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# Revision of the EU Green Public Procurement (GPP) Criteria for Textile Products and Services

*Technical report with final criteria*

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**Title: Revision of the EU Green Public Procurement (GPP) Criteria for Textile Products and Services: Technical report with final criteria.**

Abstract
The revision of the Green Public Procurement (GPP) criteria for Textile products and Services is aimed at helping public authorities to ensure that textiles products and services are procured in such a way that it delivers environmental improvements that contribute to European policy objectives for energy, chemical management and resource efficiency, as well as reducing life cycle costs. In order to identify the most significant improvement areas for criteria development an analysis has been carried out of the environmental impacts of manufacturing and using textile products and providing textile services. The most commonly used procurement processes have been also identified and are further addressed in the separate criteria document (published as a Staff Working Document of the Commission). Together these two documents aim to provide public authorities with orientation on how to effectively integrate these GPP criteria into their procurement processes.

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# 1. INTRODUCTION

This document provides the evidence base information for the revision of the Green Public Procurement (GPP) criteria for textiles. The study has been carried out by the European Commission's Joint Research Centre (JRC B5) on behalf of the European Commission's Directorate General for the Environment.

The report also presents the final revised criteria which were developed taking into account, amongst other considerations, the revised EU Ecolabel textile criteria published in 2014. It records the discussions and feedback received from stakeholders during the revision process. It also identifies, based on the background technical analysis, new criteria areas for consideration in order to better address key environmental impacts of the product group. This includes a proposed new area of focus on textile services.

## 1.1 How the EU GPP criteria are structured and can be used

Green Public Procurement is a voluntary instrument. The criteria are divided into selection criteria, technical specifications, award criteria and contract performance clauses. For each set of criteria there is a choice between two ambition levels:

- The Core criteria are designed to allow easy application of GPP, focussing on the key area(s) of environmental performance of a product and aimed at keeping administrative costs for companies to a minimum.
- The Comprehensive criteria take into account more aspects or higher levels of environmental performance, for use by authorities that want to go further in supporting environmental and innovation goals.

The different types of GPP criteria that can be included in an Invitation to Tender (ITT) are described in the Buying Green handbook (EC, 2011) as:

- Selection criteria. When assessing ability to perform a contract, contracting authorities may take into account specific experience and competence related to environmental aspects which are relevant to the subject matter of the contract. They may also exclude operators who are in breach of environmental law in some cases, and - for service and works contracts only - ask specifically about their ability to apply environmental management measures when carrying out the contract.
- Technical specifications. These constitute minimum compliance requirements that must be met by all tenders. They need to be related to characteristics of the work, supply or service being purchased itself – and not to the general capacities or qualities of the operator. It is also very important that they are clear, understood by all operators in the same way and possible to be verified.
- Award criteria. These can be used to stimulate additional environmental performance without being mandatory and therefore without foreclosing the market for products not reaching the proposed level of performance.
- Contract performance clauses. These specify how a contract must be carried out. For supply contracts, the main opportunity for the use of environmental clauses is often to specify how the goods will be delivered.

## 1.2 Criteria definition and scope

In this section the current scope of the EU GPP criteria are compared and contrasted with the revised EU Ecolabel criteria of 2014. The findings from this comparison, together with feedback from stakeholders, are then used to formulate a new scope proposal.

### 1.2.1 The scope of the current EU GPP criteria

The current GPP textile criteria were published in early 2012. The criteria reflects the scope 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.

Moreover, for 'textile clothing and accessories' and for 'interior textiles', feathers, membranes and coatings need not be taken into account in the calculation of the percentage of textile fibres.

### 1.2.2 The scope of the revised EU Ecolabel criteria

The revised EU Ecolabel criteria have a modified scope which is expanded to define three categories of product and two additional categories of intermediate products:

*(a) Textile clothing and accessories: clothing and accessories consisting of at least 80 % by weight of textile fibres in a woven, non-woven or knitted form;*

*(b) Interior textiles: textile products for interior use consisting of at least 80 % by weight of textile fibres in a woven, non-woven or knitted form;*

*(c) Fibres, yarn, fabric and knitted panels: intended for use in textile clothing and accessories and interior textiles, including upholstery fabric and mattress ticking prior to the application of backings and treatments associated with the final product;*

*(d) Non-fibre elements: zips, buttons and other accessories that are incorporated into the product. Membranes, coatings and laminates;*

*(e) Cleaning products: woven or non-woven fabric products intended for the wet or dry cleaning of surfaces and the drying of kitchenware.*

Cleaning products and non-fibre items such as zips, buttons and accessories were added as specific new sub-categories. The change to an 80% weight threshold was intended to align the EU Ecolabel with the Textile Names Directive (EU) 1007/2011 which regulates the labelling of textiles. In Article 3 of the Decision the exemptions were also modified to include linings and paddings of the kind that can be found in uniforms and suits:

> *'For 'textile clothing and accessories' and for 'interior textiles' fillings, linings, padding, membranes and coatings made of fibres included in the scope of this Decision need not be taken into account in the calculation of the percentage of textile fibres.'*

Moreover, the scope of the textile fibres addressed by the criteria is now defined as follows:

*(a) 'textile fibres' means natural fibres, synthetic fibres and man-made cellulose fibres;*

*(b) 'Natural fibres' means cotton and other natural cellulosic seed fibres, flax and other bast fibres, wool and other keratin fibres;*

*(c) 'Synthetic fibres' means acrylic, elastane, polyamide, polyester and polypropylene;*

*(d) 'Man-made cellulose fibres' means lyocell, modal and viscose.*

This was based on a view amongst stakeholders to clearly exclude textile fibres for which no ecological criteria were set, with silk and aramids being cited as examples.

### 1.2.3 Stakeholder feedback on the current GPP criteria scope

Feedback on the current scope of the EU GPP criteria was invited from stakeholders during the EU Ecolabel revision process. The main comments received are briefly summarised in Box 1.

*Box 1. Summary of stakeholder feedback on EU GPP textile criteria scope*

*Q1. Is the current scope clear and adequate?*

The general view was that the scope was clear but views differed on whether they are adequate.

The need to focus on specific products was highlighted e.g. work wear, emergency services, healthcare.

Applications differ significantly, and it was questioned whether these could be adequately assessed with one set of criteria.

*Q2. Are there any areas where you think the scope should be more specific to reflect GPP procurement priorities?*

There is a need to identify specific GPP related products and end-uses e.g. clothing/work wear, work wear cleaning services, interior office decoration (wall-, floor-, window coverings), bedclothes.

Additional feedback received from the GPP Advisory Group was that textile services was an increasing area of focus. Some countries such as the UK, the Netherlands and Denmark are working with the sector and/or are looking to incorporate such a focus into new national GPP criteria. Moreover, it was highlighted that the Nordic Swan eco-label has a specific criteria set addressing textile services.

### 1.2.4 Defining textile services

A number of stakeholders highlighted the importance of addressing textile services within the scope of the revised criteria. As an example, the Dutch Work wear criteria[1] include provision for services within their scope, defining them as:

> *'logistical services (systems for the provision of work wear), measurement taking, repairs, stock management and design.'*

A separate criteria set has also been developed for 'Workwear cleaning services' with the suggestion that the two sets can be combined for certain types of services contracts.

[1] Dutch Ministry for Infrastructure and the Environment, *Criteria for the sustainable procurement of Work wear*, Version 1.3, October 2011

Based on this feedback, together with a review of literature published by the European Textile Services Association (ETSA), several possible elements of textiles services contracts can be described, namely:

- Laundry – The procuring authority owns the textile products, is responsible for their maintenance but contracts out their cleaning (either in the form of laundry or dry cleaning). Collection and delivery are typically included within such a contract;
- Maintenance - The procuring authority owns the textile products and contracts repair services intended to extend their useful life span. Typical examples of repair operations would be the replacement of small items like buttons and zippers, fabric panel replacement and the retreating/reproofing of functional coatings;
- Take-back – A service provider is contracted to collect and sort the textile products (which are the property of the procuring authority) in order to ensure specified End-of-Life management objectives. The procuring authority waivers the property of the textile products at the moment of their collection;
- Renting – In this type of contract the procuring authority benefits from use of the textile products covered by the contract but their ownership remains with the service provider. These contracts typically involve cleaning services as well. A typical example would be the supply of clean bed sheets to a hospital. In this contract the service provider would collect used bed sheets from the hospital, clean and iron them (and, if considered necessary, repair or replace them) and then deliver the cleaned bed sheets to the hospital.

There is the possibility of combining some of these types of contracts, as in a laundry and maintenance contract, for instance.

### 1.2.5 Proposal for a revised GPP textile scope

Revision of the scope definition for the EU Ecolabel for textile products implies the following modifications to the GPP scope definition:

- The inclusion of non-fibre accessories: Zips, buttons and other accessories that are incorporated into the product were included in the EU Ecolabel scope. Whilst accessories are of limited significance from a life cycle perspective (see Section 1.4) they should be included if they are of importance in relation to, for example, the repair of garments.
- Specific reference to membranes, coatings and laminates: These may be of particular importance for outdoor garments. Criteria within the EU Ecolabel now address the environmental impacts of certain types of membranes.
- Alignment of the weight threshold: The 90% weight threshold is proposed to be updated to 80% in order to align with the Textile Names Directive (EU) 1007/2011.

The scope also warrants further updating to introduce a specific focus on GPP textile applications. This would apply to items in (a) and (b) of the current GPP scope definition. In order to clearly indicate to specifiers and procurers of textiles within contracting authorities the relevance of the GPP criteria, it is proposed to introduce specific reference to products such as bed linen, towels, uniforms, work wear and Personal Protective Equipment (PPE). In relation to PPE, the Dutch work wear criteria specifically exclude PPE to which specific EU legislation applies – for example, high visibility garments. It is therefore proposed to include a note highlighting that performance specifications required under EU or national legislation shall take precedent.

The introduction of a new criteria area with a focus on textile services will also require a specific scope definition. Based on the discussion in Section 1.1.4, it is proposed to include in the scope the rental of textiles, maintenance, laundry services and end-of-life management. It is also proposed, based on input from stakeholders, to note that such services can offer life cycle cost and environmental benefits when compared to outright purchase.

*Final scope definition*

**GPP Criteria scope**

**Textile products**

The criteria for textile products encompass the following products, which include finished products as well as intermediate products and accessories:

- Textile clothing and accessories: uniforms, workwear, personal protective equipment (PPE)[2] and accessories consisting of at least 80 % by weight of textile fibres in a woven, non-woven or knitted form.
- Interior textiles: textile products for interior use consisting of at least 80 % by weight of textile fibres in a woven, non-woven or knitted form. This includes bed linen, towels, table linen and curtains.
- Textile fibres, yarn, fabric and knitted panels: intermediate products intended for use in textile clothing and accessories and interior textiles, including upholstery fabric and mattress ticking prior to the application of backings and treatments associated with the final product.
- Non-fibre elements: intermediate products that are to be incorporated into textile clothing and accessories, and interior textiles. This includes zips, buttons and other accessories, as well as membranes, coatings and laminates that form part of the structure of clothing or interior textiles and which may also have a functional purpose.

For the purposes of these criteria, textile fibres comprise natural fibres, synthetic fibres and man-made cellulose fibres. The scope of textile fibres for which GPP criteria are provided is as follows:

- natural fibres: cotton and other natural cellulosic seed fibres, wool and other keratin fibres;
- synthetic fibres: polyamide and polyester;
- man-made cellulose fibres: lyocell, modal and viscose.

[2] Performance requirements for PPE that are laid down in EU and/or national legislation take precedence over any GPP performance requirements.

**Textile services**

Textile services are included within the scope as they can offer environmental life cycle cost benefits when compared with outright purchase. Such services comprise, as a basic scope, laundry, maintenance and take-back services for textile products that may be owned by the contracting authority or provided as part of a rental arrangement. The different potential elements of a textile service for which environmental criteria are provided are defined as follows:

- Laundry: the collection, cleaning (using a wet or dry process) and return of textiles to specified standards of cleanliness and hygiene.
- Maintenance: the maintenance and repair of textile products in order to extend their useful life span. This includes the replacement of accessories and parts, fabric panel replacement and the retreating/reproofing of functional coatings.
- Take-back: the collection and sorting of textile products in order to maximise their reuse and/or recycling. The procuring authority waives ownership of any textile products at the moment of their collection.

## 1.3 Market analysis

A guide to socially responsible public purchasing published in 2007 by Eurocities and ICLEI highlighted the significant role of the public sector as purchasers of textiles and clothing, in particular work wear[3]. It has been estimated that a quarter of the workforce may be required to wear clothing provided by their employer[4]. Work wear was defined as including:

- Representative work wear (e.g. police uniforms)
- Functional work wear (e.g. for waste collection services)
- Protective clothing (e.g. for firemen)

Protective textiles – a subset of work wear – were highlighted by the EU Lead Market Initiative (LMI) as a key area for industrial innovation[5]. Public procurement of functional protective clothing for fire-fighters, emergency services, police forces and the military sector as well as for health care professionals in public hospitals was identified as a key market driver for innovation.

Other significant areas of procurement highlighted by best practice projects include bed linen and towels by health services and care facilities, interior textiles such as curtains and upholstery, and textiles used as part of general hygiene services for buildings – such as washroom handtowels[6].

An important factor to consider is that some public sector contracts are for textile services rather than textile products. Companies therefore tender to provide and maintain a supply of functional textiles to specification[7]. The contractor may then be responsible for the useful lifetime of the product and end-of-life management.

Statistics relating to the EU public procurement of textiles appear to be limited in their availability. For example, the Eurostat PRODCOM database does not distinguish public sector purchases. A number of high level estimates have been quoted by EU initiatives. The EU Lead Market Initiative (LMI) estimated that public markets for the textile and clothing

[3] ICLEI and Eurocities (2007) *RESPIRO guide on socially responsible procurement of textiles and clothing*
[4] Centre for Remanufacturing and Re-use, *An investigation to determine the feasibility of garment labelling to enable better end-of-life management of corporate clothing*, March 2009
[5] DG Enterprise and Trade, *Lead Market Initiative*, http://ec.europa.eu/enterprise/sectors/textiles/research-innovation/lead-markets/index_en.htm
[6] ETSA and Euratex (2006) *Handbook of textile purchasing: Success stories relating to textile service*, http://www.eco-forum.dk/textile-purchase/index_files/Page2479.htm
[7] European Textile Services Association, *Healthcare & hospitals*, http://www.etsa-europe.org/homefs.htm

industry may have a value in the order of 10 billion Euros/annum. Eurocities and ICLEI In 2008 estimated that the total turnover of companies in the EU15 selling workwear was €4 billion, approximately half of which was thought to be accounted for by public procurement.

An estimate of fabric consumption for seven EU countries - Germany, Belgium, Spain, France, UK, Italy, Netherlands – between 1990-2000 is presented in Table 1. Although the survey results are very dated, they are understood to still be relevant as a broad indication of the types of fibres consumed. The equivalent estimate for health services was 56,000 tonnes [8], making a comparison difficult because the assumption made for the standard width of cotton fabric was not noted by Promptex.

It is important to note that a number of significant public services were not included within the survey, for example local authority employed personnel involved in the direct delivery of services such as municipal waste management. More recent 2005 survey data for the same countries[9] is understood to be available but could not be located within the scope of this study.

