals because there is no clear definition of a “flame retardant”. Flame retardants have been discussed extensively in other product groups and no solution satisfying all stakeholders has been found yet.

The current criteria have been criticised by producers stating that it is too arbitary in how it deals with flame retardants in textiles. For example, an additive flame retardant with no risk phrases would not currently fulfil the criteria. On the other hand, it is also the case that some products that currently qualify for Ökotex, which excludes a wider range of flame retardants than currently feature in the ECHA candidate list, may also not qualify because their precursors are covered by excluded risk phrases. Very few flame retardants exist that are fully reactive, as the industry interprets the current criteria.

Furthermore, a significant number of flame retardants currently used are understood to be incorporated in an additive form and therefore excluded by the Ecolabel unless the alternative clause in the current Regulation is used which is with reference to Regulation (EC) No 1272/2008. It is understood that without clarification this effectively excludes certain product ranges which require specific flame retardants in order to meet Member State fire regulations.

Flame retardants currently restricted by REACH and forming part of the SVHC Candidate List are as follows:

REACH Annex XIV (Restricted)

- HBCD – Hexabromocyclododecane (sunset date of 21st August 2015)

REACH Annex XVII (Authorised)

- PeBDE – Pentabromodiphenyl oxide (0,1% wt)
- OcBDE – Octabromidiphenyl oxide (0,1% wt)
- APO – Tris(aziridinyl)phosphine oxide (skin contact applications)
- TRIS – Tris (2,3 dibromopropyl) phosphate (skin contact applications)
- PBBs – Polybrominated biphenyls (0,1% wt)

REACH SVHC Candidate List

- TCEP – Tris (2,chloroethyl)phosphate
- Paraffin, C10-C13, chlorinated (SCCP)

Proposed as SVHC

- Deca-BDE – Decabromodiphenyl ether (September 2012)

With the exception of decaBDE this combined list is reflected by the flame retardants currently restricted by the Ökotex 100 label as of January 2011.

Brominated flame retardants were highlighted as an area of focus by the Commission Statements and stakeholder feedback. As we have highlighted a range of brominated retardants are now either restricted by REACH or appear on the SVHC Candidate List Although Decabromodiphenyl ether (Deca-BDE) is not restricted it has now been formally proposed for addition to the SVHC Candidate List.

It is to be discussed during the revision process whether derogations of other specific flame retardants which may be classified as hazardous substances should be made – particularly for the following specific applications in which fire retardancy may be necessary to meet member state fire regulations:

- Personal Protective Equipment (PPE).
- Furnishings and drapery that fulfil the textile product definition,
- Nightwear (poly-cotton blends and health service and care facility nightwear),
- Bed linen (particularly for health services and care facilities)

Derogations can only be made if no technically or economically feasible alternatives can be identified.

It is understood that Deca-BDE in combination with antimony trioxide may be of limited application in relation to the Ecolabel for textile products, with the exception of curtains and upholstery, where a back coating may be applied in order to fire proof furniture fabrics. For the other listed applications organophosphorous and inorganic

retardants would tend to be used, a number of which are already restricted and appear on the SVHC Candidate List.

It is also understood that the suitability of different retardants depends on whether the fibre is natural or synthetic, and that this in turn also influences the potential for residues to come into contact with skin – some of which may be by-products of the application process - and also the durability of the garment – which can be damaged and lose tensile strength because of some of the chemicals present in formulations.

How flame retardants are treated by other labels

Öko-tex distinguishes between fibre materials which receive the flame retardant properties into the spinning mass already (copolymer, additives) and a finish with flame retardant products in a later processing step [217]. For both forms of application flame retardants are only allowed for classes 1, 2 and 3 (as discussed under criterion 26) if the substance has been assessed by Öko-tex and it has been concluded that the substances can be used without any restrictions (Ökotex 100, point 4.3.) A white list is also published.

GOTS have no specific requirements for flame retardants although their hazardous substance requirements are relevant for flame retardants. They are also addressed in relation to wastewater. Flame retardants with halogens are allowed as long as they do not contribute with more than 1% AOC (Assimilable Organic Carbon) to the primary effluent. This is a requirement that is difficult to evaluate so it is a requirement where harmonisation is not advisable.

[217] Okotex 100, version 1 2011

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

Industry stakeholders highlighted the fact that flame retardants are required to meet international and national fire regulations. Reactive flame retardants are not reacted to near 100% as defined by the Ecolabel. There are very few reactive flame retardants that are not classified, and distinguishment between reactive and additive does not say anything about health or environmental risks. Many additive flame retardants have been assessed as being safe to use. Each flame retardant should each be assessed on its own merit depending on its CLP classification.

The permanency of flame retardants should be considered within the criterion. The incorporation of the function should be as permanent as possible.

In contrast a number of stakeholders proposed that flame retardants be completely restricted by the Ecolabel. Derogation could only be provided where they were necessary to meet fire regulations. Inherently flame retardant fibres should be favoured.

Follow-up and proposed approach

Evaluating the impact of the hazardous substance criteria

The new hazardous substance criterion will restrict the use of a number of flame retardants which are used to treat textiles, including APO. The proposed new Criterion 12 would require that, as far as practically possible and within the proposed timescales, hazardous substances should be substituted.

In order to test the impact of Criterion 12 on flame retardants a number of commonly used substances were screened for hazard classifications. An EFRA publication identifying common flame retardants used in textiles was also used as a reference

point [218]. The following examples of commonly used reactive flame retardants were screened. Their CAS numbers were entered into the C&L Inventory in order to determine their hazard classification:

- tetrakis (hydroxymethyl) phosphonium chloride (THPC) (124-64-1): Commonly used for cotton fabrics. It is not formally classified but notifiers self-classify it with H411.
- Dimethylphosphono (N-methylol) propionamide (20120-33-6/88385-81-3) : Commonly used for cotton fabrics. It is not formally classified but notifiers self-classify it with H317.
- Phosponate esthers (42595-45-9/ 41203-81-0): Used for polyester fabrics. They are no classified.
- Potassium hexafluoro titanate (16919-27-0) and zirkonate (16923-95-8): Used to treat wool. It is not formally classified but they are self-classified with H301 and H317, and with H412 respectively.
- Ethan-1,2-bis (pentabromophenyl) + antimony synergists (84852-53-9): Used to treat cotton, polyester and acrylic. It is not formally classified but they are self-classified with H413.
- Tris (tribromophenyl) triazine + antimony synergists (25713-60-4): Used to treat cotton, polyester and acrylic. It is not currently registered.
- Melamine cyanurate (37640-57-6): Use to treat cotton and polyester. It is not formally classified but self-classified with H373.

Of the flame retardants listed above the majority were not formally classified. Aquatic toxicity classes appear to be the most consistent. Of the additional flame retardants listed in EFRA's publication a significant number are noted as either not being registered or not being classified.

Different mechanisms for achieving flame retardancy

Flame retardancy can be achieved using a number of mechanisms. Flame retardants may be reacted with the textile substrate in order to form covalent bonds (see the examples above). For man-made fibres flame retardancy can also be achieved through the use of additives during polymerisation or by modifying the polymer structure during manufacturing [219]. An example additive used by an existing

[218] EFRA (2012) *Keeping fire in check – An introduction to flame retardants used in upholstered furniture and textile applications*

[219] Lacasse, K and W, Bauman (2004) *Textile chemicals*, Springer-Verlag

licenseholder was found to be classified with H413. An example co-polymer used by EU manufacturer Trevira was not found to be classified [220].

It is understood that in the UK, which has some of the most stringent fire regulations in the EU, some retailers meet the fire regulations for nightwear by specifying less flammable fibres[221]. However, in some cases the health risk of exposure to flame retardant treatments is also considered, sofor example, a major UK retailers' RSL restricts the use of flame retardants on clothing for small children [222].

It is also notable that the Oeko-Tex 100 white list includes a number of inherently flame retardant fibres and fabrics – including products manufactured by Gore Tex, Trevira and Dupont [223]. Many of these fibres consist of modified polyester, fluoropolymers or aramid fibres.