*Table 1. Fabric consumption by major public services (average 1990-2000)*

| **Public service** | **Wool and blends (Thousand of metres)** | **Cotton and blends (Thousand of metres)** | **Synthetic and man-made fibres excluding blends (thousands of metres)** |
|---|---|---|---|
| Army | 4,590 | 15,699 | 1,140 |
| Fire brigades | - | 1,800 | 935 |
| Police | 1,685 | 501 | - |
| Post Office | 1,696 | 1,744 | 220 |
| Railway | 1,860 | 2,180 | 103 |
| *Total* | *9,831* | *21,924* | *2,398* |

Source: Promptex (2005)

The authors of the Promptex survey highlighted cotton and wool as being the most significant fibres procured, with synthetics (excluding natural-synthetic blends) accounting for only 7% of the market [10]. Blends such as poly-cotton and poly-viscose are understood, however, to be important because of their specific qualities e.g. to reduce laundering costs, enhanced fabric durability. Notably, the survey also highlighted that approximately half of the total procured value was awarded to manufacturers located outside of the EU.

A survey by Eurocoton of hospital textile use is also referenced by Promptex (2005). The findings illustrate the nature of cotton textile use in this public service. The estimated total annual use of 56,000 tonnes can be broken down into the following end-uses:

- Bed linen, 23,000 tonnes
- Bathroom linen, 12,000 tonnes
- Clothing, 10,000 tonnes
- Other articles (*medical devices*), 11,000 tonnes

Of the pure synthetic fabrics used in the public sector, nylon (polyamide) is understood to be commonly used for abrasion resistant functions. Limited information appears to be

[8] Promptex, Euratex and ETUF-TCL (2005) *Public procurement awarding guide for the clothing textile sector*
[9] Just Style, *Public sector procurement in Europe obscured by price*, 26th January 2007, http://www.just-style.com/comment/public-sector-procurement-in-europe-skewed-by-price_id96279.aspx
[10] See footnote 9

available about the procurement of specialist technical fibres such as aramids (modified polyamides), but they are understood to be used by the military and the police in anti-ballistic clothing. The global market is estimated to be 74.5m tonnes in 2014 [11] but data for the EU portion of the market could not be obtained.

Textile services appear to be a growing sector. A recent study from 2014 carried out by Deloitte for the European Textile Services Association (ETSA) estimated the size of the *textile rental* market based on a survey of ETSA members [12]. The study focussed on four market segments, of which two – healthcare and Industry/Trade/Services (ITS) – are of particular relevance to GPP. Of the total estimated market value of €10.5 – €11.5bn in 2012 healthcare was estimated to account for around 23% and ITS 30%. Across the market segments studied, flat linen (e.g. bedding, towels, table linen) and workwear (e.g. industrial and presentational garments) accounted for around 75% of the textile rental market.

## 1.4 GPP criteria currently in use by selected Member States

### 1.4.1 Selected Member States studied for the European Commission (as of 2010)

A report prepared in 2010 by AEA Technology for the European Commission provides some insight into how Member States are implementing GPP textile criteria [13]. Product scope and the environmental aspects addressed by criteria sets were surveyed for ten Member States. The findings are summarised in Table 2.

The findings highlight that whilst most of the Member States surveyed had general product definitions, Denmark and the Netherlands had developed criteria and guidance that are more specific to GPP applications. Denmark had focussed on work wear, protective clothing, curtains and bed linen. The Netherlands had developed criteria for office soft furnishings and work wear. Germany and Finland did not at the time have specific criteria addressing textile products.

*Up-to-date links to Member State GPP initiatives can be found at the DG ENV Green Public Procurement website*:

http://ec.europa.eu/environment/gpp/material_en.htm

[11] PR Newswire, *Aramid fibres: A global market overview*, 23rd July 2014 http://www.prnewswire.com/news-releases/aramid-fibers-para-and-meta---a-global-market-overview-268301472.html
[12] European Textile Services Association, *Quantifying the opportunity:European market sizing study for ETSA*, June 2014
[13] AEA, 2010. *Assessment and Comparison of National Green and Sustainable Public Procurement Criteria and Underlying Schemes*, Report to the European Commission

*Table 2. Scope and criteria coverage of ten selected Member State GPP criteria sets*

| Member State | GPP documentation | Environmental aspects addressed |
|---|---|---|
| Austria | Criteria document - Ecological criteria for textiles | Pesticides<br>Chemical content<br>Organic fibres<br>Recycled fibres |
| Belgium | Textiles and ready to wear<br>Criteria document - Clothing and accessories | Chemical content<br>Organic fibres<br>Recycled fibres |
| | Textiles and ready to wear<br>Criteria document - Leather products | Chemical content |
| Denmark | Guidance Document for Clothing and textiles<br>Work overalls<br>Work-wear<br>Work-wear with protective properties<br>Curtains<br>Gloves<br>Bed linen | Chemical content<br>EMS<br>Organic fibres<br>Risk assessment<br>Wastewater treatment<br>Recycling of fibres |
| France | Guide to sustainable public procurement – GEM DD - Buying Clothing | Waste<br>Chemical content<br>End of life<br>Organic/fair trade cotton |
| Netherlands | Criteria Document for Office soft furnishing | Chemical content<br>Recycling<br>Recycled fibres |
| | Criteria Document for Work-wear | Chemical content<br>Recycling<br>Recycled fibres<br>Organic fibres |
| Norway | Criteria Document - Clothing and textiles | Chemical content<br>Disposal<br>Packaging |
| Sweden | Furnishing and textiles • Criteria Document for Textiles and Leather | Chemical content |
| UK | Criteria Document - Textiles Standards *(currently under revision)* | Pesticides<br>Emissions |

Source: AEA Technology *for* the European Commission (2010)

Whilst commonalities can be identified between the criteria sets, variations can also be seen in the extent of their coverage – for example, in terms of restrictions on the use of certain hazardous substances product design, supply chain management and product end-of-life management.

Other criteria areas that could be identified from the AEA Technology report and which are not addressed by the current EU GPP criteria are summarised below in Table 3, organised under common headings. Where necessary the findings of the AEA Technology report summarised here have been updated to reflect recent changes to national GPP criteria since that study was carried out, for example in the UK.

*Table 3. Additional criteria areas identified from the ten selected Member State GPP criteria*

| ***Criteria area*** | **Technical focus and/or references to other criteria** |
|---|---|
| *Product-specific requirements* | - CE marking for work gloves and protective work wear (Denmark). |
| *Supply chain management* | - Biological wastewater treatment (Denmark);<br>- Tracking and documentation of supplier energy, water and chemical consumption (Denmark);<br>- Traceability requirements for each factory and the industrial equipment they use (France). |
| *Product design and specification* | - Specification of fabrics that require less retreatment (Denmark);<br>- Design, cleaning and repair of workwear to extend its life (Netherlands);<br>- Requirement for LCA evidence to support the selection/use of novel new bioplastic and durable fibres (UK). |
| *End of life management* | - Working overalls, workwear and bed linen should be recycled or re-used, with award criteria used to incentivise innovation (Denmark, France, Netherlands, UK);<br>- Careful end of life treatment of clothing containing hazardous chemicals e.g. flame retardants (Norway). |
| *Reference to Type I Eco-labels* | - Verification by Nordic Swan (Belgium, Denmark, Norway, Sweden);<br>- Verification by Oeko-Tex 100 (Austria, Belgium, Denmark, Netherlands and Sweden);<br>- Verification by Oeko-Tex 1000 (Sweden). |

### 1.4.2 Member State GPP criteria not covered by the 2010 study

A number of Member States which have adopted GPP textile criteria were not included in the 2010 AEA Technology survey. In this section Italy and Spain are briefly reviewed. The development of GPP criteria in these countries appears to reflect the continued significance of their textile industries.

Despite its significant textile industry Italy was omitted from the 2010 survey . Whilst the majority of Italy's GPP criteria reflect those of the EU Ecolabel and EU GPP criteria for Textile products there are some distinct differences[14]. In particular, the Award criteria for synthetic fibre recycled content and organic cotton content include minimum thresholds of 30% and 50% respectively. Moreover, requirements on the recyclability and recycled content of packaging are specified.

A number of the autonomous regions of Spain which retain a significant textile industry have also been active in developing and applying GPP criteria. For example, Pais Vasco has implemented workwear criteria[15]. The criteria are structured into three levels of ambition – basic, advanced and excellent. Novel criteria include dye restrictions based on hazard classifications, the use of re-usable/returnable packaging and award criteria linked to the proportion of fibres that are compliant with the EU Ecolabel.

[14] Repubblica Italiana, 2011, Criteri ambientali minimi per l'acquisto di prodotti tessili, Supplemento ordinario n. 74 alla Gazzetta Ufficiale, 19th April.
[15] Gobierno Vasco, Textil ropa de trabajo, , http://www.ihobe.net (Accessed 2014)

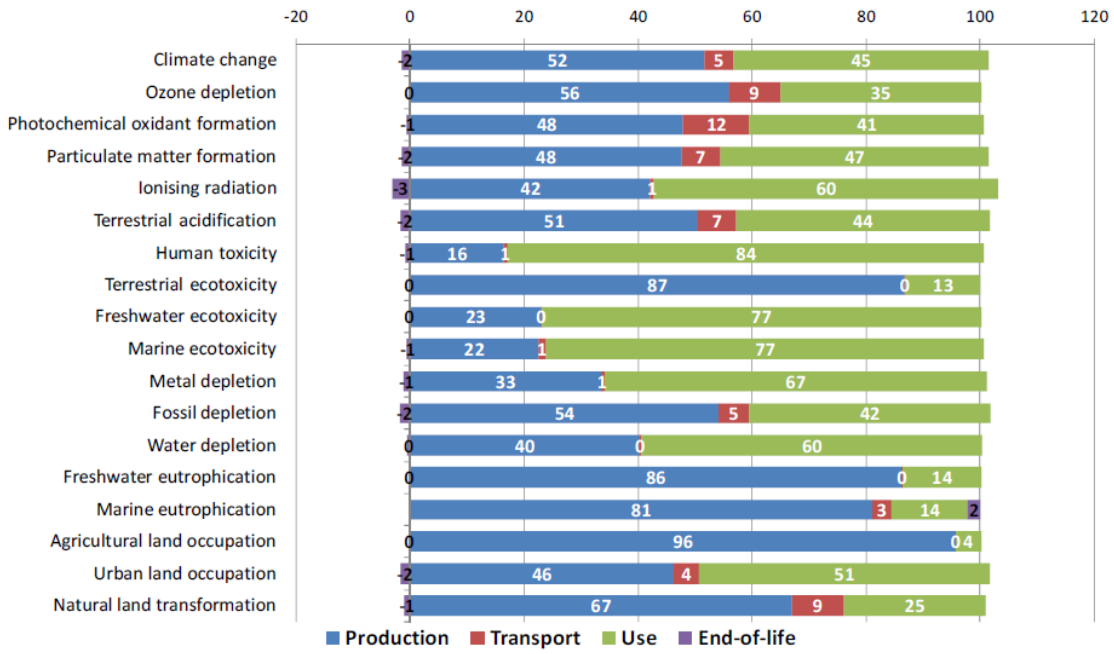
*In the technical discussion of the criteria areas in this report relevant criteria and procurement experience collected from existing national and regional GPP criteria is also discussed. This includes criteria developed by regions (e.g. Western France; Catalonia, Spain) and municipalities (e.g. Nantes, Barcelona, Vienna).*

## 1.5 The key environmental impacts of textiles

The preliminary report for revision of the EU Ecolabel textile criteria[16] presented a review of Life Cycle Assessment (LCA) studies of textile products. The main reference for the overall findings was the IMPRO Textile LCA study carried by the Joint Research Centre[17]. The overall LCA results for EU textile consumption are presented in Figure 1, noting that they are an aggregation of the impacts from the full range of textile products and fibre blends consumed by the EU market. The following can be discerned from the results:

- That for some environmental indicators such as agricultural land use, terrestrial ecotoxicity and eutrophication, the production of textile fibres can be the most significant phase.
- For other environmental indicators such as freshwater ecotoxicity, marine ecotoxicity and water depletion, the use phase can be the most significant phase in the life cycle of a textile product.
- In some cases the contribution of production and use to environmental impacts is evenly balanced, for example in the case of climate change and linked impacts such as terrestrial acidification and particulate matter formation.

These results will be subject to sensitivity depending on the fibre blends used to make a fabric, the finishes applied, how the textiles are washed, dried and ironed during their use and the lifespan of the textiles.




[16] Dodd.N, Cordella.M, Waidtløw.J, Stibolt.M, Hansen.E, 2012, Revision of the European Ecolabel and Green Public Procurement Criteria for Textile Products: Preliminary report, Joint Research Centre (IPTS), European Commission.
[17] Beton.A, Dias.D, Farrant.L, Gibon.T, Le Guern.Y, Desaxce.M, Perwueltz.A, Boufateh.I, editors
Wolf.O, Kougoulis.J, Cordella.M, Dodd.N, 2013, Environmental Improvement Potential of textiles (IMPRO Textiles), Joint Research Centre (IPTS), European Commission

*Figure 1. Impacts of textile consumption in the EU27 according to life cycle phase and midpoint indicator*

Source: JRC-IPTS and BIO Intelligence (2013)

Further to the overall findings for EU textile consumption, the following environmental 'hot spots' were identified as being of significance by JRC-IPTS's preliminary report [18]:

- *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.
- *Synthetic fibre production (acrylic, nylon, polyamide, polypropylene):* The climate change and ecotoxicity impact of energy and raw materials used to manufacture the fibres are of high significance. Nylon and acrylic are the most energy intensive fibres 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 the fibres are of high significance. 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. Viscose appeared to have 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:* There was conflicting evidence in this area, with another 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.
- *Energy and ecotoxicity associated with the use phase of textile products:* These impacts related primarily to washing energy and detergents, and can be influenced by fibre choice and blends. Comparative studies of industrial and domestic washing and drying were also identified, with more efficient industrial laundries having the potential to reduce use phase impacts.

The report also highlighted the potential benefits of more sustainable systems of resource use associated with the disposal (end-of-life) phase. Environmental benefits can be allocated as a result of re-use, recycling and energy recovery activities.

A number of environmental issues 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. There may be a number of reasons for this:

- An incomplete Bill of Materials (e.g. missing inventory of materials containing hazardous substances) in the LCA analysis;
- The products analysed were already representative of the best on the market, with their production already including improvement options and hazardous substance substitution;

[18] ibid 16

- The cut-off limit for substances used in the LCA was set too high, hence hazardous substances that are present at lower concentrations will not have been captured by the impact assessment.

Evidence suggests, however, that a precautionary approach is justified for some specific chemicals where LCA does not currently provide a full picture of their impacts. This will be explored in later sections of this report in the criteria area addressing hazardous substances.

The EU Product Environmental Footprint Category Rules (PEFCR) pilot screening report for t-shirt products also identifies hot spots along the life cycle of a textile product [19]. The pilot analysed the life cycle of a *consumer* t-shirt made of 77% cotton and 16% polyester, with the balance made up of other common fibres. The life cycle stages and associated processes cumulatively contributing at least 50% to any impact category before normalisation and weighting were identified as being:

- Raw materials production (in particular the production of cotton fibres);
- T-shirt production (in particular dyeing and transport between production sites);
- The use phase (in particular washing and ironing).

A sensitivity analysis was used to identify the environmental hotspots along the supply chain for different types of fibres. The results were also sensitive to the weight and composition of the t-shirt. For a workwear t-shirt assumptions relating to the use phase are likely to vary because industrial laundries may be used. The weight and fibre composition of the product could also vary in order to meet different functional specifications.

The findings from this Section have been used to propose revisions to the key life cycle environmental impacts that will be addressed by the criteria and the proposed GPP approach. The proposed revised text is presented in Figure 2.

[19] *Product Environmental Footprint (PEF) Category Rules (PEFCR) Pilot - T-shirts*, October 2015

**Key life cycle environmental impacts:**

- Hazardous effects on the aquatic environment due to the use of hazardous fertilisers and pesticides during the cultivation of natural fibres.
- Hazardous effects on the aquatic environment due to substances used during the processing of intermediate and final textile products.
- The use of biotic and abiotic resources from forestry, petroleum and natural gas to manufacture fertilisers and fibres.
- Greenhouse gas emissions, acidification and smog resulting from the production and use of electricity and natural gas used to manufacture synthetic fibres and to wash, dry and iron textiles.
- Early product failure which can result in the consequent waste of biotic and abiotic resources, and their landfilling or burning with potential for hazardous emissions to air and water.

**EU GPP Textiles approach**

- Purchase textiles made from fibres which are produced using fewer fertilisers, hazardous pesticides and production chemicals.
- Purchase textiles that contain recycled materials and fibres.
- Purchase textiles with a reduced use of environmentally harmful and hazardous substances in their production.
- Purchase textiles that require less energy for drying and ironing.
- Purchase colour-fast fabrics that do not shrink during use, that are constructed to be more durable in use and which have longer-lasting functional coatings.
- Contract services that minimise the energy used to wash, dry and iron textiles.
- Contract services that maintain textiles in order to extend their lifetime.
- Contract services that reuse maximise the potential for reuse and recycling of textiles at the end of their service life.

*Figure 2. Key environmental areas and impacts in a textile products' life cycle and the GPP Textiles approach*

# 2. GPP CRITERIA PROPOSALS

It is proposed to split the criteria proposals into two broad areas. The first area addresses textile products directly procured by a contracting authority. In these criteria the subject matter is therefore the textile product. The criteria proposals are based as far as possible on the EU Ecolabel for textile products, with the ambition level and type of GPP criteria selected to reflect the ease of compliance and verification, as well as market conditions.

The second area addresses services which may be procured, including the rental of textiles, asset management, laundry and end-of-life take back. In these criteria the subject matter is therefore the nature of the service provided. These criteria are mostly beyond the scope of the EU Ecolabel for textile products, and so are based on additional research.

## 2.1 Textile product related criteria

It is proposed that this group of criteria focuses exclusively on the textile product, whether it is an item of workwear or an interior textile such as curtains or bed linen. The subject matter for the procurement of textile products is proposed to be: *'purchase of textiles with a reduced environmental impact*'.

### 2.1.1 Selection criteria for tenderers

From the background research in support of revision of both the EU Ecolabel and GPP criteria two broad areas of focus for environmental improvement can be identified and related to the subject matter and criteria areas:

- Textile fibre origin: Designers and manufacturers of textile products are increasingly focussing on the sourcing and origin of the fibres from which the product is made. As we have already identified this can range from agriculture and forestry (e.g. cotton, viscose) to the chemical industry (e.g. polyester, nylon). In both cases traceability systems for tracking and verifying the origin of the fibres have to be operated.
- Chemical use: In order to implement restrictions on the use of chemicals in manufacturing a textile product their use needs to be traced to different production stages and, ultimately, production sites. The degree of confidence that restrictions are being implemented will depend to a great extent on the level of control over their supply chain. Manufacturers may exercise or being able to demonstrate different levels of control over their supply chain, ranging from direct control of their own production sites to the outsourcing of production stages via intermediates.

It is therefore proposed that these two areas of progress by manufacturers are reflected in the Selection Criteria, together with an additional request for relevant examples of how these aspects have been managed on previous contracts. Given that these capabilities might tend to reflect those of the leading manufacturers in the market, it is proposed that the Selection Criteria are used as a comprehensive level of ambition.

*Final criterion*

| Core criteria | Comprehensive criteria |
|---|---|
| **SC1. SELECTION CRITERIA** | |
| | Tenderers must be able to demonstrate the resources, expertise, documented procedures and management systems they have in place to address the following aspects of the product and its supply chain:<br><br>Textile fibre origin: systems that allow for the traceability of the source, content and production systems of natural and man-made fibres for which environmental criteria will apply. This includes transaction records that allow for verification and traceability from the origin of the raw material or feedstock to manufacturing and processing of yarn and greige fabric. This may include the use of third party certifications of origin and traceability.<br><br>Chemical management: the implementation of a restricted chemical substance list, including communication of the list to dyeing, printing and finishing sites, monitoring of the compliance of production sites (as relevant to criteria P3. 2) and monitoring of the compliance of final products (as relevant to criteria P3. 1), including laboratory testing. The use of auditors for site visits, textile compliance schemes and laboratories for product testing that are accredited to international standards (e.g. ISO 17025, ISO 17065, ISO 19011 or equivalent) will also be required.<br><br>**Verification:**<br><br>Tenderers must describe the systems and capabilities that they have in place to monitor and verify textile fibre origin and chemical management. Moreover, they will describe the systems of documentation, auditing and analysis used to monitor compliance of suppliers and the final product.<br><br>The resourcing and expertise that will be used to manage compliance must be confirmed. Relevant examples must be provided from previous contracts to supply textile products showing how these two aspects have been managed and verified. |

### 2.1.2 Fibre sourcing

#### 2.1.2.1 Cotton fibres

*Technical background to the criteria proposal*

Cotton was identified by JRC-IPTS's IMPRO Textiles study as the textile fibre associated with the most significant environmental impacts[20] – both in absolute terms based on the quantity consumed in the EU and in terms of the nature of the environmental impacts associated with its cultivation as a global commodity crop.

Cotton cultivation requires approximately 2.5% of the world's cultivated land yet uses 16% of the world's total use of pesticides, accounting for more than any other single major crop[21]. The major environmental impacts are associated with the manufacturing of fertilisers and pesticides, pollutant loading of water courses by the run-off from the land of fertilisers and pesticides, land degradation from intensive cultivation and water use for irrigation[22].

Globally two major improvement options for reducing the environmental impacts of cotton production can be identified:

- Integrated farming: IPM (Integrated Pest Management) and the broader approach known as Integrated Crop Management (ICM), which incorporates IPM, are a means of improving the cotton yield whilst improving land management and reducing exposure of humans and the environment to hazardous pesticides.
- Organic farming: As defined by organic production Regulation 834/2007[23] is a system that avoids the use of industrial fertilisers and pesticides.

These two systems are, since 2014, options for applicants for the EU Ecolabel. An overview of data on the global availability of certified cotton from these two forms of production is provided in Table 4. The table shows that certified cotton grown according to IPM principles accounts for a greater market share than certified organic production. It is to be noted, however, that these estimates do not include uncertified IPM and organic cotton, for example from the USA, Pakistan, Egypt and Turkey.

In the case of IPM it has been estimated that this form of production may account for more than 19% of global cotton production. However, the proportion that is certified is increasing rapidly, with the Better Cotton Initiative (BCI) being the fastest growing scheme in the market.

As can be seen from **Error! Not a valid bookmark self-reference.** certified cotton grown according to IPM principles accounts for a greater market share than certified organic production. It is to be noted, however, that these estimates do not include uncertified IPM and organic cotton, for example from the USA, Pakistan, Egypt and Turkey.

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*Table 4. Estimates of Organic and IPM cotton production and market share for 2013*

[20] See footnote 17

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

[22] Kooistra.K.J, Mancini.F and A.J.Termorshuizen, *Environmental Impact Assessment of Cotton Cultivation in Central India* in Mancini.F, *Impact of Integrated Pest Management Farmer Field Schools on health, farming systems, the environment, and livelihoods of cotton growers in Southern India* (2006) Biological Farming Systems Group, Wageningen University, The Netherlands.

[23] 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

| Production system | Fibre production (Tonnes) | Share of world production | *Estimated* Share of EU market |
|---|---|---|---|
| Global cotton production | 26,800,000 | 100% | - |
| Certified organic production | *109,676* [1] | 0.4% | *1.3%* |
| Certified IPM production<br>1. BMP (Australia)<br>2. Better Cotton Initiative<br>3. Cotton Made in Africa<br>4. Fair Trade<br><br>*Total certified IPM production* | <br>*11,252*[2]<br>820,000<br>85,000<br>*17,780*[3]<br><br>*934,032* | <br>0.04%<br>3.1%<br>0.3%<br>0.07%<br><br>*3.5%* | <br>*0.1%*<br>*10.0%*<br>*1.0%*<br>*0.2%*<br><br>*11.4%* |

Notes:

1. Estimated based on a 21% decline in production in 2013 according to the Textile Exchange.
2. The quantity of uncertified BMP cotton is considerably greater, having been estimated at 60% of Australia's total production, which was 885,960 tonnes in 2013. With BMP joining the Better Cotton Initiative in 2014 the quantity of certified BMP cotton is anticipated to grow significantly.
3. Estimated based on a 3% decline in production in 2013 according to Fair Trade.

*Source: Textile Exchange (2014), Better Cotton Initiative (2014), Cotton Made in Africa (2014)*

For uncertified organic production there is limited data on what the latent potential may be. Organic cotton is understood to be produced by overseas aid and NGO funded projects in countries including Tanzania, Benin, Colombia and Kyrgyzstan. However, the barriers to obtaining certification and lack of market signals are cited as preventing this cotton meeting formal criteria[24]. Sponsors and investors in such projects include organisations such as Helvetas and Biosustain. Taking the latter as an example, production has reached 8,000 tonnes/year of cotton lint for processing [25]. Public procurement could play a role in bringing this cotton into the market by providing certainty of demand, particularly given that a number of large multinational high street clothes retailers are cited as being reluctant to use cotton from specific sources.

The comparative benefits of the two systems and the forms of verification that can be used are briefly summarised in the next two sections:

*Organic cotton production systems*

Organic cotton is often cited as the most environmentally preferable form of cotton. This is because the requirements for certification set strict rules restricting the use of agrochemicals such as industrial pesticides and fertilisers. For example, Article 12 of Regulation (EC) No 834/2007 (the 'Organic Regulation') states that:

> *'the prevention of damage caused by pests, diseases and weeds shall rely primarily on the protection by natural enemies, the choice of species and varieties, crop rotation, cultivation techniques and thermal processes;'*

LCA studies comparing organic and conventional cotton production illustrate the significant potential for improvement across a number of impact categories of relevance to cotton production, including Global Warming Potential, acidification and eutrophication [26, 27].

[24] Personal communication with Jens Soth, Helvetas (2015)
[25] Solidaridad, *Improving productivity and marketing of cotton through strengthening selected producer organisations in Eastern Africa*, Project final report – period December 2011 to December 2013.
[26] ibid 22

Wageningen University made a comparison of conventional, organic and IPM cotton. They concluded that while organic cotton production has significant 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. In some developing countries it should also be noted that the cost of agrochemicals is prohibitive to the extent of some farmers using little or no pesticides [28].

Production of organic cotton has expanded rapidly over the last decade as a result of demand created by large multinational high street clothes retailers , specialist national retailers, specialist organic mail order retailers and niche US brands with an EU market presence. However, with a slump in global cotton prices, production has fallen again. Data for 2012 compiled by the Textile Exchange and presented in Figure 2 highlights a dip in production to less than 1.0% of global cotton production[29]. This is despite publicly reported increases in demand from leading retailers, highlighting potential problems with data collection and systems of traceability. Data from 2014 suggests there was a further decline during the period 2012-2014 to 116,794 mt [30].

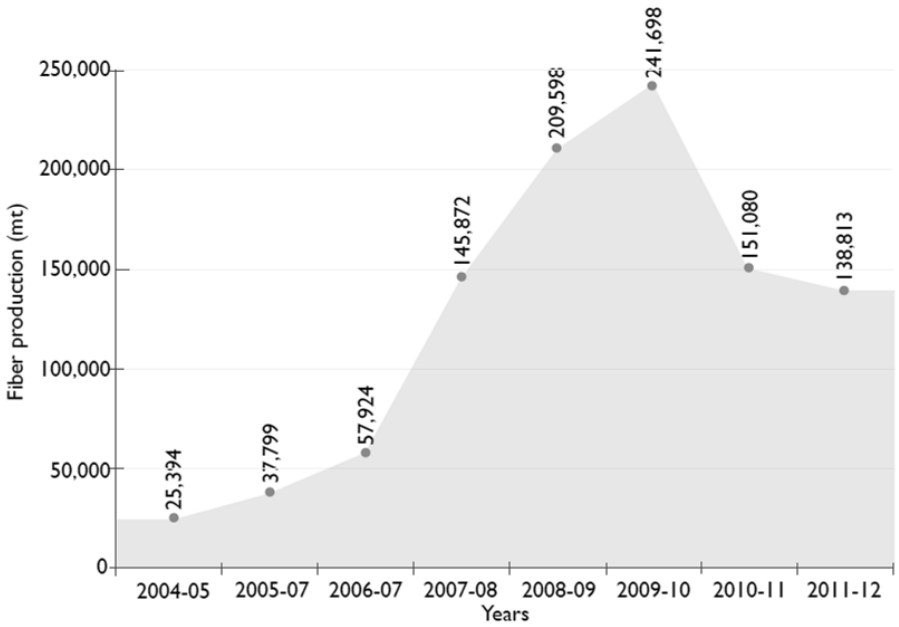



*Figure 2. Global certified organic cotton production trend 2004-2012.*
*Source:* Textile Exchange (2013)

Organic cotton production is generally certified by national control bodies recognised by the EU or the USA or by the independent body IFOAM. The status of these certifiers as EU organic control bodies may be problematic because cotton is not formally covered by Europe's organic production Regulation 834/2007, although it is understood that in many cases they tend to already be recognised because they certify other products. A number of private certification schemes also exist that provide traceability systems to support organic content claims.

[27] PE International, *Life Cycle Assessment (LCA) of organic cotton: A global average*, Textile Exchange, November 2014
[28] Kooistra.K and A.Termorshuizen, *The sustainability of cotton - Consequences for man and environment*, Wageningen University, Report 223, April 2003.
[29] Textile Exchange (2013) Organic f*arm and fibre report 2011-12*
[30] Textile Exchange (2014) *Organic farm and fibre report 2013-14, Press release*

Feedback from public procurement exercises in France, Spain and Austria, as well as industry stakeholders, suggests that prices can vary considerably in comparison to conventional cotton. Variations of between 10% and 100% are reported. Where specified it has tended to be as an award criterion in order to gauge the market's response and ensure that there are enough bidders. To take one example, a procurement exercise in France which required organic cotton as a technical specification resulted in only two tenders, with the cheapest tender incurring a price premium of +22%.

*IPM cotton production systems*

IPM, sometimes also referred to in conjunction with ICM (Integrated Crop Management), is a system of cultivation that is intended to minimise the application of pesticides by the careful observation and management of crops. The UN 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*

The training of farmers to apply IPM techniques is a critical factor in their success. 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.

Monitoring evidence from FAO programmes suggests that IPM cotton can reduce pesticide use by between 30% and 90% whilst also being 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). Overall it has been reported that IPM production can achieve on average the highest yields for cotton crops, with conventional growing intermediate and organic presenting the lowest yields [31].