The durability of flame retardants

The European Flame Retardant Association (EFRA) [224] and international scientific research on flame retardants compiled by the US National Academy of Science [225] highlights the importance of flame retardant durability. Clothing may need to resist many washing cycles whereas for interior textiles such as curtains water soak tests may be sufficient. Expert literature on the subject distinguishes between non-durable, semi-durable and durable finishes [226]:

- Non-durable finishes may require retreating after one laundering;
- Semi-durable may endure more than 5-10 washing cycles or dry cleaning,

---

[220] Balabanovich, A.I. *Thermal decomposition study of 2-methyl-1,2-oxaphospholan-5-one 2-oxide,* Thermochimica Acta 409 (2004) 33–39

[221] Bolton Consultancy Ltd (2009) *Flammability of nightwear - UK*

[222] Marks & Spencer, *Environmental & Chemical policy for textile processing, Module 1: RSL*, May 2011

[223] Oeko-Tex Association, *Flame retardant products* https://www.oeko-tex.com/en/manufacturers/certified_products/active_chemical_products/flame_retardant_products/flame_retardant_products.html

[224] EFRA (2012) *Keeping fire in check – An introduction to flame retardants used in upholstered furniture and textile applications*

[225] USA National Research Council (2000) *Toxicological risks of selected flame retardant chemicals*, Sub-committe on flame-retardant chemicals, Committee on toxicology, National Research Council

[226] See footnote 40

- Durable may endure more than 50 washing cycles [227].

Inherently flame retardant fibres are durable, although it is understood that certain washing conditions can damage the flame retardancy of some fibres [228]. Durable flame retardants have the potential benefit of extending the functional lifespan of products whilst minimising exposure of consumers and the environment during the use phase.

Proposal:

It is proposed that flame retardant treatments (including their associated formulations, cross-linking agents and synergists) are screened according to the requirements of proposed new Criterion 12.

Treatments that are classified in accordance with Regulation (EC) No 1272/2008 are proposed for derogation if it can be demonstrated that:

1. They are required to meet fire regulations;
2. They are required to meet ISO, EN or Member State standards for specific product end-uses;
3. Their flame retardancy is:
   i. Durable for clothing applications;
   ii. Semi-durable for interior textiles (see proposed new Criterion 40);

Further input is requested from stakeholders to inform the durability specifications and to identify any relevant standards.

Proposed revised criteria, September 2012
Incorporation of substances that are restricted into proposed new Criterion 11: Restricted Substance List, all other flame retardants are to be screened according to proposed new Criterion 12 on the substitution of hazardous substances and must meet proposed new Criterion 40 on the durability of finishes.

[227] USA National Research Council (2000) *Toxicological risks of selected flame retardant chemicals*, Sub-committe on flame-retardant chemicals, Committee on toxicology, National Research Council

[228] Trevira, *How Trevira CS works*, http://www.trevira.de/en/textiles-made-from-trevira/home-textiles/flame-retardant-textiles-trevira-cs/how-trevira-cs-works.html

AHWG2 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

The general approach to derogation linked to durability and the potential for textile hazard class B to be derogated was supported. There were, however, some opposing views on the strict application of the derogation conditions. The value of listing restricted substances was also questioned.

A specific concern raised related to the strictness of the derogation condition. An industry stakeholder stated that it could limit voluntary fire safety benefits. An example was given where building fire regulations may require upper floors to have fire proof curtains but may not require them on lower floors. However, the building owner would likely want to specify fire proof curtains throughout, but they could not all be ecolabelled.

A general concern was raised about the narrow definition of finishes. It was highlighted by industry stakeholders that flame retardants can also be incorporated as additives or as co-polymers. These should be permitted if they meet the durability tests.

It was noted that the synergist antimony trioxide would require derogation for use to apply flame retardants used as backcoatings. These are required to meet fire regulations.

An example was provided by an existing licenseholder of a flame retardant that is incorporated into a fibre as an additive. The additive would pass the proposed durability tests, with test results verifying retention of function after 50 washes. However, the current wording only defines finishes so this treatment would not be eligible.

The wash durability criteria is not appropriate for all flame retardant end-uses. Some are either not washed at all or are not cleaned in washing machines e.g. theatre curtains, textile wall covers, roller blinds, removable furniture upholstery. Here a soaking test may be more appropriate.

A general comment was made about the relationship between durability and

exposure. It was stated by two industry stakeholders that conclusions could not be drawn about health, safety and environmental properties from a flame retardants durability, including risks of exposure of the consumer or the environment. Oeko-tex 100 was cited as it only places a restriction on specific, individually assessed substances and not additional criteria such as durability.

Follow-up research and proposed approach

Antimony trioxide synergist

It is understood that antimony trioxide is used as a synergist in the application of ethane bis(pentabromophenyl) (EBP) flame retardant, which is cited as an alternative to decaBDE, which is commonly used in furniture and interior textiles in order to meet Member State fire regulations [229]. decaBDE was proposed by the UK for ECHA's Candidate List of SVHC's in August 2012. Practical alternatives for these applications are therefore required.

A derogation screening of ATo has been carried out for the bed mattresses product group. This suggested that it should be derogated but with a condition applied to limit workforce exposure during the application of the flame retardant. The condition shall be based on European workforce exposure limit values.

Proposal:

It is proposed that Antimony trioxide is specifically derogated for use as a synergist in applying flame retardants. An eight hour mean shift value ELV for 0.5 mg/m^3 should be applied to application of the flame retardant to the final product.

Durability standards

Feedback from stakeholders highlighted the need for greater differentiation between textile end-uses in order to specify appropriate durability tests. This feedback informs the following proposed revision of the definitions which form the basis for the criteria:

- Non-durable finishes may require retreating after one laundering;

[229] ETSA, *ISO 15797: Standard for testing workwear for industrial laundries*, http://www.etsa-europe.org/Etsa-Europe.org/iso/ISO15797.htm

- Semi-durable may endure more than 5-10 washing cycles (40^{o}C), soak tests (40^{o}C) or dry cleaning,
- Durable may endure more than 50 washing cycles [230].

The addition of soak testing to semi-durable definition caters for interior textiles such as curtains and wall coverings that are not intended to be machine washed.

Proposal:

Soak testing is to be added to the permitted testing for semi-durable applications.

Durability and exposure pathways

Industry stakeholders questioned the use of durability as a proxy for minimisation of the risk of exposure for consumers and the environment. The expert scientific reference on flame retardants NRC (2000) highlights the following factors in influencing the durability of flame retardants:

- Launderability, aftercare and defined cleansing requirements,
- Weatherability,
- Exposure to light, heat, and atmospheric agents, usually together, present in indoor environments.

They highlight that leaching is a relevant mechanism for measuring the loss of flame retardants and associated degradation products, resins and plasticizers. The higher temperatures used in durability tests would not therefore be representative of the normal ambient conditions in which leaching may occur.

They do suggest, however, that durability data can be used as a measure for the rate of removal of flame retardants which could then be used to estimate ecotoxicological risks. This opinion is also shared by the German Federal Institute for Risk Assessment [231]. Higher temperature tests could be inferred to determine the 'removeability' to wastewater, which is a relevant pathway given the hazard statements H411-13 identified in relation to a number of common flame retardants.

[230] USA National Research Council (2000) *Toxicological risks of selected flame retardant chemicals*, Sub-committe on flame-retardant chemicals, Committee on toxicology, National Research Council

[231] German Federal Institute for Risk Assessment, *Introduction to the problems surrounding garment textiles*, BfR Information 18/2007, 1st June 2007

Pathways for exposure of the consumer are more problematic, as they will depend on the level of skin contact.

Proposal:

Durability is to be retained as a fitness for use criteria, on the basis of its potential to extend the life of garments and minimise removal of flame retardants, degradation products and fixing agents.

Additive flame retardants

The intention of the new approach to flame retardants is to support more durable function and to substitute hazardous substances. If additive flame retardants are able to meet these two sub-criteria then it is proposed that they are permitted. Data for an example additive flame retardant provided by an industry stakeholder suggests that durability criteria can be easily met, however, like the majority of the reactive flame retardants that we have evaluated derogation would be required for textile hazard category B aquatic toxicity.

Proposal:

The definition of 'finish' is to be broadened to 'functional finishes, treatments and additives'. Co-polymers would be exempt as they would be considered to be inherently flame retardant.

Summary of the final criteria proposal

The final criteria proposal comprises a list of restricted flame retardants (see Criteria 13), the majority of which are Candidate List SVHC's, a derogation framework for certain hazard classifications (see Criteria 14) and durability testing criteria (see Criteria 25).

In recognition of their importance in certain products and applications non-hazardous flame retardants are to be permitted in ecolabelled products. Flame retardants classified with certain hazards are also to be derogated, recognising the need for a number of specific chemistries. This is according to the conditions that:

- Flame retardants are required in order to fulfil specific standards, regulations or public procurement requirements. This reflects a compromise position as many Member States request a complete restriction on their use.
- The function is durable according to the test standards in Criteria 25, which are specified for both washable and non-washable fabrics. This is intended to minimise any possible exposure path and extend the life of treated garments.

Inherent flame retardant function is exempted from the requirement of Criteria 25 in order to incentivise inherent design.

Specific comments and discussion points are further analysed under Criteria 13 and 14.