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.

A definition of IPM has also been developed by the European Commission[32] and forms a key part of the European Union's agricultural policy, with Member States now required to take all necessary measures to introduce low-pesticide input pest management. Although this is understood to have led to improved EU cotton production, with producers in Greece and Spain adopting IPM and ICM practices [33], this only represents only a very small proportion of global production.. IPM was initially 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 Sustainable Use of Pesticides" and this was followed up by Directive 2009/128/EC *Establishing a community*

[31] 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

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

[33] EuropaBio, *Baseline information on agricultural practices in the EU: Cotton (Gossypium hirsutum L.),* http://www.europabio.org/sites/default/files/120526_report_eu_farming_practices_cotton.pdf

*framework to achieve the sustainable use of pesticides*[34]. The Directive introduced a definition of the principles of IPM (see Box 2).

*Box 2. General principles of IPM as defined by Annex III of Directive 2009/128/EC*

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.

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.

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.

Sustainable biological, physical and other non-chemical methods must be preferred to chemical methods if they provide satisfactory pest control.

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.

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.

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.

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.

The principles of IPM and the learning from educational programmes worldwide promoted by the FAO now form the basis for a number of cotton IPM certification schemes. These schemes aim to bring low-pesticide input cotton to the textile market and allow for traceability from the farm. As was highlighted in table 4 the most significant certification

[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

schemes are the Better Cotton Initiative[35], Cotton Made in Africa[36] , Fair Trade[37] and BMP (Australia)[38]. BMP will, from 2014, form part of the Better Cotton Initiative. These schemes tend to combine IPM principles which the farmers must follow with restrictions on the use of hazardous pesticides. The EU has also recently launched the SPRING initiative to develop a scheme for Pakistan in conjunction with WWF-Pakistan.

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. These certifications include traceability either based on the cotton bales or bulk purchasing and resale by a 'demand alliance' to its members.

Feedback from public procurement exercises in France and Spain suggests that IPM has only been specified in the form of the 'Fair Trade' certification – suggesting that social criteria rather than IPM were the main consideration. Their experience, together with feedback from industry stakeholders, suggests a price premium over 'conventional' cotton of between +5% and +40%.

*Genetically Modified cotton*

Genetic modification (GM) is an issue of particular relevance to cotton because GM varieties are now commonly used to improve yield worldwide. EU policy does not specifically prohibit GM production. The use of specific GM plant breeds in the EU is, instead, subject to an authorisation process and to date the cultivation of GM varieties of cotton has not been authorised within EU territory.

Given that EU cotton production amounted to 300,000 tonnes in 2013, the majority of cotton likely to be used to fulfill public contracts can be expected to be imported from outside of the EU. Data for worldwide cotton production shows that the proportion of the area under cultivation that is planted with GMO cotton varieties ranges from 40% (Brazil) to 99.5% (Australia), with approximately 81% of global production estimated to be based on GMO varieties[39].

Of the IPM schemes reviewed only Fair Trade and Cotton Made in Africa restrict GM cotton. 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 0.4% which, assuming a higher proportion of IPM consumption, may be 1.2% in the EU. On this basis it can be seen that a GM cotton restriction would be likely to constrain a public authority's 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.'*

During revision of the EU Ecolabel and for sake of consistency with the principles used in the Organic Regulation the cotton criteria was revised to reflect the Organic Regulation (EC) 834/2007 by stating that where conventional and/or IPM cotton are combined or blended with organic cotton that this cotton shall not be genetically modified. A corresponding

[35] Better Cotton Initiative, P*roduction principles and criteria v2.0*, December 2009
[36] Aid by Trade Foundation, Cotton Made in Africa - Criteria matrix Version 2.0, January 2011
[37] Fairtrade International, *Fair trade standard for small producer organisations*, Version 1.1, May 2011
[38] CRC (2005) Integrated pesticide management guidelines for cotton production systems in Australia,
[39] International Service for the Acquisition of Agri-Biotech Applications, http://www.isaaa.org/default.asp

clause was therefore also added to the assessment and verification referring to Regulation (EC) No 1830/2003 on the traceability and labelling of GMOs in food and feed products[40].

In the discussions on the EU Ecolabel criteria, a concern was raised by EU Ecolabel Competent Bodies and applicants about the availability of non-GM cotton and the ability to verify it. Consultation with the Bremen Cotton Exchange [41], who are an important EU clearing house for the trade of cotton on the world market, has confirmed that although there are still countries which do not use GM cotton, their number is decreasing due the economic advantages of increased yields and reduced chemical use.

Based on current evidence, three possible routes can be identified to obtain non-GM conventional cotton on the world market:

- EU producers: The growing of GM cotton fibre is not currently licensed in the EU. Cotton is mainly grown in Greece and Spain, although production is limited (quoted at 300,000 tonnes in 2011/12, 1% of global production);
- Non-EU producers: In small number of countries GM cotton is not permitted and is strictly controlled. This includes Turkey (2.8% of global production in 2013) and certain countries in central Asia (specifically Uzbekistan and Turkmenistan – estimated at 4.5% global production in 2011/12);
- Certified non-GM cotton: Bilateral purchase of cotton grown under the Fair Trade or Cotton Made in Africa certification schemes. These schemes specifically restrict the use of GM varieties but availability is currently very limited*, as illustrated in Table 4.*

With regards to verification of the non-GM origin of the cotton, this can be obtained in the EU Ecolabel by carrying out a PCR (Polymerase Chain Reaction) screening test for the most common genetic modifications. This test shall be carried out on raw cotton before wet processing, thereby ensuring that the DNA present is undamaged, and an accuracy of 96% is quoted [42]. The testing cost is indicatively €200-300/sample, falling to approximately €100 for further samples tested.

It is not clear the extent to which Control Bodies exist in countries such as Turkey to provide certification and traceability for non-GMO cotton, for example according to the broad traceability provisions of Article 4, Part A of Regulation No 1830/2003.

[40] Regulation (EC) No 1830/2003 of the European Parliament and the Council of 22 September 2003 concerning the traceability and labelling of genetically modified organisms and the traceability of food and feed products produced from genetically modified organisms and amending Directive 2001/18/EC

[41] The Bremen Cotton Exchange, http://baumwollboerse.de/en/

[42] Based on the results of screening trials carried out by the Joint Research Centre's Institute for Health and Consumer Protection (IHCP)

*Summary of stakeholder feedback*

**Stakeholder comments on the proposals**

The ambition level of the minimum content requirement of 60% was questioned, with a number of stakeholders asking either for clearer confirmation of market availability to support this level or for a higher minimum percentage content, with for example 60% IPM for the core criterion and 100% organic for the comprehensive criterion. Alternatively the greater market availability of IPM cotton could justify an increase from 60% to 80%.

The criteria should make reference to specific certification schemes that are of significance in the market, for example the Global Organic Textile Standard (GOTS).

The market data for the worldwide availability of organic cotton does not present a complete picture. There are a number of countries where organic cotton is being grown as part of agricultural projects supported by overseas aid projects. For example, in Tanzania by Solidaridad. GPP criteria could play a role in providing 'planning certainty' in order to bring this cotton to the market.

An LCA study comparing organic cotton with conventional cotton production was cited as evidence for the improvement potential of organic cotton. The study was recently completed for the Textile Exchange by PE International.

*Final criteria*

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **TECHNICAL SPECIFICATIONS** | |
| **TS1. Cotton fibres**<br><br>A minimum of 20 % of the content of cotton goods used to fulfil the contract must be either:<br><br>1. Organic: grown according to the requirements laid down in Regulation (EC) No 834/2007,[43] the US National Organic Programme (NOP) or equivalent legal obligations set by trade partners of the EU; or<br><br>2. Integrated Pest Management (IPM): grown according to IPM principles as defined by the UN Food and Agricultural Organisation (FAO) IPM programme[44] or EU Directive 2009/128/EC[45]<br><br>*If the contracting authority wishes to further support growth of the organic cotton market and/or identifies a shortage in the supply of certified organic cotton, uncertified or transitional organic cotton[46] may be permitted* | **TS1. Cotton fibres**<br><br>A minimum of 60 % of the content of cotton goods used to fulfil the contract must be either:<br><br>1. Organic: Grown according to the requirements laid down in Regulation (EC) No 834/2007[43], the US National Organic Programme (NOP) or equivalent legal obligations set by trade partners of the EU, or<br>2. Integrated Pest Management (IPM): Grown according to the principles as defined by the UN Food and Agricultural Organisation (FAO) IPM programme[44] or EU Directive 2009/128/EC[45]<br><br>If the contracting authority wishes to further support growth of the organic cotton market and/or identifies a shortage in the supply of certified organic cotton, uncertified or transitional organic cotton[46] may be permitted (see explanatory note 'Supporting the market for |

[43] Council Regulation (EC) No 834/2007of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91 (OJ L 189, 20.7.2007, p. 1).
[44] More about IPM, The Food Agriculture Organisation (FAO) of the United Nations, http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/ipm/more-ipm/en/.
[45] See Annex I to Directive 2009/128/EC of 21 October 2009 of the European Parliament and of the Council, establishing a framework for Community action to achieve the sustainable use of pesticides.
[46] The Organic Regulation (EC) No 834/2007 defines 'in-conversion' as 'the transition from non-organic to organic farming within a given period of time, during which the provisions concerning the organic production have been applied'. Written confirmation from an organic competent authority of a country, or an organic control body, that

| | |
|---|---|
| *(see explanatory note 'Supporting the market for organic cotton' below).*<br><br>*If the contracting authority wishes to support organic labelling for the products used then the organic cotton used to fulfil the requirements must not be blended with genetically modified cotton. Proof may be requested if other sources of cotton used in the product(s) are obtained from countries where GM cotton is approved for use.*[47]<br><br>**Verification:**<br><br>The cotton origin and content of the goods will be verified upon delivery by means of a third party certification scheme for IPM or organic cotton production together with documented transaction records that allow for the cotton content of individual items or batches of goods to be verified and traced back to the point of certification.<br><br>This includes valid certification for organic or IPM production,[48] as well as documentation of transactions that demonstrate the purchase of the claimed cotton content and provide traceability.<br><br>If relevant, a screening test[49] to verify non-genetically modified cotton will be provided upon request if conventional and IPM cotton are blended with organic cotton. | organic cotton' below).<br><br>If the contracting authority wishes to support organic labelling for the products used then the organic cotton used to fulfil the requirements must not be blended with genetically modified cotton. Proof may be requested if other sources of cotton used in the product(s) are obtained from countries where GM cotton is approved for use [47].<br><br>**Verification:**<br><br>The cotton origin and content of the goods will be verified upon delivery by means of a third party certification scheme for IPM or organic cotton production together with documented transaction records that allow for the cotton content of individual items or batches of goods to be verified and traced back to the point of certification.<br><br>This include valid certification for organic or IPM production[48], as well as documentation of transactions that demonstrate the purchase of the claimed cotton content and provide traceability.<br><br>If relevant, a screening test[49] to verify non-genetically modified cotton will be provided upon request if conventional and IPM cotton are blended with organic cotton. |
| **AWARD CRITERIA** | |
| **AC1. Cotton fibres**<br><br>Points shall be awarded in proportion to each 10% improvement upon the minimum technical specification of certified IPM or organic cotton content.<br><br>**Verification:**<br><br>See criterion TS1 | **AC1. Cotton fibres**<br><br>Points shall be awarded in proportion to each 10% improvement upon the minimum technical specification of certified IPM or organic cotton content.<br><br>**Verification:**<br><br>See criterion TS1 |
| **Supporting the market for organic cotton**<br><br>The limited availability of organic cotton on the world market can pose a challenge for public contracts. On the other hand, public contracts can play an important role in creating demand. To address this challenge it is therefore recommended that early market consultations and/or prior information notices are used to notify potential bidders of upcoming contracts and the likely volumes of cotton textiles required. | |

growers have given notice of the conversion and subjected their farm(s) to an organic control system would provide formal proof of in-conversion status.

[47] See http://www.isaaa.org/gmapprovaldatabase/countrylist/default.asp.

[48] At the time of writing the following schemes are considered to provide sufficient assurance: IPM: the Better Cotton Initiative (BCI), AGRO 2 (Greece), Cotton Made in Africa, Fair Trade, the Australian Better Management Programme (BMP); Organic: EU recognised organic control bodies, US organic programme, IFOAM.

[49] A qualitative screening test for common genetic modifications carried out according to 'EU Reference Methods for GMO Analysis' is the recommended form of verification (see http://gmo-crl.jrc.ec.europa.eu/gmomethods). Tests are be to be made on samples of raw cotton from each country of origin and before it has passed through any wet treatment. Certification of IPM cotton by schemes that exclude genetically modified cotton will be accepted as proof of compliance.

Bidders could also be encouraged to source cotton through collaborations with agricultural development projects. These type of projects, which in some case may have their own certification schemes (e.g. Cotton Made in Africa), have the potential to support new certification schemes for organic or IPM production. It is also the case that certification can be costly. Because of this cost, uncertified organic cotton can be obtained from a number of countries where development projects have promoted low input agriculture or where specific agricultural policies have been adopted.

In order to bring more organic cotton into the market, contracting authorities can support the market in two ways:

1. By accepting certification provided by organic control bodies, government control bodies or third party schemes upon award of the contract and/or purchase of the cotton. Combining this approach with early market consultations would give producers and growers more time and also send a clear signal to the market that there is demand to formally certify cotton.
2. Accepting cotton from farmers that are in the transitional conversion period as they move to organic production as laid down in Article 17 of the Organic Regulation. This would incentivise growers and projects based on low-input techniques to look at the options for marketing their cotton, as well as the future potential for certifying their production.

The latter would recognise the investment and changes required to move from conventional to organic systems, providing greater certainty that there will be a market for the cotton.

*Summary rationale for the requirements and verification:*

- There are two improvement options available for cotton fibres: organic and IPM production systems.
- Organic cotton has the benefit of avoiding the use of synthetic fertilisers and pesticides and requiring more sustainable forms of land management, but the yield is lower by 20-50% and, if grown in areas where there is stress on water resources, water use may not always be lower.
- IPM cotton has the benefit of reducing the use of synthetic fertilisers and pesticides as well as producing a higher yield, but does not completely eliminate the use of potentially hazardous pesticides or, depending on the system, lead to more sustainable forms of land or water management.
- Whilst organic cotton is still a niche product on the global market, demand from major retailers and specialist clothing companies has driven its growth, and it currently accounts for an EU market share of around 1.3%.
- Although it has been estimated to account for around 20% or more of global production, IPM cotton could not, until recently, be clearly identified in the market because it was not possible to certify its origin. Estimates for the four main certification schemes suggest that it currently accounts for an EU market share of around 11.4%.
- The greater market availability and, potentially, lower price premium suggest that IPM is better suited than organic cotton as a Core criterion. It is therefore proposed to mirror the minimum content requirement from the EU Ecolabel of 20%. However, it is considered that bidders able to offer organic cotton on a competitive basis should not be locked out, so it is therefore proposed that organic cotton shall also be included, but *on an optional basis*.
- Whilst it is considered important to stimulate demand for organic cotton the tendency towards a greater price premium and its greater market scarcity suggest that it is better suited as an option for bidders alongside IPM cotton – reflecting the approach in the EU Ecolabel – or as part of an award criterion to encourage the

market to bring forward products with a higher content than the minimum Core or Comprehensive requirements at competitive prices.

- It is therefore proposed to have a flexible overall Comprehensive criterion target of 60% for environmentally improved cotton – allowing bidders to comply by supplying either IPM or organic cotton. The threshold of 60% reflects the higher level of IPM ambition which applies to specific products in the EU Ecolabel.
- An award criterion could be used to encourage tenderers to bring forward products with higher contents of organic and/or IPM cotton, given the potential risk of a reduced number of bidders and price premiums.
- In accordance with the principles of organic production laid down in the EU Organic Regulation, organic cotton shall not be blended with cotton that originates from GMOs. This could include conventional and/or IPM cotton of genetically modified varieties. Verification should therefore be requested in these circumstances.
- A guidance note has been added to highlight the role that public authorities can play in supporting the market for organic cotton.

#### 2.1.2.2 Wool fibres

*Technical background to the criteria proposal*

Revision of the wool criteria for the EU Ecolabel focused on four main areas of environmental improvement, taking a life cycle approach:

- Ectoparasiticides in wool: Wool cleaning (scouring) effluent tends to contain large amounts of pesticides as a result of their use to treat sheep. The most hazardous ectoparasiticides may be minimised at source by restricting and testing for specific substances before the wool is scoured or by specifying organic wool.
- Water pollution by wool scourers: The dirt, grease and sint that must be washed out of wool before it can be processed by the textile industry can result in a heavily loaded wastewater which may be discharged to the environment. This potential pollutant load can be reduced significantly by removing these wastes at source, with the additional resource efficiency benefit of maximising their value as by-products.
- Energy use by wool scourers: Cleaning wool of dirt, grease and sint requires energy to heat hot water and to power the operation of by-product and wastewater treatment plant.

From a life cycle perspective energy use is significant but no agreement could be reached between stakeholders on a benchmark for the performance of wool scourers. Ectoparasiticide testing is contained within the final criteria but requires relatively complex sampling and testing of wool consignments from farmers to ensure that it is meaningful.

This leaves water pollution control as a potential focus for GPP as it is comparatively easy to verify, albeit still requiring data to be obtained by manufacturers from wool scouring sites.

*Determining water pollution thresholds for wool scourers*

The wastewater treatment strategies of wool scourers in Australia, New Zealand, China and the EU were compared in order to determine limit values for Chemical Oxygen Demand (COD) of wastewater discharged to the environment. The practices of the wool scourers were cross-referenced with the BAT (Best Available Techniques) in the EU textile BREF.

Grease is understood to contribute to approximately 48-71% of the COD from wool scouring and therefore its removal is a critical factor in COD reduction. Dirt is understood to

contribute to approximately 17-31% of the COD. The comparison of wool scourers highlighted the importance of minimising COD by removal at source of dirt and grease. The benefit to COD levels will, however, vary depending on the type of wool with fine wool carrying more grease and therefore requiring more cleaning to lower COD levels.

Wool scourers can be seen to pursue different strategies for COD removal from effluent. Whilst major scourers have implemented BAT technologies as specified in the BREF for Textiles their overall approach differs. Two examples of wool scouring are described below to illustrate the differences.

In the first example dirt and grease removal is maximised at source. Multi-stage grease recovery is combined with the pre-cleaning of wool to remove dirt before scouring in order to minimise COD at source. Dirt and grease removal 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 effluent is then sent for off-site treatment by a modern municipal wastewater treatment plant. This combination of treatment stages enables COD to be reduced from 180 g/kg following grease removal down to below 45 g/kg.

In the second example residual dirt and grease is treated by advanced on-site wastewater treatment plant. Basic grease recovery is followed by a multi-stage effluent treatment works including chemical flocculation, activated sludge and evaporation. The combination represents BAT. This combination of treatment stages enables COD to be reduced from 100 g/kg following grease removal to below 25 g/kg.

*Summary of stakeholder feedback*

**Stakeholder comments on the proposals**

It should be clarified whether the COD requirement applies to direct or indirect wastewater discharges from a wool scouring site.

A stakeholder recommended that EU Ecolabel and Nordic Swan requirements on pesticides should be reflected in the criterion.

*Final criteria*

| Core criteria | Comprehensive criteria |
|---|---|
| **TECHNICAL SPECIFICATIONS** | |
| **TS2. Wool fibres**<br><br>*(Same for core and comprehensive criteria)*<br><br>It is recommended to use this criterion only where the wool content of the textile products is greater than 50 %.<br><br>The wastewater discharges from wool scouring, either directly from treatment on-site or indirectly from off-site wastewater treatment, measured in g COD (chemical oxygen demand)/kg greasy wool must be ≤25 g for coarse wool and lamb's wool and ≤45 g for fine wool.<br><br>**Verification:**<br><br>The tenderer will upon delivery of the goods provide compliant monitoring data for the processing lots from which wool used in the contract comes from.<br><br>COD calculations will relate to the wool throughput in kg to the wastewater flow in litres from each processed lot of wool. Monitoring data must be obtained by third party testing according to ISO 6060 or equivalent wastewater from each wool scouring site that wool is purchased from.<br><br>Transaction records will be provided that verify the wool scouring site for the wool used to manufacture the products. | |

*Summary rationale for the requirements and verification:*

- A number of different aspects of sheep farming and wool scouring require addressing in order to minimise the environmental impacts of wool production.
- The complexity of verification for the EU Ecolabel criteria on pesticides suggests that the simpler criteria on wastewater treatment could instead be included within the GPP criteria. This would have the dual benefit of removing pesticide residues from wastewater and encouraging resource efficient scouring (see the points below).
- The requirement for wastewater treatment has been simplified into final point of discharge COD limits of 45 g/kg and 25 g/kg for fine and coarse wool scours respectively. These limits will reduce the organic loading of effluent as well as removing residual pesticides.
- These limits are based on reductions in COD of 75% by coarse and fine wool scourers. This reduction in COD also supports greater resource efficiency as the residues removed from the wool are valuable by-products.
- These limits can be achieved by modern wool scours using a combination of dirt and grease removal at source together with on or off site (direct or indirect) wastewater treatment. The 45 g/kg threshold would permit scourers achieving a high level of dirt and grease removal to comply.
- The verification reference to an ISO standard ensures that the test results are comparable. Flexibility is ensured by allowing for compliance based on test results from either on- or off-site treatment plant. Compliant monitoring data shall be requested for wool processing lots supplied for use in execution of the contract.

### 2.1.2.3 Man-made cellulose fibres (e.g. viscose, modal, lyocell)

*Technical background to the criteria proposal*

Man-made cellulose fibres (also referred to as rayon) are manufactured at an industrial scale from cellulose pulp. 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, reflecting renewed interest and a market perception that it is a more sustainable fibre than cotton[50]. Fibre types are viscose, modal and lyocell.

A peer reviewed LCA study carried out by Utrecht University and commissioned by the manufacturer Lenzing (2010) was critically reviewed in order to compare the environmental performance of viscose, modal and lyocell fibres[51]. Of the potential improvement measures that can be identified from the study two are addressed by the EU Ecolabel criteria, namely:

- Moving to a biorefinery approach, with black liquor and other by-products being used either as fuel to generate steam for pulp production processes (thereby offsetting on-site emissions) or as co-products for use as feedstock to produce other products e.g. acetic acid, turpentines, soap;
- Minimisation of carbon disulphide solvent emissions to air and water from the viscose and modal fibre production stage. These emissions are avoided in Lyocell fibre production because a safer, biodegradable solvent is used.

An environmental issue addressed in the EU Ecolabel criteria but not highlighted as significant by the LCA study are halogenated emissions to water from pulp production.

[50] Asia Paper Markets, *Commodities to watch – dissolving pulp*, Market briefing paper, February 2001
[51] Shen, L and M.K.Patel, *Life cycle assessment of man-made cellulose fibres*, Utrecht University, Lenzinger Berighte 88 (2010) 1-59

Although the form of verification is familiar – being similar to that for paper products – it is considered that sulphur emissions are more significant and have the benefit of allowing for differentiation of the cleaner Lyocell production process.

A further environmental issue highlighted by the LCA study but that is more difficult to quantify because it is regionally specific and is not yet well addressed by LCA impact category indicators is the impact of deforestation[52]. Hardwood pulp is required to manufacture the fibres and the sourcing of this feedstock has been cited as being associated with deforestation in developing countries[53]. Given the policy significance of illegal and sustainable sourcing at International and EU level it is therefore considered to address this issue within the criteria.

*BAT limit values for sulphur emissions*

Benchmark emissions levels are provided in the EU BREF for polymer production. Three viscose fibre production technologies are addressed – staple fibre production and two forms of filament fibre production, batch and integrated washing. The emissions levels are presented as ranges:

- Filament fibre, integrated washing 170-220 kg/tonne fibre
- Filament fibre, batch washing 40-60 kg/tonne fibre
- Staple fibres, 12.5-30 kg/tonne fibre

From dialogue with industry it was identified during the EU Ecolabel revision process that for filament fibres 170kg/t and 40kg/t are achievable for the best integrated and batch washing processes respectively, whereas 12.5kg/t for staple fibres requires multiple pollution control technologies that are not yet implemented by manufacturers of fibres for textiles. For staple fibres a threshold of 30 kg/tonne of fibre was therefore retained based on the performance of EU market leaders.

*Reducing the formation of dioxins and halogenated compounds*

The use of chlorine as a bleaching agent for pulp can lead to the formation of dioxins, 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 – so called Elemental Chlorine Free (ECF) bleaching - is effective in reducing the potential for dioxin formation to non-detectable levels[54].

The BREF highlights that Elemental Chlorine Free (ECF) processes are increasingly being replaced by Total Chlorine Free (TCF) processes in order to further reduce/eliminate AOX emissions and dioxin formation [55]. However, for viscose fibres ECF pulp still dominates the market, with TCF mainly only used for specialist applications, such as medical devices. At the fibre production stage sodium hypochlorite (NaClO) bleach is still required to meet customer requirements for the uniform whiteness of the fibres. Hydrogen peroxide bleaching is used, but only for medical applications where chlorine cannot be present.

During revision of the EU Ecolabel textile criteria a proposal was made to replace the organically bound chlorine (OX) limit value for fibres with a simpler requirement for Elemental Chlorine Free (ECF) pulp or low halogenated wastewater discharges from pulp

[52] This methodological issue is discussed in Allacker.K, Souza.D and Sala.S, Land use impact assessment in the construction sector: an analysis of LCIA models and case study application, *The International Journal of Life Cycle Assessment,* November 2014, Volume 19, Issue 11, pp 1799-1809.
[53] 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
[54] European Commission, *Best Available Techniques reference document for production of pulp, paper and board*, IPPC Bureau, Draft May 2012.
[55] ibid 54

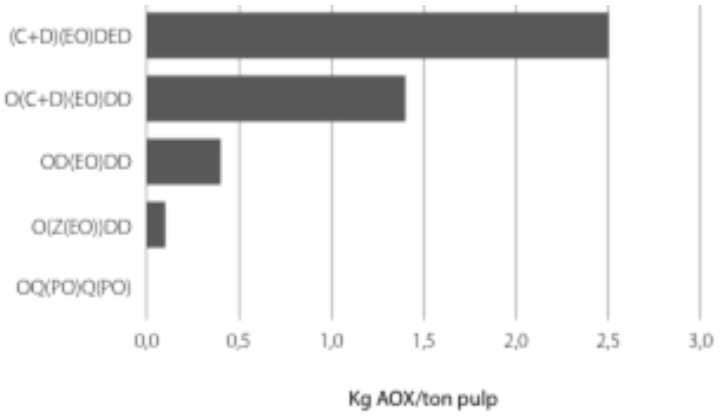
production. There is, however, no definitive form of ECF pulp production and establishing equivalence between fibre and pulp is not straightforward.

The pulp and paper BREF suggests that for modern plant halogenated emissions (AOX) levels in wastewater can vary in a range between 0.03 and 0.40 g/t pulp. The term 'ECF-light' has been used to describe bleaching sequences at the lower end of this range. Moreover, it is understood from discussions with a leading viscose manufacturer that meeting a limit value of 150g/t air dried pulp for OX in fibres would also require 'ECF-light' pulp production.

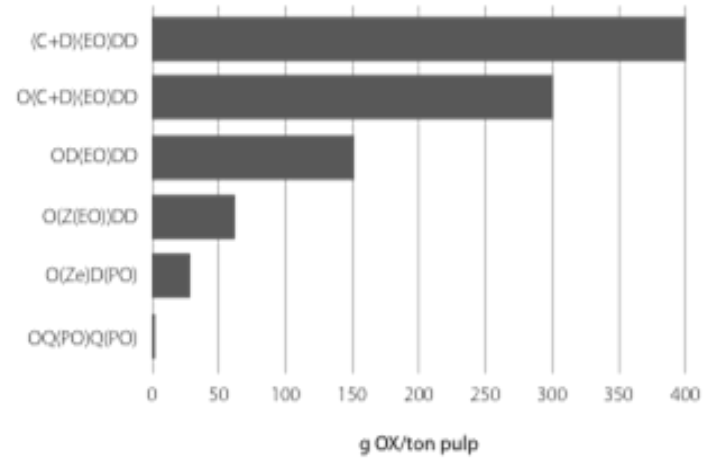
An indicative comparison of bleaching sequences published by METSO suggests that only bleaching sequences with AOX emissions of <0.15-0.17 kg/t of air dried pulp would permit an OX in fibres of <150g/tonne air dried pulp to be achieved (allowing for a contribution from bleaching of the final fibre)[56]. This is illustrated in Figure 3. On this basis a threshold of 0.17 kg/ADT pulp was proposed for the EU Ecolabel and is also proposed as a Comprehensive GPP criterion.

*Figure 3. Comparison of AOX and OX arising from bleaching sequences*

*a) AOX emissions from example ECF bleaching sequences*




*b) OX levels in pulp bleached with example bleaching sequences*




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

*Sourcing of legal wood pulp*

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

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

feedstock to produce, than paper pulp[57]. It is understood to be largely produced using eucalyptus, a tree grown in regions that may be of concern in terms of legal sourcing, as well as beech and bamboo pulp grown in Western Europe and China respectively.

Tackling illegal logging and associated trade is a policy objective for Europe in accordance with its 2003 Forest Governance, Law Enforcement and Trade (FLEGT) Action Plan. The Timber Regulation (EC) 995/2010[58] introduced new requirements for the sourcing of timber products from 2013, which includes wood pulp. It prohibits illegally harvested timber (domestic or imported) from being placed on the EU market and introduces 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.*

The Regulation defines 'legally harvested' as wood and wood-based materials (excluding packaging and recycled wood) that has been *'harvested in accordance with the applicable legislation in the country of harvest*'. 'Applicable legislation' means the legislation in force in the country of harvest covering the following matters:

- Rights to harvest timber within legally gazetted boundaries;
- Payments for harvest rights and timber including duties related to timber harvesting;
- Timber harvesting, including environmental and forest legislation including forest management and biodiversity conservation, where directly related to timber harvesting;
- Third parties' legal rights concerning use and tenure that are affected by timber harvesting; and
- Trade and customs, in so far as the forest sector is concerned.

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. Valid EU FLEGT and UN CITES licenses are deemed to provide assurance of legality.

Third party forest and forest products certification systems that meet the due diligence criteria set out in Article 6 of the Regulation can be used as a valuable tool in the due diligence system. These could, for example, include FSC 'Controlled sources' or verification by organisations such as SGS, Bureau Veritas and Control Union. These can be used as long as they can meet the due diligence criteria set out in Article 6 of the Regulation, and Article 4 of the Commission implementing Regulation (EU) No 607/2012[59].