~~CURRENT CRITERION 29: ANTI FELTING FINISHES~~

Major proposed changes	○ Criterion to be incorporated into the new Criterion 11 Restricted Substance List and new Criterion 12 Substitution of hazardous substances in dyeing, printing and finishing
Present criterion, Decision 2009/567	
Halogenated substances or preparations shall only be applied to wool slivers and loose scoured wool. *Assessment and verification:* The applicant shall provide a declaration of non-use (unless used for wool slivers and loose scoured wool).	

AHWG1 technical discussion

Here we present the initial background research and argumentation circulated in advance of the first ad-hoc working group meeting in February 2012.

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

According to the draft IPPC reference [BREF Textiles] 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 to combed tops for specific end products (e.g. underwear).

The issues to be addressed by the criteria are two-fold – 1) the COD and AOX of wastewater effluent and 2) the restriction of substances under Articles 6(6) and 6(7) of the Ecolabel Regulation. Ecotoxicity from wastewater effluent was not highlighted as a specific area for improvement in the preliminary report.

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.

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

Feedback received was that this criterion is still required. It is likely that the oxidising agents are classified.

Proposal:

It is proposed that the restriction is incorporated into the proposed new Criterion 11 RSL and that alternative finishes are screened according to proposed new criterion 12.

AHWG2 stakeholder feedback and follow-up research

Stakeholder feedback

The feedback has been compiled and analysed under new criteria proposal 11: Restricted Substance List (RSL).

Follow-up research and proposed approach

See new criteria proposal 11: Restricted Substance List (RSL).

~~CURRENT CRITERION 30: FABRIC FINISHES~~

Major proposed changes	○ Criterion to be incorporated into proposed new Criterion 11 and 12

Present criterion, Decision 2009/567

The word ‘finishes’ covers all physical or chemical treatments giving to the textile fabrics specific properties such as softness, waterproof, easy care.

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.

Alternatively, classification may be considered according to Regulation (EC) No 1272/2008. In this case no substances or preparations may be added to the raw materials that are assigned, or may be assigned at the time of application, with and of the following hazard statements (or combinations thereof): H351, H350, H340, H350i, H400, H410, H411, H412, H413, H360F, H360D, H361f, H361d H360FD, H361fd, H360Fd, H360Df, H341.

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.

AHWG1 technical discussion

No change is proposed for this criterion. The technical criteria are now superceded by the Article (6) and (7) requirements of the Ecolabel Regulation. The wording is to be coordinated with the new proposed criterion 10 on hazardous substances and implementing criteria 11 and 12.

Stakeholder feedback

Some reservations were expressed about removing this criterion, linked to reservations about the new Criterion 10 on hazardous substances and mixtures.
A proposal was made to introduce a new criterion which would focus on airborne emissions from finishing processes, including VOC's. A methodology for predicting and calculating emissions was outlined, reflecting BAT technique in the textile BREF and as also used by Bluesign.
A proposal was made to address garment finishing methods that are considered to be harmful to workers. An example was given of denim sand blasting.
Persistent perfluorinated substances used as water repellent and heat resistant finishes and coatings should be avoided or reduced. It was suggested that only short chained polymers might be permitted. Substitutes can still breakdown into perfluoro-sulfonic acid (PFOS) or perfluoro-octanoic acid (PFOA) monomers. PFOA is likely to be proposed as a SVHC by at least one .

Proposal:

Given that the criterion is based on the screening of finishes against risk phrases it is proposed that finishing is addressed by the proposed new Criterion 12.

It is also proposed that the durability of finishes is introduced as a new fitness for use criteria as a means of reducing consumer exposure and extending the life of products. The criteria would address: softness, waterproofing, easy care and flame retardancy. See criteria proposal 40

The possibility for introducing a criterion addressing airborne emissions from finishing processes is proposed for discussion at the second AHWG. Alternatively the proposed methodology could be listed within the proposed new process Criterion 13 as BAT.

Proposed revised criterion v1, September 2012
Criterion to be addressed by proposed new Criterion 12: Screening of dyeing, printing and finishing preparations and recipes. Certain substances are restricted by proposed new Criterion 11: Restricted Substance List.

AHWG2 stakeholder feedback and follow-up research

Stakeholder feedback

The feedback has been compiled and analysed under new criteria proposals 11: Restricted Substance List (RSL) and 12: Substitution of hazardous substances in dyeing, printing and finishing.

Follow-up research and proposed approach

See new criteria proposal 11: Restricted Substance List (RSL) and 12: Substitution of hazardous substances in dyeing, printing and finishing.

CURRENT CRITERION 31: FILLINGS

Major proposed changes	○ Retention of the criterion as part of a new criteria section entitled 'components and accessories' ○ Addition of a reference to fillings in Article 1 and in the introduction to the fibre criteria
Present criterion, Decision 2009/567	
31.1. Filling materials consisting of textile fibres shall comply with the textile fibre criteria (1–9) where appropriate. 31.2. Filling materials shall comply with criterion 11 on 'Biocidal or biostatic products' and the criterion 26 on 'Formaldehyde'. 31.3. 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	

AHWG1 discussion

No change is currently proposed for this criterion.

Stakeholder feedback

No feedback was received on this criterion

Proposal:

The wording is to be coordinated with the new proposed criterion 10 on hazardous substances.

Proposed revised criterion v1, September 2012
31.1. Filling materials consisting of textile fibres shall comply with the textile fibre criteria (1–9) where appropriate. 31.2. Filling materials shall comply with criterion 11 on ‘Biocidal or biostatic products’ and the criterion 26 on ‘Formaldehyde’. 31.3. 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

~~CURRENT CRITERION 32: COATINGS, LAMINATES AND MEMBRANES~~

Major proposed changes	○ Retention of the criterion as part of a new criteria section entitled 'components and accessories' ○ 32.3 is to be incorporated into Criterion 11 and 12
Present criterion, Decision 2009/567	
32. Coatings, laminates and membranes 32.1. Products made of polyurethane shall comply with the criterion set out in point 3.1 regarding organic tin and the criterion set out in point 3.2 regarding the emission to air of aromatic diisocyanates. *Assessment and verification*: As indicated in the corresponding criteria. 32.2. Products made of polyester shall comply with the criterion set out in point 8.1 regarding the amount of antimony and the criterion set out in point 8.2 regarding the emission of VOCs during polymerisation. *Assessment and verification*: As indicated in the corresponding criteria. 32.3. Coatings, laminates and membranes shall not be produced using plasticisers 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.

Alternatively, classification may be considered according to Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (1). In this case no substances or preparations may be added to the raw materials that are assigned, or may be assigned at the time of application, with and of the following hazard statements (or combinations thereof): H351, H350, H340, H350i, H400, H410, H411, H412, H413, H360F, H360D, H361f, H361d H360FD, H361fd, H360Fd, H360Df, H341.

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

AHWG1 technical discussion

No change is currently proposed for this criterion.

Feedback from stakeholders

No feedback was received from stakeholders

Proposal

It is proposed that the wording is coordinated with the proposed new Criterion 12 and with any revision to the criteria for polyester and elastane.

Proposed revised criterion v1, September 2012
32. Coatings, laminates and membranes 32.1. Products made of polyurethane shall comply with the criterion set out in point 3.1 regarding organic tin and the criterion set out in point 3.2 regarding the emission to air of aromatic diisocyanates. *Assessment and verification*: As indicated in the corresponding criteria. 32.2. Products made of polyester shall comply with the criterion set out in point 8.1 regarding the amount of antimony and the criterion set out in point 8.2 regarding the emission of VOCs during polymerisation. *Assessment and verification*: As indicated in the corresponding criteria. 32.3. Coatings, laminates and membranes shall not be produced using plasticisers or solvents which are assigned any of the classifications listed in Criterion 12. ~~not be produced using plasticisers 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.~~ ~~Alternatively, classification may be considered according to Regulation (EC) No~~

~~1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (1). In this case no substances or preparations may be added to the raw materials that are assigned, or may be assigned at the time of application, with and of the following hazard statements (or combinations thereof): H351, H350, H340, H350i, H400, H410, H411, H412, H413, H360F, H360D, H361f, H361d H360FD, H361fd, H360Fd, H360Df, H341.~~

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

Summary of the final proposal

The criterion has been moved under the heading of ‘Components and accessories’. Plasticisers are now addressed within the Criteria 13 and Appendix 1 Restricted Substance List, which contains a list of restricted phthalates. Fluoropolymer membranes, which are used in outdoor clothing for breathability and water proofing, are also addressed within the RSL.