Despite the obligations from the Timber Regulation, there is still a risk that timber used to manufacture pulp may originate from non-legal sources. Public authorities, which wish to

[57] European Commission, *Best Available Techniques reference document for production of pulp, paper and board*, IPPC Bureau, Draft May 2012.
[58] 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
[59] Further information available in the "Guidance Document for the EU Timber Regulation" available at: http://ec.europa.eu/environment/eutr2013/_static/files/guidance/guidance-document-5-feb-13_en.pdf

have a higher degree of reassurance that the timber is actually legally sourced, can include a contract performance clause requiring that the wood pulp supplied under the contract has been legally harvested.

*Sourcing of sustainable wood pulp*

European sustainable forestry policy [60] and certification schemes for sustainable forestry [61] find their basis in the UNEP and FAO principles of Sustainable Forestry Management (SFM) established at the Rio Earth Summit in 1992 [62]. These principles, although not defined in specific detail in UNEP or FAO literature, provide an internationally agreed reference point which is used by certification schemes. At European level, Sustainable Forestry Management (SFM) is now defined in more detail by Forest Europe's SFM criteria, which have been endorsed by ministers from European countries [63]. The conformance of certification schemes with ISO/IEC 17065 is also relevant in relation to the quality and assurance provided by the verification systems used [64].

In terms of market share the two most significant certification schemes are those operated by the Forestry Stewardship Council (FSC) [65] and the Programme for the Endorsement of Forestry Certification (PEFC)[66]. In 2009 these schemes accounted for 9% of global forestry and 26% of industrial timber supplies [67]. PEFC is the most significant scheme, accounting for over two thirds of certified timber on the world market. The majority (over 90%) of certified timber originates from Europe and North America.

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 a current EU Ecolabel license holder 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 Europe's man-made fibre association, CIRFS, suggested 25%.

Belgium[68], Denmark, Germany[69], UK[70] and the Netherlands[71] are notable for their detailed monitoring and evaluation of forestry certification schemes in support of Green Public Procurement (GPP)[72]. These Member States use their own adapted criteria and processes to determine whether certification schemes provide sufficient assurance. They currently coincide in recognising that FSC and PEFC provide sufficient levels of assurance based on their national criteria. Denmark, Germany, the Netherlands and the UK are currently working together to identify the common ground between their respective timber procurement policies.

[60] European Commission, *EU forests and forest related products*, http://ec.europa.eu/environment/forests/home_en.htm
[61] Rametsteiner, E and M, Simula, *Forest certification—an instrument to promote sustainable forest management?* Journal of Environmental Management 67 (2003) 87–98
[62] Castaneda, F. *Criteria and indicators for sustainable forestry management*. UN FAO, http://www.fao.org/docrep/x8080e/x8080e06.htm#TopOfPage
[63] Forest Europe, *Sustainable Forestry Management criteria and indicators*, accessed August 2016, http://www.foresteurope.org/sfm_criteria/criteria
[64] ISO/IEC 17065: 2012*, Conformity assessment – requirements for bodies certifying products, processes or services*.
[65] Programme for the Endorsement of Forestry Certification, http://www.pefc.org/
[66] Forestry Stewardship Council, http://www.fsc.org/
[67] UNECE and FAO (2010) *Forest products annual market review* 2009-2010
[68] 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
[69] Germany Government Procurement Policy, *Wood and paper based products*, http://www.sustainableforestprods.org/tools/german_government_procurement_policy
[70] UK Central Point of Expertise on Timber (2008) *Review of forestry certification schemes results*
[71] Timber Procurement Assessment Committee, Netherlands, http://www.tpac.smk.nl/
[72] 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* 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

*Summary of stakeholder feedback*

**Stakeholder comments on the proposals**

The sulphur emissions threshold for staple fibres should be lowered to 20 g/kg, in order to reflect the lower threshold in the polymer BREF, which was published in 2003.

A stakeholder recommended focussing only on chlorine emissions from pulp and not the fibre. Moreover, they recommended lowering the OX level in fibres to 100ppm.

Recognising the problems raised in relation to sustainable forestry certification, a stakeholder called for 'deeper harmonisation' of certification schemes across the EU, with specific reference made to FSC and PEFC schemes as having the potential to form the basis for a common approach to timber policies in GPP criteria.

*Final criteria*

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **TECHNICAL SPECIFICATIONS** | |

**TS3. Man-made cellulose fibre (e.g. viscose, modal, lyocell)**

*(Same for core and comprehensive criteria)*

*This type of fibre may be used instead of cotton in a variety of clothing items or interior textiles requiring a softer handle. It may also be blended with synthetic fibres to improve wear and make it easier to dry. It is recommended to use this criterion only where the man-made cellulose fibre content of the textile products is greater than 50 %.*

**TS3.1 Sulphur emissions to air**

For viscose and modal fibres, the sulphur content of the emissions of sulphur compounds to air from the fibre production process, expressed as an annual average, must not exceed the values in table (a).

*Table a. Viscose and modal sulphur emissions values*

| **Fibre type** | **Performance value (g S/kg)** |
|---|---|
| Staple fibre | 30 g/kg |
| Filament fibre<br>- Batch washing<br>- Integrated washing | <br>40 g/kg<br>170 g/kg |

**Verification:**

The tenderer will upon award provide monitoring data, transaction records and batch production records demonstrating the compliance of supplier(s) and associated production sites used to manufacture the fibres used in the contract.

Compliant monitoring data will be provided for those production sites used to make the specific fibre product to be used in execution of the contract.

| | |
|---|---|
| | **TS3.2 Halogenated emission from pulp**<br><br>Pulp used to manufacture the fibre product used in the contract shall be bleached without the use of elemental chlorine.<br><br>The resulting total amount of chlorine and organically bound chlorine in the finished fibres (OX) shall not exceed 150 ppm or in the wastewater from pulp manufacturing (AOX) shall not exceed 0.170 kg/t air dried pulp.<br><br>**Verification:**<br><br>The tenderer shall upon award provide a test report for the specific fibre product and its production line demonstrating compliance with either the OX or the AOX requirement, using the appropriate test method or equivalent:<br><br>- OX: ISO 11480 (controlled combustion and microcoulometry).<br>- AOX: ISO 9562. |
| **Sustainable Sourcing of wood pulp**<br><br>*These GPP criteria do not include a proposal on the sourcing of wood pulp derived from sustainable forestry, for the following reasons:*<br><br>Several Member States are using their own green or sustainable public procurement criteria to define sustainable forest management and have different processes in place to determine whether certification or other third party verified schemes provide sufficient assurance. In this situation, it was not possible, within the framework of this criteria development process, to provide a harmonised definition of sustainable managed forestry.<br><br>The current consensus of the Member States with an active sustainable timber procurement policy is that, in general, proprietary certification schemes, such as those of the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC) provide sufficient levels of assurance for compliance with their national criteria. | |

*Summary rationale for the requirements and verification:*

- Cellulose fibres such as viscose, modal and lyocell are manufactured from cellulose feedstock derived from timber, bamboo or cotton.
- Manufacturing these fibres results in wide ranging environmental impacts including natural resource use, habitat loss, energy use, air and water pollution.
- LCA evidence together with EU policy priorities suggest that criteria should focus on raw material (wood pulp) sourcing and emissions at the fibre production stage.
- Emissions to air of hydrogen sulphide are of concern during fibre production and are directly possible to verify and control by suppliers.
- A criterion is therefore proposed with limit values for emissions to air of sulphur from fibre production sites, with the criteria being aligned with the revised thresholds adopted in the EU Ecolabel for textiles, which reflects industrial best practice which is applicable as both a Core and Comprehensive technical specification.
- Halogenated emissions from pulp manufacturing are proposed as a more ambitious Comprehensive criterion because it requires verification from further along the supply chain. The thresholds are aligned with the EU Ecolabel.
- The sourcing of wood from legal forestry is a policy objective of the EU and a number of Member States. The raw material used to make this type of fibre raises

particular concerns given that it may be sourced from regions such as Asia where there is greater concern about deforestation.

- For the moment, in view of the differences in national timber procurement and on-going work aimed at identifying the communalities between different schemes, no requirements or definitions addressing the sustainability of wood pulp are currently proposed.

### *2.1.2.4 Polyester and Polyamide (nylon) fibres*

*Technical background to the criteria proposal*

The market analysis suggested that polyester and nylon are amongst the most frequently specified synthetic fibres in public procurement. Analysis of the life cycle of both fibres for the EU Ecolabel revision highlighted recycled content as the most significant environmental improvement option to reduce the raw material and process energy use associated with fibre manufacturing.

*The environmental improvement potential of recycled polyester*

Polyester with a recycled content is largely made from waste plastic PET bottles. A comparative LCA study of virgin PET and R-PET carried out by Shen et al (2010) quantified the environmental improvement potential of mechanical and chemical recycling options for seven out of eight of the Life Cycle indicators used, as illustrated in Figure 4 [73].

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 a lower impact, and therefore a better overall improvement potential, than chemical recycling.

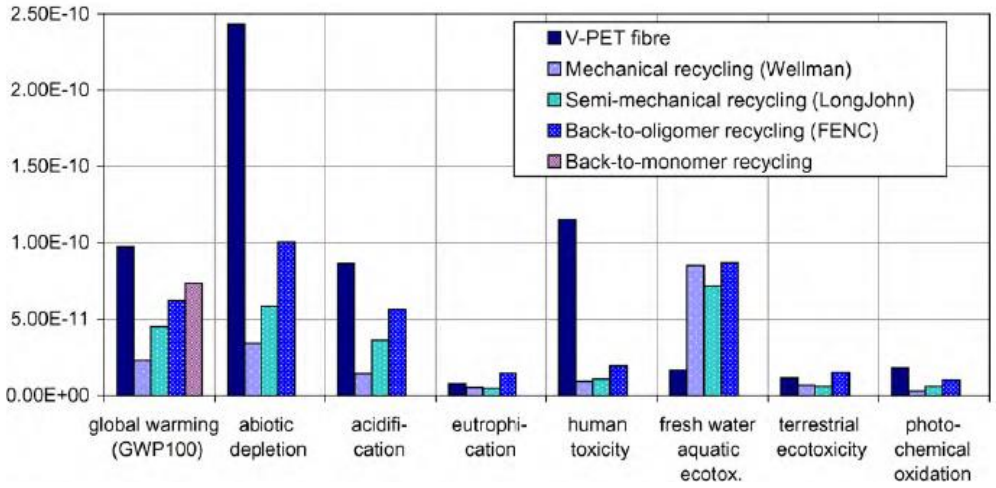



*Figure 4 Normalised results for 1 ton of PET fibre using a "cut-off" approach with cradle-to-factory gate for second life. Source: Shen et al (2010)*

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[74], is currently manufactured using 100% recycled PET feedstock. EU manufacturers include Wellman, Advansa, Miroglio, Greenfiber and Radici[75].

[73] 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)
[74] Oerlikon, *The fibre year 2009/10 – A world survey on textiles and non-wovens industry*, May 2010
[75] CIRFS full members, http://www.cirfs.org/MEMBERSHIP/CIRFSMembers/FullMembers.aspx

The technical specifications of staple fibre are close to the specifications required for PET bottles, so with adequate 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[76]. Feedback during the EU Ecolabel revision process highlighted that quality issues such as reduced fibre strength and abrasion resistance, as well as problems with dyeability and achieving colour consistency, are challenges when using fibres with recycled content. This is potentially problematic in meeting the higher quality specifications required in public contracts – for example, very detailed camouflage patterns for the military or for uniforms, where colour matching of tops and trousers is important. In the case of office upholstery fabrics sufficient abrasion resistance may only be possible to achieve by using pre-consumer waste polyester.

*The availability of polyester with a recycled content*

As already noted staple polyester fibre is already likely to contain a high recycled content and so is a relatively mature specification in the market. Filament fibre is understood to be more challenging as quality requirements are more exacting. In order to understand the availability and quality specifications of filament fibre with a recycled content, EU and global manufacturers of polyester filament fibre were identified and investigated:

- Mechanically recycled content: Two EU manufacturers are understood to manufacture filament fibre products – Filature Miroglio and Radici, both in Italy. Both claim to manufacture fibre products that are suitable for a wide variety of clothing applications, including technical wear and sportswear.
    - Filature Miroglio: The filament is manufactured with 100% recycled content and is solution dyed – a form of dyeing whereby the dye is incorporated into the fibre when it is manufactured [77]. Production capacity is quoted at 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[78]. 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 20%

[76] 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/
[77] Filature Miraglio, *Newlife product*, Accessed 2012, http://www.filaturemiroglio.com/eng/newlife.php
[78] Radici Group, *r-Starlight – Post-consumer recycled polyester*, Accessed 2012, http://www.radicigroup.com/starlightfibres/En/Products/Products_05.aspx

recycled content and is third party certified[79]. Production capacity is quoted as approximately 14,000 tonnes/annum[80].

- Chemically recycled content: As of 2013/14 and based on the available information and stakeholder input, it is understood that there are 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[81].
    - Hyosung's MIPAN Regen product is a 100% recycled content product and is third party certified by the Global Recycled Standard (GRS)[82].

Certification systems for recycled content were also explored. The most significant identified was the Global Recycle Standard. Their list of certified companies as of June 2012 included 18 manufacturers of polyester filament together with fabric containing filament with a recycled content[83]. Locations include China, India and Taiwan. The recycled content ranges between 10 and 100%. An example is Libolon in Taiwan which has a production capacity of 15,000 tonnes/annum[84]. Data obtained from GRS for the spread of recycled contents for GRS certified product is presented in Table 5.

*Table 5 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)

Other examples of certification include schemes established in EU Member States such as the Seconda Vita scheme in Italy [85] and the Belgian QA-CER scheme[86] as well as private schemes established by testing bodies such as Intertek's R-PET management system certification[87]. The organic natural fibre certification scheme GOTS also includes a requirement that any polyester fibre shall be of recycled origin[88].

Whilst the EN standard 15343 *'Plastics recycling traceability and assessment of conformity and recycled content'* has the potential to provide a traceability system for recyclate,

[79] Unifi, *REPREVE product line*, http://unifi.com/pdf/utsc_repreve_eng.pdf
[80] Textile News, UNIFI opens REPREVE recycling centre, May 2011 HTTP://WWW.TEXTILEWORLD.COM/ARTICLES/2011/MAY/UNIFI_OPENS_REPREVE_RECYCLING_CENTER.HTML
[81] Teijin Fibres Ltd, *Eco Circle*, http://www.teijinfiber.com/english/products/specifics/eco-circle.html
[82] 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
[83] Textile Exchange, *Companies certified to the Global Recycled Standard*, Current as of June 2012.
[84] Libolon, Polyester chips – using recycled polyester to create new polyester yarn, Accessed 2012 http://www.libolon.com/polyester.php
[85] Italian Plastics Institute, *Plastic seconda vita*, http://www.ippr.it/il-marchio-psv
[86] QA-CER, *QA-CER certification of the quality management system for recycling and production companies*, Version 1, January 2013
[87] Intertek, *R-PET management system certification system*, www.intertek.com
[88] Global Organic Textile Standard, http://www.global-standard.org/

consultation with EU fibre manufacturers suggests that it is only used by raw material suppliers. Instead it is understood that many EU manufacturers of recycled polyester fibres verify traceability via production management and raw material control using ISO 14021 and/or ISO 9000. This reflects the approach taken by QA-CER which is based on ISO 9000 *and* EN 15343.

*The environmental improvement potential of recycled nylon*

Nylon is more energy intensive to manufacture than polyester. This energy use can be traced to the production of the feedstock caprolactam (an amine), adipic acid and cyclohexanone which account for 89.4% - 92.4% of the primary energy inputs required, excluding feedstock energy.

Recycling of nylon 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[89]. This is because the production of the feedstock is avoided.

*The availability of nylon with a recycled content*

In order to understand the possible availability and quality specifications of nylon fibre with recycled content an attempt was made to identify EU and global manufacturers. Based on the best available information and input from stakeholders it can be seen that the number of manufacturers is currently limited. The following fibre 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[90]. 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. Feedstock includes used fishing nets.
- 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)[91]. 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[92]. Pre and post-consumer waste is used as feedstock. Data on production capacity could not be obtained. The recycled content of the fibre is third party certified. In 2011 the company launched a nylon textile take-back option for industry production waste[93].

Consultation with a stakeholder who has experience specifying recycled nylon confirmed its limited availability and higher price. 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 US review suggests that recycled nylon is available in a wider range of deniers than recycled polyester and that dyeability is comparable[94]. Information on comparative mechanical strength and abrasion resistance could not be obtained.

[89] 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
[90] Aquafil, *The Econyl project*, Accessed January 2013, http://www.aquafil.com/en/sustainability/the-econyl-project
[91] Hyosung, *MIPAN Regen product*, http://www.mipan.com/eng/products/regen.html
[92] Unifi, *REPREVE product line*, http://unifi.com/pdf/utsc_repreve_eng.pdf
[93] 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
[94] Thiry, M.C. (2010) *Everything old is new again – Recycling, recycled and recyclable fibres*, AATCC review, USA

*Summary of stakeholder feedback*

**Stakeholder comments on the proposals**

A stakeholder commented that tenderers should have the option to demonstrate other environmental improvement activities, as is the case with the EU Ecolabel criteria. It is also not clear why other man-made fibres are not included.

A requirement for antimony-free polyester was proposed by one stakeholder in addition to recycled content. The availability of this specification should be checked. It was claimed that the longer timescales for procurement would give suppliers more time to identify antimony-free suppliers.

It was noted that the certification GOTS includes a requirement that any polyester fibre used in a fabric (up to 30% by weight) shall be recycled. It should therefore be mentioned as being accepted or as equivalent.

A note of caution was raised in relation to the recycling of polymers that may contain hazardous chemicals. The recyclability of synthetic fibres should therefore be considered, with the US Cradle to Cradle scheme[95] being proposed as a possibility.

*Final criteria*

| Core criteria | Comprehensive criteria |
|---|---|
| **TECHNICAL SPECIFICATIONS** | |
| | **TS4. Polyester recycled content**<br><br>Polyester fibre product(s) to be used in fulfilment of the contract must be manufactured using a minimum recycled content of 20 %.<br><br>*Note: Technical issues may be encountered in meeting other quality specifications required in a contract. This should be taken into account when evaluating tenders and could also be addressed through market enquiries or during competitive dialogue (if used).*<br><br>**Verification:**<br><br>The tenderer will upon award demonstrate that the production line(s) for the fibre product are dedicated to production with the minimum recycled content.<br><br>Third party certification of the recycled content and its traceability will be provided for the production lines of the products to be delivered and the recyclate feedstock. ISO 14021, ISO 9001 or equivalent may be used. The verification will provide information in accordance with parts 4.4 of EN 15343. |

[95] Cradle to Cradle products programme, http://www.c2ccertified.org/

| AWARD CRITERIA | |
|---|---|
| | **AC2. Polyester and polyamide (nylon) recycled content**<br><br>Points will be awarded for polyester and/or nylon fibre product(s) to be used in fulfilment of the contract for each additional increment of 10 % greater than a minimum recycled content of 20 % pre-consumer and/or post-consumer waste.<br><br>*Note: Technical issues may be encountered in meeting other quality specifications required in a contract. This should be taken into account when evaluating tenders and could also be addressed through market enquiries or during competitive dialogue (if used).*<br><br>**Verification:**<br><br>The tenderer will upon award demonstrate that the production line(s) for the fibre product are dedicated to production with the minimum recycled content.<br><br>Third party certification of the recycled content and its traceability must be provided for the production lines of the products to be delivered and the recycle feedstock. ISO 14021, ISO 9001 or equivalent may be used. The verification must provide information in accordance with parts 4.4 and 6 of EN 15343. |
| | **AC3. Polyester recycling**<br><br>Points will be awarded to tenderers that can demonstrate:<br><br>– that the design of the final textile product facilitates ease of separation for polyester fabrics at the end of a product's service life;<br>– the provision of a voluntary take-back route for the textile product so that the contracting authority can return polyester fabrics to be recycled or reused.<br>**Verification:**<br><br>The tenderer must upon award:<br><br>- provide details of the design measures and features that will facilitate ease of fabric separation for recycling, and/or;<br><br>- provide details of the take-back arrangements and a written commitment that extends in time to cover the end-of-life of the products. |

*Summary rationale for the requirements and verification:*

- Polyester and polyamide (nylon) are understood to be by far the most commonly specified man-made fibres in public contracts.

- The incorporation of recycled content into polyester and nylon fibres was identified during revision of the EU Ecolabel textile criteria as the measure with the most significant potential for life cycle environmental improvement. This is because it avoids the manufacturing of virgin feedstock.
- Recycled polyester manufactured from PET drinks bottles is becoming common on the global fibre and textile market, although there are still issues relating to quality in some end-uses, for example with fibre strength for some applications and with military camouflage and uniforms where colour matching is important. Both staple and filament fibre can be specified with high recycled content.
- Recycled nylon is less common because of a limited supply of feedstock and there is less industry experience of its use in textile products.
- Given that recycled polyester fibre is more prevalent on the market it is proposed that the EU Ecolabel minimum requirement for filament fibre of 20% is used as a Comprehensive criterion. Whilst staple fibre with higher content is easier to source, it is considered that a 20% threshold would recognise that Contracting Authorities may not have prior knowledge as to whether staple of filament fibre will be used in products. *An advisory note has also been added that quality issues may, nonetheless, arise.*
- Given the potential for issues relating to quality at higher recycled contents – for example, fibre strength, abrasion resistance and colour uniformity - it is proposed that recycled content for higher contents of recycled polyester and for all recycled nylon are award criterion, with the 20% threshold used in the EU Ecolabel used as a starting point for then rewarding further increments of 10%. This would also recognise that recycled nylon is less prevalent in the market and that pricing may be higher.
- It is important to ensure a clear and verifiable link between the subject matter – i.e. the textile products to be supplied – and the achievement of the recycled content. The evidence collected suggests that fibre manufacturers produce specific fibre/yarn lines using dedicated production lines. Verification is therefore proposed to focus on verification for the specific fibre or yarn product line.
- Certification and traceability of recycled feedstock can be achieved for a production site and related to a fibre product if there is a dedicated production line. Systems modelled on EN 15343 and/or ISO 9000 are currently used by the EU synthetic fibre industry. Examples include Member State schemes in Italy and Belgium and private schemes such as the Global Recycled Standard (GRS) and Intertek's R-PET management system.
- It is therefore proposed that verification is based on EN 15343 and, depending on their availability, Member State or private third party certification systems. Whichever system is used it shall as a minimum address sections 4.1, 4.3 and 6 of EN 15343, which describe the basic requirements for a traceability system – control of input, recyclate characterisation and recycled content.
- The recyclability of synthetic fibres is an important consideration for the establishment of a circular economy. An additional award criterion is therefore proposed that would encourage closed loop systems, design for ease of separation of fibres and accessories at the end of service life and/or the certification of the recyclability of fibres. Only polyester is proposed to be covered, as this has been the focus of attention by industry.
- The closed loop take back option reflects Teijin's 'Eco-circle' scheme to which a number of EU clothing manufacturers now form partners.

### 2.1.3 Chemical restrictions

Textile manufacturing requires multiple production stages and chemical processes to deliver finished products. As part of the revision of the EU Ecolabel textile criteria an extensive review of chemical restrictions relating to different processes was carried out. This review sought to distinguish between hazardous substances that are of concern at different points in the product lifecycle:

- Those that are of concern at production sites because they may be released to the air or water, and;
- Those that are of concern because they may remain on the final product and during the use phase may expose the end-user or, as a result of washing, may be released into the aquatic environment.

Substances from earlier processing stages such as oils applied to fibres during spinning and weaving are, according to the textile BREF and IMPRO Textiles, those of the greatest significance in terms of the environmental pollution of wastewater from production sites. However, it should be recognised that for GPP these production stages may be particularly challenging to verify as they may not be easily controlled by a final product manufacturer and may be difficult to trace along the textile supply chain. An indicative overview of the textile supply chain is presented in Figure 5.

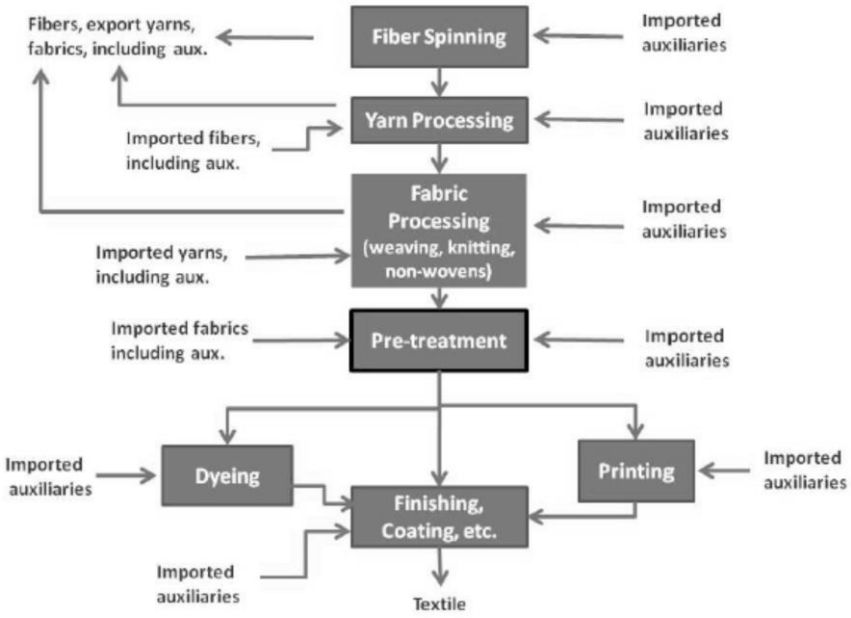



*Figure 5. Indicative overview of the EU textile supply chain*

Source: AFIRM (2011)

The European Commission's Reference document on Best Available Techniques for the Textiles industry (2003)[96] additionally identifies the following substance groups of concern for water pollution:

- Akyl phenol ethoxylates (APEO's) surfactants
- PBDE and chlorinated paraffin flame retardants
- Process auxiliaries including EDTA, DTPA and NTA

[96] Joint Research Centre (IPTS), *Reference documents*, European Commission, http://eippcb.jrc.ec.europa.eu/reference/

- Metal containing substances such as potassium dichromate
- Chlorine and chlorine releasing compounds such as hypochlorite bleach
- Potentially carcinogenic substances such as certain azo dyes
- Halogenated carriers used in dyeing

All of these substance groups are addressed by the EU Ecolabel, with the lists of specific substances updated to reflect more recent prioritisation of substances for restriction or authorisation under REACH. Volatile Organic Compounds (VOC's) are additionally identified as being of concern for air pollution, particularly the following which are associated with so-called 'finishing' processes:

- Pigment printing pastes used in printing processes
- Cleaning processes that use organic solvents
- Heat treatments where the substances applied degrade or evaporate

Substances from the bleaching (optical brighteners), dyeing, printing and finishing stages were identified by the EU Ecolabel revision process as being of the greatest significance in terms of chemicals that may remain on the final product.

#### 2.1.3.1 Substances to be tested for on the final product

*Technical background to the criteria proposal*

Substances that may remain on the final product can be readily grouped by their function, with their presence on the final product varying according to the fabric and the specification of the final product. Indicative concentrations for substances found on final textile products are presented by function group in Table 6 .

*Table 6 Indicative concentrations of functional and residual substances on final textile products*

| Functional group | Concentration on finished product (% w/w) | Technical notes |
|---|---|---|
| Dyes<br>*Aryl amines* | 0.05 – 3.0%<br>>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 auxiliaries. |
| Surfactants | 5.5 – 26.4 mg/kg | Residual concentrations may remain from dyeing, washing and finishing. |
| 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. |

Evidence from a risk assessment of textile products in Germany concluded that the concentrations and range of substances commonly found in final textile products generally pose minimal health risks to the consumer[97]. There are, however, some combinations of garments and substances that evidence suggests pose higher risks e.g. tight, skin contact garments coloured with allergenic disperse dyes. Poorly regulated production outside of the EU can, however, result in greater risks of exposure because substances restricted by REACH or classified under CLP as carcinogenic, mutagenic or toxic to reproduction (CMR) may be used or be present on the final product e.g. APEO surfactants remaining from the washing of fabrics, azo dyes which cleave to carcinogenic aryl amines, formaldehyde remaining from finishing processes.

There is evidence from EU industry associations TEGEWA and ETAD[98] that in the EU the textile Industry has successfully reduced the number of hazardous substances used in textile formulations and recipes. This is particularly relevant to public procurement because in some cases, such as military wear, there may be a tendency to source textiles from EU production sites[99].

In an attempt to control their textile supply chains leading manufacturers implement Restricted Substance Lists (RSL's). RSL's are generally subject to due diligence which requires a combination of site visits and the sample testing of final products. Sample testing tends to be carried out 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 number of Type I Ecolabels include criteria that are based on final product testing, including the EU Ecolabel and the Blue Angel. Private certifications also exist that are based on final product testing, such as Oeko Tex 100[100] and Made in Green[101], and a combination of final product testing and production site standards, such as Oeko-Tex 1000 (now called Sustainable Textile Production)[102], GOTS and Bluesign[103]. Limited data was found to be available to indicate the market significance of these private certification schemes. It is understood that 125,000 Oeko-Tex 100 product certifications were awarded in 2013. Feedback from stakeholders underlined their significance in the market, with Oeko-Tex 100, for example, providing worldwide access to accredited laboratories that are familiar with the test methods used.

Oeko Tex 100 is currently referred to in the national GPP criteria of Austria, Belgium, Denmark, Netherlands and Sweden. Feedback from a limited number of public sector stakeholders also suggests that Oeko Tex 100 is actively being used as a technical specification for textiles. This is because it offers a simple verification option, being based largely on the testing of the products to be supplied.

[97] Federal Institute for Risk Assessment, *Introduction to the problems surrounding garment textiles*, BfR Information No. 018/2007, 1 June 2007
[98] ibid 96
[99] See footnote 8
[100] Oeko Tex Association, *Oeko Tex Standard 100*, Accessed 2014, https://www.oeko-tex.com
[101] Aitex, http://www.aitex.es
[102] Oeko-Tex Association, *Sustainable Textile Production (Step)*, Accessed 2014, https://www.oeko-tex.com/en/manufacturers/concept/sustainable_textile_production_step/step.xhtml
[103] Bluesign, *The Bluesign system*, Accessed 2014, http://www.bluesign.com/

In the example of a procurement exercise by the French Navy specific limit values were set for the presence of four chemicals in the final supplied product – aromatic amines, azo dyes, cadmium and formaldehyde[104]. Oeko Tex 100 certification was accepted as verification, as well as equivalent test results from accredited laboratories.