~~CURRENT CRITERION 33: ENERGY AND WATER USE~~

Major proposed changes	○ Replacement with proposed new Criterion 13: Dyeing, printing and finishing process efficiency
Present criterion, Decision 2009/567	
The applicant shall provide data on water and energy use for the manufacturing sites involved in wet processing. *Assessment and verification:* The applicant is requested to provide the above mentioned information.	

AHWG1 technical discussion

The wording of the criterion makes it impossible to benchmark the data from different productions sites. A number of key environmental impacts relating to energy and water consumption arising from production were highlighted in the Preliminary report. By collecting and reporting the data it gives the producer a very useful tool to manage their energy and water consumption and to then use this data to implement improvements. It is possible that the criteria could be updated as part of the proposed new Corporate Social Responsibility (CSR) criteria.

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback
Stakeholders were split between retention of the criterion and incorporation into the proposed Corporate Social Responsibility (CSR) criteria.

Follow-up research and proposed approach

The issue of energy and water use has been extensively investigated as part of the background to proposed new Criterion 13, which is intended to address more comprehensively the potential for reductions in energy, water and chemical use by using BAT techniques.

Proposal:

That the criterion is replaced by the proposed new Criterion 13

Proposed criterion revision v1, September 2012
Replacement and updated by the proposed new Criterion 13: Dyeing, printing and finishing process efficiency.

4.3 FITNESS FOR USE CRITERIA

The following criteria apply either to the dyed yarn, the final fabric(s), or the final product, with tests carried out as appropriate. “Appropriate” in this case means that all products shall be tested according to the criteria 34 – 39 (plus the new criteria proposals) unless the product type is explicitly excluded. If a product does not meet the fitness for use criteria or the test methods are not suited for it, the product is not then eligible for the EU Ecolabel.

CURRENT CRITERION 34: DIMENSIONAL CHANGES DURING WASHING AND DRYING

Major proposed changes	○ The limits for dimensional changes are to be harmonised with the Blue Angel ○ The reference to bathroom linen, including terry towel products is to be clarified. ○ An industrial laundry testing standard is to be added for commercial textiles
Present criterion, Decision 2009/567	
The dimensional changes after washing and drying shall not exceed: - plus or minus 2% for curtains and for furniture fabric that is washable and removable, - more than minus 8% or plus 4% for other woven products and durable non-woven, other knitted products or 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 standards EN ISO 6330, ISO 5077 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,	

AHWG1 technical discussion

This criteria was not altered in the last revision. It was suggested to lower the tolerance and to remove the possibility to exceed the tolerance if the dimension change was clearly listed on the product label. None of these suggestions were implemented in the final document.

Feedback received in the first questionnaire from the German Competent Body suggested a change to the limits to the following based on discussion with producers regarding the limits in the Blue Angel label. These changes would reflect the criteria in the Blue Angel (RAL-UZ 154).

Table 4.3.1 Blue Angel tolerances for dimensional change

Textile products or type of material	**Dimensional changes during washing and drying**
for curtains and for furniture fabric that is washable and removable	+/- 2 %
knitted fabrics	+/- 4 %
Chunky knit	+/- 6 %
For bathroom linen, including terry towelling and fine rib fabrics	+/- 7 %
Interlock	+/- 5 %
Woven fabrics: Cotton and cotton mix wool mix synthetic fibres	 +/- 3 % +/- 2 % +/- 2 %

AHWG1 stakeholder feedback and follow-up research

Stakeholder feedback
The first AHWG requested clarification as to whether the criteria covers bathing cloths.

Proposal:

Harmonisation with the dimensional changes contained within the Blue Angel is proposed. The criterion applies to all products.

Proposed revised criterion v1, September 2012

The dimensional changes after washing and drying shall not exceed:

Textile products or type of material	Dimensional changes during washing and drying
for curtains and for furniture fabric that is washable and removable	+/- 2 %
knitted fabrics	+/- 4 %
Chunky knit	+/- 6 %
Towels and fine rib fabrics	+/- 7 %
Interlock	+/- 5 %
Woven fabrics: Cotton and cotton mix wool mix synthetic fibres	 +/- 3 % +/- 2 % +/- 2 %

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 standards EN ISO 63 30, ISO 5077 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.

AHWG2 stakeholder feedback and follow-up research

Stakeholder feedback

A Competent Body requested that terry toweling be specifically referred too under bathroom linen. Feedback from an existing licenseholder who manufactures towels and washcloths suggests that the original tolerance of +/- 8 for bathroom linen is normal and acceptable for these products.

Follow-up research and proposed approach

It was also noted in wider follow-up discussions with commercial licenseholders that the criteria currently only covers domestic laundry temperatures. It might therefore be appropriate to add reference to commercial laundry standard ISO 15797 which tests dimensional changes at higher temperatures [232].

Proposal:

- It is proposed to revert to the original value of +/-8 for bathroom linen.
- The commercial laundry standard ISO 15797 is to be used for assessment and verification where appropriate.

[232] ISO 15797: 2002, *Industrial washing and finishing procedures for the testing of workwear*.

CURRENT CRITERION 35: COLOUR FASTNESS TO WASHING

Major proposed changes	○ No change is proposed
Present criterion, Decision 2009/567	
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 (in so far 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).	

AHWG1 technical discussion

This criterion was not changed in the last revision. Only the wording of the text was made more clear and in line with the text in the standard ISO-105-C06. Comments from the initial stakeholder questionnaire indicated that the present level is appropriate. The criterion is almost similar to the criterion in the Blue Angel. The only difference is more exacting requirements for indigo dyed denim (see Blue Angel point 3.4.2).

Stakeholder feedback

Limited feedback was received. No changes were proposed.

Proposal:

<u>It is proposed to leave this criterion unchanged.</u>

CURRENT CRITERION 36: COLOUR FASTNESS TO PERSPIRATION (ACID, ALKALINE)

Major proposed changes	○ No changes are proposed
Present criterion, Decision 2009/567	
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 colored (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).	

AHWG1 technical discussion

This criterion was not changed in the last revision. Comments from the initial stakeholder questionnaire indicated that the present level is appropriate. The criterion is similar to the criterion in the Blue Angel.

Stakeholder feedback Limited feedback was received from stakeholders. No change was proposed.

Proposal:

No major changes to the criterion are proposed. A reference to silk at a 20% content level is to be deleted as it would not be applicable to the EU Ecolabel.

Proposed revised criterion v1, September 2012
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 colored (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).

CURRENT CRITERION 37: COLOUR FASTNESS TO WET RUBBING

Major proposed changes	○ No change is proposed
Present criterion, Decision 2009/567	
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.	

AHWG1 technical discussion

This criterion was not changed in the last revision. Comments from the initial stakeholder questionnaire indicated that the present level is appropriate. The criterion is similar to the first part of criterion in the Blue Angel (point 3.4.4 include both wet and dry rubbing).

Stakeholder feedback
Limited feedback was received from stakeholders. No change was proposed.

Proposal:

No change is proposed to the criterion.

CURRENT CRITERION 38: COLOUR FASTNESS TO DRY RUBBING

Major proposed changes	○ No change is proposed
Present criterion, Decision 2009/567	
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.	

AHWG1 technical discussion

This criterion was not changed in the last revision. Comments from the initial stakeholder questionnaire indicated that the present level is appropriate. The criterion is similar to the last part of criterion in the Blue Angel (point 3.4.4).

Stakeholder feedback

Limited feedback was received from stakeholders. No change was proposed.

Proposal:

No change is proposed to the criterion.

CURRENT CRITERION 39: COLOUR FASTNESS TO LIGHT

Major proposed changes	○ No change is proposed
Present criterion, Decision 2009/567	
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.	

AHWG1 technical discussion

This criterion was not changed in the last revision. Comments from the initial stakeholder questionnaire indicated that the present level is appropriate. The criterion is similar to the criterion in the Blue Angel.

Underwear is not covered by the criterion. The reason for this is that is not exposed as much to the sun as other kind of clothing. Some license holders have stated that the same argument could be used to exempt baby clothing since they do not normally come into contact with direct sun for long periods. It has therefore been suggested that baby clothing in general is exempted from this requirement.

Stakeholder feedback

Limited feedback was received from stakeholders. No change was proposed.

Proposal:

No major changes to the criterion are proposed. A reference to silk at a 20% content level is to be deleted as it would not be applicable to the EU Ecolabel.

Proposed revised criterion v1, September 2012
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.

New Criterion: Durability Of Surface Finishes

New criterion proposal	○ A new criterion which would require durability of function, to encompass easy care, softeness, water repellency and flame retardancy; ○ Testing would be based on relevant ISO and BS standards for the cleaning of fabrics

Proposed criterion text v1, September 2012

Surface finishes that impart a functional benefit to the textile product should achieve a high level of durability. Finishes addressed by this criterion are easy care, softeners, water repellency and flame retardancy. The following requirements apply:

- Flame retardant and water repellent finishes should retain xx% of their functionality after 50 wash cycles at 40^{o}C, or as specified within the relevant standards listed below.
- Softeners intended to improve the handle of fabrics and easy care finishes intended to reduce the need for ironing should retain xx% of their functionality after x wash cycles at 40^{o}C.

For water repellents and flame retardants consumers should be provided with guidance as how to maintain the functionality of the coatings applied to the product.

Textile fibres, fabrics and membranes that lend the final product intrinsic functional properties are exempt from these requirements.

Assessment and verification: The applicant shall provide reports from tests carried out according to ISO 6330:2001 (+ 2009 A1) and BS 5852. For products with intrinsic properties applicants shall provide test reports demonstrating a high level of comparable performance with alternatives which may be applied as finishes.

AHWG2 technical discussion

Here we present the initial background research and argumentation circulated in advance of the first ad-hoc working group meeting in September 2012.

Stakeholders commented during the first AHWG that the durability of finishes such as flame retardants should be a consideration. They also commented that the fitness for use criteria should take a broader approach to the durability of textile products. The current criteria have a significant focus on dye fastness under various conditions. A number of other functional finishes may be applied to the final textile product, with their fastness depending upon their distinct chemistry and how the garment is used.

Concerns about the environmental impact of finishes such as flame retardants and water repellents can largely be seen to relate to two stages in a textile products' lifecycle:

- Use phase: Leaching of the finish into the environment or onto the consumer during use. This could occur as a result of environmental conditions or during laundering. The exposure paths for some surface finishings are addressed by the current Ecolabel criteria. For example, the current flame retardant criteria require covalently bonded finishes. Finishes may also be used about which there is currently uncertainty as to their environmental impact and which may not currently be classified under CLP.
- End of life phase: If a product is landfilled or incinerated. Studies have demonstrated that textiles raise significant concerns in relation to hazardous emissions and that a contributor may be the thermal degradation of finishes and treatments [233].

The proposed Criteria 10-12 on Hazardous substances introduce a horizontal approach to the restriction of substances may be hazardous to consumers. However, information about the hazards associated with many chemical formulations is imperfect and may change over time as new scientific evidence is brought forward.

Evidence suggests that the fastness and durability of functional finishes applied to a product are likely to influence both the rate of leaching into the environment and the

[233] Abad.E, Adrados,M.A, Caixach,J, Fabrellas,B.and J. Rivera, *Dioxin mass balance in a municipal waste incinerator*, Chemosphere 40 (2000) 1143-1147

lifespan of a product [234]. On this basis it is proposed to introduce a new Fitness for use criteria that aims to ensure a high level of durability. This would reduce the risk of exposure of consumers and the environment from leaching during use and during the re-application of finishes (if this is feasible). It could also extend the life of products which consumers may choose to dispose of if their functionality has diminished.

Expert literature concerning durability and specialist manufacturers of flame retardant and water repellent finishes suggest that between 50 and 100 wash cycles [235] or resistance to boil temperatures or dry cleaning may be suitable benchmarks for a flame retardant or water repellent durable finish. Relevant testing standards appear to be:

- ISO 6330:2001 (+ 2009 A1) which specifies textile washing and drying procedures
- BS 3426:36 which specifies testing for the stability of coated fabrics to domestic washing.

Further information is required on applicability to softeners and easy care, which may have a shorter lifespan of 5-10 wash cycles [236], as well as possible thresholds for the deterioration of finishes. Deterioration upon folding and creasing could also be a relevant consideration.

For some functions it is also the case that fibres, fabrics or membranes have been developed that minimise or avoid the need for surface finishes [237] :

- inherently flame retardant fibres (such as WL Gore's Pyrad laminate [238]),
- densely woven cotton (such as Ventile fabric [239]),

---

[234] See Lacasse, K and W, Bauman (2004) *Textile chemicals*, Springer-Verlag *and* Swedish National Chemicals Inspectorate, Chemicals in textiles – report of a Government Commission, Report No.5/97,

[235] USA National Research Council (2000) *Toxicological risks of selected flame retardant chemicals*, Sub-committe on flame-retardant chemicals, Committee on toxicology, National Research Council

[236] Momentive, *Magnasoft SRS70 softener*, Product datasheet

[237] DuPont, *Inherent versus treated flame retardant fabrics*, Accessed 2012, http://www2.dupont.com/personal-protection/en-us/dpt/article/flame-resistant-technology.html

[238] Gore Protective Fabrics, *Pyrad flame retardant*, Accessed 2012, http://www.goreprotectivefabrics.com/remote/Satellite/Military-Gore-Pyrad/GORE-PYRAD-Product

[239] Ventile Fabrics, Accessed 2012, http://www.ventile.co.uk/

- modal viscose fibres (such as Lenzing's MicroModal fibres [240]),
- polyester-cotton blends (such as 'easycare' labelled products)
- weatherproof membranes (such as Schoeller Dry Skin membranes [241]).

These products reduce the need for finishes as well as associated curing processes, which are energy and water intensive. The criteria could therefore be used to promote the selection of alternative functional solutions.

[240] Lenzing, *MicroModal*, Accessed 2012, http://www.lenzing.com/en/fibers/lenzing-modal/micromodalr.html

[241] Schoeller, Accessed 2012, http://www.softshell.ch/en/fabric-groups/soft-shell/schoellerR-dryskin.html

AHWG2 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

Fibre additives are incorporated into fibres which have been tested to last more than 50 wash cycles. It was also noted that not all finishes are intended to remain on the fibre e.g. those applied to enable efficient spinning. The current wording should distinguish between functions incorporated into a fibre and those added to the surface. Durability therefore not only applies to surface finishes.

It was noted that if the durability of a textile product is high then it will improve its life cycle performance and increase its value and potential for re-use.

See also feedback summarised under Criteria 28: Flame retardants

Proposals:

The following proposals reflect feedback from stakeholders and follow-up research:

- Introduce soak test standard BS 5651:1989 for textiles that are not machine washed (see Criteria 28 discussion)
- Change the name of the criteria to 'durability of function' together with a broader reference to finishes, treatments and additives.
- Introduce test standard for easy care based on ISO 7768 which measures retention of appearance. Propose SA-4 as minimum standard.
- Addition of ISO 15797 industrial laundry standard as appropriate to textiles that will be cleaned in commercial laundries at higher temperatures.

AHWG3 stakeholder feedback and follow-up research

Here we present a summary of feedback received following the second ad-hoc working group in Brussels on the 23rd April 2013, together with follow-up research and the resulting final criteria proposal.

Stakeholder feedback

It was highlighted by an industry stakeholder that if the durability of a textile product is high then it will improve its life cycle performance and increase its value and potential for re-use. For workwear wear/tear is a much more significant cause of product failure than loss of function through washing.

It was highlighted that not all finishes are intended to remain on the fibre e.g. those applied to enable efficient spinning. The current wording should therefore distinguish between functions incorporated into a fibre and those added to the surface.

The concept of 'Semi-durable' flame retardants was not accepted by some industry stakeholders e.g. soak test.

A quantitative test for softness cannot be specified, it can only therefore be based on a subjective panel, and the consumer in general accepts low durability

Follow-up response and final proposal

Detailed technical comments were received for each of the functions defined within the criteria proposal. These comments are dealt with in turn in table 4.3.2 below.

Table 4.3.2 Summary of technical comments by function

Function	Stakeholder comments	Proposed response
Water, oil and stain repellency	Waterproof technical garments may only be washed by consumers up to 10 times in their lifetime.	A report commissioned by the Outdoor Industry Association was consulted in order to refine the performance and test method [242]. The report defines expected performance ratings for a range of performance clothing. Ratings have been introduced for water, dirt and stain repellency relating to specific ISO standards. 20 wash cycles are specified.
	Workwear products will not maintain their functionality after 50 wash cycles at 75°C. Moreover, the industrial laundry cycle temperature of 75°C should be lowered to 60°C for technical fabrics with taped seams.	The number of wash cycles for commercial products has been reduced down to 10. The standard test method specified by ISO 10528 is at 75°C. An exclusion for garments with taped seams has been added.
	It was proposed that a residual performance level after washing should be not below 60% of original	The proposals for retention of functionality are all greater than or equal to 60%.

[242] Zero Discharge Coalition, *Durable Water and Soil Repellent Chemistry in the Textile Industry – A Research Report*, November 2012

	To extend the durability a re-proofing process may be needed. In addition to the washing condition it should be specified the drying conditions (e.g. including ironing) to reactivate the function.	Drying conditions and associated test standards have now been added. The criteria additionally states that *'consumers should be provided with guidance on how to maintain the functionality of finishes'.*
Flame retardancy	The function of flame retardant fabrics should be fully retained after either 20 or 50 wash cycles at 75°C.	The aim of the criteria is to both extend the lifespan of a garment whilst also minimising leaching and the need to re-apply the finish. Examples have been provided of flame retardants incorporated into synthetic fibres which have been tested to last more than 50 wash cycles. It is therefore proposed to maintain a strict requirement in order to incentivise inherent function.
	Semi-durable flame retardants would reduce the fire safety performance of interior textile products. Curtains, drapes and upholstery textiles have to be cleaned to remove dust and dirt as they result in poor testing results.	The flame retardant industry has highlighted the relevance of semi-durable standards for interior textiles. It is not clear that products exist on the market that are durable.
	For workwear which drying conditions should be specified in case the textile is labelled with both tunnel finisher and tumble drying.	A final limited consultation is required with industry stakeholders.

Easycare	A performance level of SA-3 would be more appropriate for garments with a high content of natural fibers	The performance standard has been reduced accordingly.
	Why are only 10 domestic wash cycles specified for Easycare? This value does not seem to be demanding in the light of possible formaldehyde concentrations.	The rating is understood to represent a very good performance for Easycare based on industry input. Moreover, the ISO 7768 standard specifies 5 wash cycles.
Softness	Softness can only be assessed quantitatively by a panel of evaluators and there appears to be no common recognised standard	This comment is supported by research from earlier in the process. It is therefore proposed to withdraw the sub-criteria.

Summary of final criteria proposal

The final proposal introduces durability standards for the following functions which are of a high level of concern from stakeholders in relation to their potentially hazardous nature :

- Water, oil and stain repellents,
- Flame retardants,
- Easycare.

The aim of the criteria is to extend the lifespan of a garment whilst also minimising leaching and the need for re-application of additives or surface coated finishes. In relation to the latter point the criteria also supports a number of hazardous substance derogations in Criteria 14.

Products which have an inherent function due to their design or chemistry are exempted in order to incentivise durable product design.

Test methods are specified throughout that are based on the washing and drying of products followed by assessment and rating of the retained function. Methods are specified for both domestic and industrially washing and dyring in order to ensure wide applicability.

New Criterion proposal: Resistance to pilling

New criterion proposal	○ A new criterion which would require resistance to surface pilling of polyester fleece and knitted wool and/or acrylic products ○ Testing would be based on ISO standard series for the pilling of knits and fabrics
Proposed criterion text v1, September 2012	
Non-woven fabrics made of polyester and knitted fabric made of wool and/or acrylic shall resist pilling to a standard of 4. Assessment and verification: The applicant shall provide test reports using the following test method: ISO 12945-2	

Rationale and proposal

The proposal is derived from the earlier, more comprehensive 'design for durability' criteria which included reference to resistance to piling. Piling is the formation of balls of fibre or 'pills' on the surface of a fabric as a result of abrasion. The result is a visible, localised deterioration of the garments appearance which may result in early discard by the consumer. Recent consumer studies by Which?, WRAP [243] and NICE [244] have highlighted the role that physical appearance in consumers decisions to discard clothing.

Wool, cotton, acrylic and polyester have a tendency to pile. It is also understood that knitted panels and non-woven fabrics made from staple synthetic fibres have a greater propensity to pile because they may be more brittle, particularly where the fibre contains recycled content which makes the fibre less homogenous and more prone to breakage.

[243] WRAP (2011) *Valuing our clothes*, UK

[244] Laitala,K and I,Grimstad Klepp, *Improvements in design and quality for promoting sustainable use*, National Institute for Consumer Research (SIFO), Norway

The reduction of prevention of pilling has been the subject of ongoing research and development by industry [245]. Singeing, enzymes or chemical fixing can be used by manufacturers to reduce pilling [246] . The tightness of fabric weave can also be increased. It also understood that fibre manufacturers have modified the chemical structure of fibres in order to produce 'low pill' fibres. Many of these techniques have the disbenefit of reducing the softness and handle of the fibre.

AHWG3 stakeholder feedback and follow-up research

Here we present a summary of feedback received following the second ad-hoc working group in Brussels on the 23rd April 2013, together with follow-up research and the resulting final criteria proposal.

Stakeholder feedback

General feedback suggested that a standard of 3-4 would represent a high level of performance. High standards of abrasion resistance are demanded for commercial fabrics.

It was commented by a testing institution that using ISO 12945-2 the requirement should be 3. 4 is not practical with this method and the industry standard is now the part 2 (Martindale) method.

It was commented that the Martindale method is not suitable for knitted garments, with the pill box method being more appropriate. In this case a rating of 4 would still be appropriate.

A (Pill Box) rating of 4 was considered too difficult to meet for pure new wool and wool acrylic blends. A rating of 2-3 is proposed as a good and achieveable performance.

Polyamide tights and leggings would require a different rating. A rating of 2 was proposed.

It was commented by a Member State that the reference to cotton fabrics would not apply to all forms of products, for example towels, so this should be reviewed for its selectivity.

[245] Du Pont (2009) *Understanding the science of pilling - the untold story*,

[246] Lacasse, K and W, Bauman (2004) *Textile chemicals*, Springer-Verlag

Summary of the final proposal

The final proposal requires a minimum rating of 3 for wool, cotton and polyester fabrics, knits and blends. Polyamide tights and leggings are required to achieve a minimum rating of 2. This targets the knits and fabrics with the greatest propensity to pill.

For the purpose of testing the criteria istinguishes between non-woven fabrics and knits and woven fabrics. Two different testing methods are specified based on the ISO 12945 series.

New Criterion proposal: Wash resistance and absorbency of cleaning products

New criterion proposal	○ A new criterion which would require cleaning products to be resistant to repeated washing and to demonstrate a high level of absorbency ○ Testing would be based on EN ISO standards for wash cycles and absorbency
Proposed criterion text v1, September 2012	
Cleaning products shall be wash resistant and absorbent according to the relevant testing parameters identified in table *4.3.2* and *4.3.3*. Products that are formed from twisted yarn shall be excluded from the requirements of this criteria. Assessment and verification: the applicant shall provide test reports using the following test methods as relevant: EN ISO 6330 and EN ISO 9073-6. Testing according to EN ISO 6330 shall be carried out using washing machine type A for all products and materials.	

Rationale and proposal

The proposal was put forward by a Competent Body which has a number of licenseholders that manufacture cleaning products such as mops and cloths.

The Nordic Swans criteria for non-woven cleaning products were reviewed as a starting point for selecting sub-criteria and test methods [247]. The Nordic Swan fitness for use criteria address the removal of dust and dirt, hygienic properties, abrasion and absorbtion. However, the test methods and verification for these qualities are unclear as some of them appear to be left open for discussion and agreement with applicants. Rating methods for the quality being measured are not always specified.

Based on consultation with a number of licenseholders, together with reference to marketing literature for consumer cleaning products of leading manufacturers such as Vileda, it was decided to focus on wash resistance and absorbency. Wash cycles according to EN ISO 6330 were specified for the level of wash resistance. The test specifications are provided in table 4.3.2.

[247] Nordic Ecolabelling, *Fabric cleaning products containing microfibers*, Version 2.0, October 2010

Table 4.3.3. Values and parameters for the wash resistance of cleaning products

Textile cleaning products or type of material	Numbers of washes	Temperature	EN ISO 6630 test reference
Woven and non-woven products for wet cleaning	80	40 °C	Procedure 4N
Microfibre products for dusting	200	40 °C	Procedure 4N
Products deriving from recycled textile fibres	20	30 °C	Procedure 3G
Mops for washing floors	200	60 °C	Procedure 6N
Cloths for washing floors	5	30 °C	Procedure 3G

For absorption EN ISO 9073-6 specifies a test method for non-wovens. This was selected as being suitable for the a range of cleaning products, with the exception of products made from twisted yarn, which is not possible to test according to the standard.

In order to determine absorption times for the cleaning products within the scope a short run of testing was commissioned by an Ecolabel Competent Body using three products from existing licenseholders and a further four that have applied. Seven textile cleaning products belonging to the categories 'microfibre products for surface and floor cleaning' and 'woven and non-woven products for wet cleaning' were tested according to EN ISO 9073-6:2003 in a laboratory accredited to ISO 17025. The best performance of <10 seconds was selected as the basis for the criteria.

Table 4.3.4. Values and parameters for the absorbency of cleaning products

Textile cleaning products or type of material	Liquid absorbency time
Products deriving from recycled textile fibres	≤ 10 seconds
Microfibre products for surface and floor cleaning	≤ 10 seconds
Woven and non-woven products for wet cleaning	≤ 10 seconds
Products for washing floors	≤ 10 seconds

5.0 PROPOSALS FOR NEW CRITERIA AREAS

In this section new areas suggested to be included in the criteria document are discussed and presented. These are in addition to the proposed new Criterion 10-13 which address the requirements of Article 6(6) and 6(7) of the Ecolabel Regulation and the new fitness for use Criterion. The new criteria area proposed for this revision were:

- Supplier social responsibility
- Brand and retailer producer responsibility
- Consumer labeling advice

These new proposals were formulated in response to the findings from the preliminary report. Specific considerations in formulating the criteria were the LCA findings identifying the key areas of environmental impact associated with textile production, current industry best practices and consumer expectations.

Following feedback from the 2nd Ad Hoc Working Group it was decided to only take forward the Supplier social responsibility criteria area, aligned with the emerging recommendations of the Ecolabel Social Task Force.

5.1 Corporate Social Responsibility

New criterion proposal	○ Limited introduction of CSR into the ecolabel criteria, setting out minimum CSR and reporting standards ○ Provision to suspend licenses if non-compliance with minimum CSR standards is reported to Competent Bodies. ○ Addition of ILO Core Standard 155: Occupational safety and health. ○ Clarification that the criteria would apply to cut/make/trim production sites in the supply chain for the ecolabelled product.
Proposed criterion text v1, September 2012	
Applicants shall ensure that the fundamental principles and rights at work as specified in the - International Labour Organisation's Core Labour Standards shall be observed by all production sites used to manufacture EU Ecolabelled products. The ILO Core Standards are: *029 Forced Labour* *087 Freedom of Association and Protection of the Right to Organise* *098 Right to Organise and Collective Bargaining* *100 Equal remuneration* *105 Abolition of Forced Labour* *111 Discrimination (Employment and Occupation)* *138 Minimum Age Convention* *182 Elimination of the Worst Forms of Child Labour* *Assessment and verification: The applicant shall obtain reports on compliance from their production sites. These should be compiled and provided to Competent Bodies. Third party certification will be accepted as evidence of compliance.* *A license may be suspended or revoked if substantive evidence is received that ILO Core Labour Standards have been breached.*	

AHWG1 technical discussion

Here we present the initial background research and argumentation circulated in advance of the first ad-hoc working group meeting in February 2012.

Setting CSR criteria are relative new to the EU Ecolabel. But for the production of textiles CSR related issues are of great importance when it comes to customers expectations – which have become increasingly sensitised in recent years to social and environmental issues - and in order to avoid situations where EU Ecolabeled products may be produced by companies who have not addressed these issues. This could lead to bad press and, based on the recent experiences of a number of high profile brands and retailers [248], could reflect badly on the reputation of the EU Ecolabel.

CSR issues form an important part of the promotion of the Ecolabel to manufacturers in countries which supply the EU. In some countries where social and environmental standards may not be as high, organisations such as the United Nations Environment Programme (UNEP) are actively engaged in promoting the market opportunities created by the ecolabel [249]. Leading clothing retailers are also active in auditing their sub-suppliers performance due to the high consumer profile of these issues [250]. CSR criteria would re-enforce and reward this work.

This may be an area in which it will be difficult for the Competent bodies to evaluate documentation or to evaluate findings from audits. One possibility is therefore verification of compliance for productions sites by recognised third party assurance schemes. Schemes identified as being used by industry include:

- Business Social Compliance Initiative (BSCI)
- Global Social Compliance Programme (GSCP)
- Ethical Trading Initiative (ETI)

---

[248] The Guardian, *Gap, Next and M&S in new sweatshop scandal*, 8th August 2010, http://www.guardian.co.uk/world/2010/aug/08/gap-next-marks-spencer-sweatshops

[249] UNEP, *Enabling developing countries to seize ecolabel opportunities project*, Accessed 2012, http://www.unep.fr/scp/ecolabelling/

[250] See Marks & Spencer's Ethical Trading Policy http://corporate.marksandspencer.com/howwedobusiness/our_policies/ethical_trading *and* H&M's Code of Conduct http://about.hm.com/content/hm/AboutSection/en/About/Sustainability/Commitments/Responsible-Partners/Code-of-Conduct.html

- Fair Labor Association (FLA)
- Fair Wear Foundation (FWF)
- Social Accountability 8000 (SA8000)
- Worldwide Responsible Apparel Production (WRAP)
- Global Reporting Initiative (GRI)

Codes of Conduct included within these schemes specifically address human rights, labour rights, working agreements and salaries and occupational health and safety issues.

The ecolighting criteria were the first Ecolabel criteria to introduce a CSR criterion in which reference is made to basic CSR standards [251]. Criteria within environmental schemes such as GOTS, Oeko-tex 1000 and Bluesign also address CSR issues and, provided that third party verification has been carried out, could be used as a harmonised compliance route.

An option to use existing third party verification routes would reduce the workload of the Competent Bodies whilst still ensuring there is a focus on these areas and would force the producers to actively evaluate if they are in compliance with the suggested criteria. It is important to note, however, that verification systems and the associated level of assurance they provide varies, with some only able to provide second party verification following self-assessment. This is reflected in the recent grading of a number of schemes by clothing association MADE-BY [252]. In situations where declarations may be questioned Competent Bodies could request the documentation backing the declaration.

[251] Commission decision of 6 June 2011 on establishing the ecological criteria for the award of the EU Ecolabel for light sources

[252] MADE-BY, *Benchmark for social standards*, Accessed 2012, http://www.made-by.org/node/22

AHWG1 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 22nd February 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

Opposing views were expressed by stakeholders.

On one hand the proposals were supported because this is a high profile issue for consumers and textiles are imported from 'high risk countries'. Manufacturers supported the proposal because it fitted with their existing CSR policies. SA8000 was mentioned as an example of an existing scheme to which stakeholders are certified.

In contrast views were expressed that this criterion would be difficult to verify and would complicate certification given that 60% of textiles are imported and much of the remaining 40% is based on so-called 'grey' (unfinished) textile fabrics which are also imported.

In order to make the criterion manageable proposals included an ability to suspend licenses if a scandal occurs or non-compliance is reported, and third party proof of compliance based on the growing number of compliance schemes and reporting standards.

Follow-up research and proposed approach

Experience shared in the first meeting of the Ecolabel's Horizontal Task Force on Social Criteria has been used as the basis for further criteria development. The aim of the Task Force is to address if and how social criteria should be taken into account by the Ecolabel. The first meeting was held on the 5th March in Brussels. Experience was shared by Germany (representing the Blue Angel), Denmark (representing the Nordic Swan) and the Netherlands (Ministry of Infrastructure and the Environment presenting a GPP perspective):

- The Blue Angel has taken a view based on stakeholder opinion to focus on the International Labour Organisation's core conventions [253] which have been adopted as 'basic principles'. These conventions are contained within the ILO's Declaration on fundamental principles and rights and work [254]. Four tiers of verification were considered which ranged from self-verification to membership of multi-stakeholder initiatives. A key issue for them is the potential for this issue to result in scandals, therefore they have introduced the ability to terminate contracts (licenses) based on non-compliance and there are 'focal points' where stakeholders can submit complaints. Their experience is that process based verification is better than a pass/fail approach.
- The Nordic Swan has focused on minimum number of issues for compliance. Features of their approach are a requirement for open/public CSR reports and plans to audit against, a requirement for SA8000 compliance [255], and a license revocation option. Their experience is that is very difficult to comply fully with SA8000.
- The Netherlands have developed an approach to 'social public procurement' which is applied to larger contracts [256]. Their approach is based on, as a minimum, an annual requirement for supply chain risk assessment, self-declarations of 'reasonable endeavours' and/or certified performance against standards or codes established by supply chain initiatives. A list of supply chain initiatives that meet their qualifying criteria is published. Infringements reported by third parties or communities – so called countervailing powers – must be acted upon. Their research suggests that working hours and workplace safety pose the greatest risks.

[253] International Labour Organisation, *Conventions and recommendations*, Accessed 2012, http://www.ilo.org/global/standards/introduction-to-international-labour-standards/conventions-and-recommendations/lang--en/index.htm

[254] International Labour Organisation, *ILO Declaration on Fundamental Principles and Rights at Work and its Follow-up*, http://www.ilo.org/declaration/thedeclaration/textdeclaration/lang--en/index.htm

[255] Social Accountability International, SA8000 Standard, http://www.sa-intl.org/

[256] European Commission, First step for social criteria in procurement, December 2009, http://ec.europa.eu/enterprise/policies/sustainable-business/corporate-social-responsibility/reporting-disclosure/swedish-presidency/files/nat_laws_and_policy_init/nl_social_criteria_in_public_procurement_-_summary_en.pdf

A number of relevant principles and codes of conduct were also highlighted – including the UN 'Protect, respect, remedy' framework which promotes a due diligence approach, the UN Global Compact which is aimed at companies, OECD guidelines for multi-nationals, ISO26000 for multi-stakeholder reporting and industry initiatives such as BSCI and the CSR 2010 group.

It was also noted that the European Commission distinguishes between SME's and large companies in how they address this issue. DG Internal Market is preparing a new requirement for non-financial reporting by EU companies [257]. This will include social and environmental performance. Requirements will be graded by company size.

Key points of relevance to product criteria development were:

- There is no precedent for achieving or successfully evidencing 100% compliance;
- It is better to focus on incremental improvement against minimum standards than absolute requirements;
- Avoid requirements that create potential for scandals and build-in routes to take action if they occur (a safety net);
- Requirements for due diligence can be applied to larger companies, whilst requirements applied to SME's should be less onerous;
- Third party initiatives and certifications can play a role in reducing the burden for CP's/procurers but they are costly and may not always be meaningful.

Proposal:

It is proposed that minimum criteria based on adherence to the eight ILO Core Conventions are introduced. Reference will be made to the specific conventions, building on the approach taken by the Ecolighting criteria and reflecting the approach taken by the Blue Angel. Applicants will be required to report on compliance and progress.

[257] European Commission, *Non-financial reporting*, The Internal Market Directorate General, Accessed 2012, http://ec.europa.eu/internal_market/accounting/non-financial_reporting_en.htm

Competent Bodies would have the power to suspend licenses if significant breaches of ILO Conventions are reported and to revoke them if the breaches have been found to have occurred.

AHWG2 stakeholder feedback and follow-up research

Here we present a summary of feedback received at the second ad-hoc working group in Brussels on the 26th and 27th September 2012, together with follow-up research and the resulting proposals for further revision of the proposed criteria.

Stakeholder feedback

There was general support for the criteria as proposed. The proposal is pragmatic although the production sites to which it would apply requires clarifying – at the moment the wording implies only sites owned by the applicant.

It is important that we don't discriminate against EU manufacturers. The criteria is concerned more with manufacturing sites in developing countries.

The risk to the Ecolabel's reputation of any contraventions occuring should be considered – there are clearly risks with and without the criteria. But with this new criteria expectations would be raised.

The frequency of verification could be an issue. The Nordic Swan, for example, carries out control visits. An opinion was expressed that it is too early for verification by third party schemes. This could come later once there is greater experience with the criteria. Discussions with licenseholders in Denmark highlighted that they tend to have only limited control over their supply chain.

The ILO standard 155: Occupational safety and health should be added because of its relevance to textile manufacturing.

It was proposed that as a requirement within the main criteria that the sandblasting of denim be prohibited due to recent high profile campaigns which have brought to light the health problems it can cause to workers.

The following proposals for a further revision of the criteria are based on stakeholder feedback and follow-up research:

- Addition of ILO standard 155 addressing occupational health and safety: Health and safety has received greater attention as a result of a number of

high profile recent incidents at factories in Bangladesh and Cambodia supplying major EU brands and retailers such as H&M and Zara [258].

- Scope of the criteria: Clarification of the wording to state that the criteria applies to dyeing, printing, finishing and cut/make/trim stages of production for ecolabelled products,
- Frequency of verification: This shall take place upon application and subsequently during the license period for any new production sites.

A separate proposal to prohibit the sandblasting of denim has also been developed. The manual sandblasting of denim to achieve a distressed look is understood to place workers at risk of suffering from respiratory problems such as silicosis. A range of major clothing brands have supported anti-sandblasting campaigns and have begun closer audits of their suppliers. NGO organisations such as the Clean Clothes Campaign [259] have investigated the issue at production sites in far east and have campaigned for bans on both manual and mechanical sandblasting.

[258] BBC News, *H&M and Zara to sign factory safety accord*, 14th May 2013

[259] Clean Clothes Campaign, *Deadly denim: Sandblasing in the Bangladesh clothing industry*, http://www.cleanclothes.org/resources/publications/ccc-deadly-denim.pdf/view

AHWG3 stakeholder feedback and follow-up research

Here we present a summary of feedback received following the second ad-hoc working group in Brussels on the 23rd April 2013, together with follow-up research and the resulting final criteria proposal.

Stakeholder feedback

There remains strong support for maintaining social requirements within this product group and to single out relevant production sites in order to keep it manageable for applicants. Furthermore, it was requested to extend the scope to weaving and dyeing sites.

The criteria should make reference to the OECD Guidelines for Multi-national Enterprises and the United Nations Global Compact.

Third party verification is also supported in order to provide a high level of assurance. The level of comprehensiveness of the the reports compiled from production sites should be clarified. Some stakeholders felt that a signed code of conduct could be sufficient enough.

European production sites should not be deemed to meet all ILO criteria, as was proposed in the September draft criteria. There may, however, be an issue for EU production sites to comply because much of the focus for CSR audits is on production sites in the far east.

EU textile machinary manufacturers are understood to supply sandblasting equipment that minimises risks to workers. The process is enclosed and fully ventilated.

Scope of the criteria

Recent factory fires,collapses and health and safety incidents in the far east have highlighted the human risks associated with the most labour intensive parts of the textile supply chain, namely the final assembly of the product – the so-called 'cut/make/sew' stages [260]. This stage is also the focus of initiatives such as the Fair Wear Foundation [261].

[260] BBC News, *Can Bangladesh clothing factory disastors be prevented?*, 2nd May 2013, http://www.bbc.co.uk/news/business-22382329

Given concerns raised about the introduction of CSR criteria at the June 2013 EU Ecolabel Social Task Force meeting, a preference for strict verification requirements and uncertainty over the possible impact on licenses it is proposed to focus the criteria on the cut/make/sew stage. The scope can then be reviewed again at the time of the next revision.

Strictness of verification

A recent review of social compliance schemes by MADE-BY [262] and discussions at the STF suggest that rigorous verification would be required to ensure credibility. MADE-BY highlight the importance of independent verification by experienced auditors. Third party verification is also required by standards such as ISO 26000 and SA8000 and Codes of Conduct such as the Business Social Compliance Initiative (BSCI) and the Fair Wear Foundation.

Reference to equivalent Codes of Conduct

Within the textile industry our research suggests that ILO Labour Standards provide a common point of reference for the reporting and auditing of production sites, and they underpin an increasing number of voluntary initiatives, codes of conduct and certification schemes e.g. the Joint Initiative on Corporate Accountability and Workers Rights (JO-IN) [263], the US organisation WRAP which has a database of 1,850 certified sites [264]. Reference to the ILO conventions therefore allow a criteria to be formulated which can be verified via a range of existing initiatives.

In order to better position the criteria within the broader context of Corporate Social Responsibility it was recommended that reference be made to the OECD Guidelines for Multi-national Enterprises [265] and the United Nations Global Compact [266]. These

---

[261] Fair Wear Foundation, *Bangladesh: Strong voice for garment workers*, 10th July 2013, http://www.fairwear.org/534/news/news_item/bangladesh-strong-voice-for-garment-workers/?id=577

[262] See footnote 248

[263] JO-IN, *Joint Initiative on Corporate Accountability and Workers' Rights* http://www.jo-in.org/pub/about.shtml

[264] WRAP Apparel, *Worldwide Responsible Accredited Production*, http://www.wrapapparel.org/

[265] OECD, *Guidelines for multi-national enterprises*, http://mneguidelines.oecd.org/

two Codes of Conduct have been reviewed and whilst they have a much broader scope than the ILO Core Labour Standards there are clear areas of overlap which could be recognised.

On this basis it is proposed that Codes of Conduct and Standards that are deemed to be equivalent are listed in the User Manual.

Summary of the final proposal

The final criteria requires cut/make/sew production sites used to make ecolabelled products to comply with the fundamental principles and rights of work that form the basis for the ILO Core Labour Standards and which are included within the UN Global Compact and the OECD Guidelines on Multi-National Enterprises.

In addition compliance with ILO labour standard 155 addressing occupational health and safety would be required, reflecting stakeholder concerns following major recent incidents at factories supplying major clothing brands.

In order to provide a high level of assurance compliance third party verification is required. Additionally the Ecolabel license may be suspended or revoked if substantive evidence is received by Competent Bodies of non-compliance. The latter if considered by Member States to be an essential safety net for the criteria.

A list of equivalent Codes of Conduct and Standards would be listed in the User Manual and, given the increasing activity in this area, kept up to date.

[266] UN, *Global Compact: The ten principles*, http://www.unglobalcompact.org/AboutTheGC/TheTenPrinciples/index.html