*Candidate List 'Substances of Very High Concern'*

In the EU Ecolabel criteria a restriction is made on the presence of SVHCs identified under the REACH system in Europe. A threshold of 0.1% for the non-presence of SVHCs is set, reflecting the legal requirements for notification upon request by consumers under Article 33(2) of the REACH Regulation, which manufacturers and their suppliers are familiar with as they are under a legal requirement to provide such declarations.

A practical issue faced by manufacturers is that not all Candidate List substances are relevant for textiles. Whilst suppliers must, according to the law, provide a notification of the presence of SVHC in articles placed on the EU market, it would be prohibitive to verify such a notification, because analytical testing would be required for all substances on the Candidate List, or at least those identified as being relevant to the product. It is therefore considered that at this stage only the act of providing the declaration would be required as a technical specification.

*Summary of stakeholder feedback*

**Stakeholder comments on the proposals**

The overall stringency of the criteria addressing chemicals in the textiles was questioned by one stakeholder. They should be stricter as they only refer to compliance with regulatory requirements. Reference was made to the approach proposed by the Swedish Chemical Agency, which takes a more precautionary approach.

The testing of the product on a risk basis should be strengthened by referring to hazard classifications as used in the EU Ecolabel. Moreover, the presence of SVHCs, and more specifically CMRs, should be restricted. Information is available because declaration by manufacturers is required under REACH Article 33.

Dyes that are Carcinogenic, Mutagenic or toxic for reproduction (CMR) and sensitising should be included within the scope of Annex 1 of the criterion. Metal complex dyes based on copper, chromium and nickel should also be added. There are already bans on their use in many textile environmental labels, including Bluesign and Oeko-Tex. It was, moreover, queried why the restrictions are in some cases less strict than Oeko-Tex 100.

The degradability of used auxiliaries and finishing agents for fibres, yarns and fabrics, or the quality of the wastewater arising from these processes is not addressed.

The proposed 16 ppm restriction on formaldehyde for skin contact products was considered by one workwear manufacturer to be too strict. It would make it technically very difficult to meet the requirements in criterion P5.1 for 'smoothness retention'. The lack of durability of alternative resins at high wash temperatures required for thermal disinfection was also cited as a particular problem. The 75ppm threshold used by Oeko-Tex 100 was proposed instead.

[104] European Commission, *Sustainable uniforms for the French Navy*, GPP in Practice information sheet

*Final criteria*

| Core criteria | Comprehensive criteria |
|---|---|
| **TECHNICAL SPECIFICATIONS** | |
| *(Same for core and comprehensive criteria)*<br><br>The tenderer must declare the presence of any REACH Candidate List[105] substances at a concentration of greater than 0.1 % (weight by weight) in the finished product.<br><br>**Verification:**<br><br>The tenderer must provide a valid REACH Article 33(2) declaration upon delivery of the finished article(s). If Candidate List substances are declared as being present, they must be identified. | |
| *(Same for core and comprehensive criteria)*<br><br>The final supplied product must not contain the substances listed in Annex 1 at greater than the individual or sum total concentration limits. This must be demonstrated by laboratory testing of a sample of each product type supplied during execution of the contract. The contracting authority will reserve the right to also request a further random check.<br><br>**Verification:**<br><br>Each product sample must be analysed by a laboratory accredited to carry out the relevant tests according to ISO 17025 or by the accreditation body for a textile testing scheme that requires product testing. Certificate(s) demonstrating compliance must be provided upon delivery of the goods.<br><br>Where the test methods are the same, test results from valid Type I ecolabels, including the EU Ecolabel, as well as third-party textile testing schemes, must be accepted [106]. | |

*Accompanying Annex 1 substance restrictions*

| Substance group | Restrictions that shall apply | Concentration limits | Test method |
|---|---|---|---|
| **1.1 Azo dyes**<br><br>*Applicability:*<br><br>Clothing containing acrylic, cotton, polyamide and wool. | Azo dyes shall not be used that may cleave to aromatic amines that are known to be carcinogenic (*see the listing provided in Appendix 2 of the EU Ecolabel* [107]). A limit value for aryl amines shall apply for the purpose of testing the final product. | 30 mg/kg for each amine | EN 14362-1 and 3 or equivalent. |
| **1.2 Formaldehyde**<br><br>*Applicability:*<br><br>All clothing and interior textiles containing natural fibres. | The following limit values apply to residual formaldehyde on the finished product:<br><br>- Products for babies and children under 3 years old<br><br>- All other products<br><br>*Improved performance for skin contact garments could additionally be requested as an award criterion [108].* | 16 ppm<br><br>75 ppm | EN ISO 14184-1 or equivalent. |

[105] The REACH candidate list available at https://echa.europa.eu/regulations/reach/authorisation/the-candidate-list.
[106] At the time of writing the schemes Oeko Tex 100, Bluesign and GOTS are considered to provide a sufficient level of assurance.
[107] European Commission, *EU Ecolabel textile product group*, http://ec.europa.eu/environment/ecolabel/products-groups-and-criteria.html
[108] There may be a trade-off in terms of the quality and durability of stay press garments, particularly where garments are to be subject to high temperature washing.

| | | | |
|---|---|---|---|
| | *The following requirement can be applied as a Comprehensive criterion for interior textiles only:*<br>- Emissions from the final product | 0.1 mg/m³ | EN 16516 and EN ISO 14184-1 or equivalent |
| **1.3 Auxiliaries**<br>*Applicability:*<br>All products. | The following substances shall not be present on the final product:<br>- Nonylphenol<br>- Octylphenol | 100 mg/kg sum total | Solvent extraction followed by HPLC/MS |
| | The following substances shall not be present on the final product:<br>- Nonylphenol ethoxylates<br>- Octylphenol ethoxylates | 100 mg/kg sum total | ISO 18254 |
| **1.4 Coatings, laminates and membranes**<br>*Applicability:*<br>Where incorporated into textile structure | Coatings, plastisol printing, laminates, membranes and plastic accessories shall not contain the following phthalates:<br>- DEHP (Bis-(2-ethylhexyl)-phthalate)<br>- BBP (Butylbenzylphthalate)<br>- DBP (Dibutylphthalate)<br>- DMEP (Bis2-methoxyethyl) phthalate<br>- DIBP (Diisobutylphthalat)<br>- DIHP (Di-C6-8-branched alkyphthalates)<br>- DHNUP (Di-C7-11-branched alkylphthalates)<br>- DHP (Di-n-hexylphthalate) | Sum total 0.10% w/w | EN ISO 14389 or equivalent. |

*Summary rationale for the requirements and verification:*

- The presence of certain hazardous textile chemicals can be tested for on the final product, providing a relatively definitive basis for verification of their presence or non-presence.
- EU textile manufacturers and brands are increasingly testing their final products for the presence of hazardous chemicals, providing their suppliers with restriction lists with which they shall comply. These so-called Restricted Substance Lists (RSL's) consist of a combination of final product testing and declarations based on production formulas.
- A number of certifications exists for final product testing, with the most widely used being the Oeko Tex 100 scheme. This scheme is referred to in the national green procurement criteria of at least five Member States and its underlying substance restrictions are actively being used in tenders.
- It is proposed that given the increasing use of final product testing in procurement and the potential ease of verification that a small number of final product tests are identified for inclusion as Core and Comprehensive technical specifications.

- Four tests for substances of high concern are proposed having been identified from the EU Ecolabel criteria and the EU textile BREF – azo dyes, formaldehyde, APEO's and phthalates. These are proposed to be listed in the annex of the criteria document. Moreover, the requirement relating to azo dyes is reflected in ISO 13688 Protective clothing – general requirements.
- Reflecting current procurement practices Oeko-Tex 100 limits on free formaldehyde are proposed for skin contact products. An additional 'safety net' limit on emissions from interior products is proposed given the reclassification of formaldehyde as a Category 1B carcinogen.
- A restriction on the use of CMR dyes is considered to be more appropriately addressed in the award criterion P3.3/Annex 2 because they are not routinely tested for by certifications such as the EU Ecolabel or Oeko-Tex 100.
- The possibility for a further random check of products supplied is noted in the criterion, reflecting the practice of certifications such as Oeko-Tex 100.

#### 2.1.3.1 Restrictions on the use of substances to be verified by production sites

*Technical background to the criteria proposal*

As it has already been identified many production stages raise concerns relating to the potential for pollution of air and water resulting from the wide range of textile chemicals used. Many of these substances are used in production formulas to pre-treat fabrics and to apply colours, coatings and prints, as well as to impart specific finishes and handle to the final product as specified by the client.

In order to control the use of hazardous chemicals at these production stages verification invariably must take place at the production site. This is because it is more difficult to systematically trace the use of these substances on the final product or to use this to determine the extent to which the environment may have been exposed.

The philosophy of Type I Ecolabels such as the EU Ecolabel and the Blue Angel, as well as private certification schemes such as Bluesign, GOTS and STeP (Sustainable Textile Production), is to avoid their use at source by substituting hazardous chemicals in production formulas. These schemes include site visits to verify declarations and management systems linked to compliance with Restricted Substance Lists. EU textile manufacturers are also understood to regularly carry out site visits to production sites, including those in the Far East, although the extent to which manufacturers are addressing environmental management cannot be substantiated.

Feedback from public sector stakeholders is that some form of third party verification would be preferable for sub-contracted production sites outside of the EU. In contrast contractors with production sites located in the EU could be more readily visited if a concern was raised about compliance. The main requirement in this case is therefore to ensure that *if required* the criteria can be verified by a public authority.

In the revised EU Ecolabel a link was made between the use of certain types of coatings such as repellents and flame retardants and durability of the function they provide. This was with a view to minimise leaching of the coating to the environment during wash cycles and to extend the useful life of the product. A link is therefore proposed to the product criteria on durability.

*Final criterion*

| Core criteria | Comprehensive criteria |
|---|---|
| **AWARD CRITERIA** | |
| | **AC4. Restrictions on substances to be verified at production sites**<br><br>Points will be awarded to tenderers who restrict use of the substances listed in Annex 2 in dyeing, printing and finishing production processes for the supplied product(s).<br><br>**Verification:**<br><br>The tenderer must provide upon delivery of the goods a valid site audit report carried out by a third party verifying the production formula used at the dyeing, printing and finishing sites for the product. The audit report must be not older than two years and must include:<br><br>– findings from inspections of chemical stores and the operation of production processes;<br>– confirmation of the formulations used, and;<br>– results of analytical testing (if carried out) at each site. |

*Accompanying Annex 2 substance restrictions*

| Substance group | Restrictions that shall apply | Verification requirements |
|---|---|---|
| **2.1 Dyes and pigments** | The following dyes and pigments shall not be used in textile production:<br><br>Acid Red 26, Direct Black 38, Disperse Blue 1, Basic Red 9, Direct Blue 6, Disperse Orange 11, Basic Violet 14, Direct Red 28, Disperse Yellow 3, Pigment Red 104, Pigment Yellow 34 | Site audit at which the dyes used are to be identified. |
| **2.2 Auxilliaries** | The following substances shall not be used in textile production:<br><br>- bis(hydrogenated tallow alkyl) dimethyl ammonium chloride (DTDMAC)<br>- distearyl dimethyl ammonium chloride (DSDMAC)<br>- di(hardened tallow) dimethyl ammonium chloride (DHTDMAC)<br>- ethylene diamine tetra acetate (EDTA)<br>- diethylene triamine penta acetate (DTPA)<br>- 4-(1,1,3,3-tetramethylbutyl)phenol<br>- 1-Methyl-2-pyrrolidone<br>- Nitrilotriacetic acid (NTA) | Site audit at which the chemical used as auxiliaries are to be identified. |
| **2.3 Bleaching** | Chlorine based bleaches shall not be used for the bleaching of any yarns, fabrics or knitted panels. | Site audit at which the bleaches used are to be identified. |
| **2.4 Water, stain and oil repellent treatments** | *Core requirement:*<br><br>Long chain (≥C5) perfluoroalkane sulfonic acids or sulfonates (PFSA) and (≥C7) perfluoroalkyl carboxylic acids or carboxylates (PFCA) substances shall not be used.<br><br>*Comprehensive requirement*:<br><br>Fluorinated water, stain and oil repellent treatments shall not be used, unless these functions are required in combination.<br><br>*In addition, for both Core and Comprehensive criteria the garment(s) shall be tested to be durable (see Criterion TS7)* | Site audit at which the repellents used for the finishes are to be identified. |
| **2.5 Waterproof membranes** | Fluoropolymer membranes and laminates used for outdoor clothing shall not be manufactured using PFOA or any longer chain fluorinated surfactants. | Site audit of the membrane/laminate supplier *or* documentation from a government regulatory body. |

| | | |
|---|---|---|
| **2.6 Flame retardants** | *Core requirement*:<br><br>The following flame retardants shall not be used:<br><br>- HBCDD – Hexabromocyclododecane<br>- DecaBDE – Decabromodiphenyl ether<br>- TEPA – Tris(aziridinyl) phosphinoxide<br>- TRIS – Tris (2,3 dibromopropyl) phosphate<br>- TCEP – Tris (2,chloroethyl)phosphate<br>- Paraffin, C10-C13, chlorinated (SCCP)<br><br>*Comprehensive requirement:*<br><br>Where fire protection is required the fabric shall be tested to provide a high level of durability *(see Criterion TS7)* | Site audit at which the flame retardants used are to be identified. |

Summary rationale for the requirements and verification:

- Production formulas to achieve color, coatings and prints as well as finishes and softness of the fabric require a range of textile chemicals. These can include hazardous substances, some of which may be in the process of being restricted or authorised under the EU's REACH system.
- The restriction of their use requires verification at production sites of the formulas and recipes used.
- Six restrictions have been identified, one related to dye types which have wide application, two which can be applied to all textile products – auxiliaries and bleaching – and three which relate to technical functions of fire protection and repellency (water, stain or oil).
- The restrictions are based on the EU Ecolabel, although in the case of flame retardants only those substances not yet subject to REACH restrictions are listed, and in the case of repellents, a differentiation is proposed to be made between Core and Comprehensive, given that non-fluorinated repellents would be too selective at the moment for the Core criteria.
- The EU Ecolabel largely relies on self-declarations on the basis of Safety Data Sheets (SDS) which detail the chemicals used and their hazardous properties. Concern about the assurance this form of verification would provide of compliance by production sites located outside of the EU suggests that third party site audits should be considered.
- Whilst third party auditing is understood to be less prevalent in the market at the moment there are an increasing number of certifications that require this (e.g. STeP, Bluesign, GOTS) and second party audits are regularly carried out by some major textile manufacturers. A number of the leading EU workwear manufacturers still operate their own production sites in Europe, potentially making audits more affordable.
- On this basis it is therefore proposed that this criterion is made an Award criterion. This would recognise that third party site audits would incur additional costs and are not currently common practice. Only those tenderers offering this higher level of assurance would acquire extra points. Moreover, it is proposed to link the fire protection and repellency restrictions to a requirement for such treatments to be durable, thereby minimising loss to the environment during washing and extending the useful life of the product.

### 2.1.4 Durability and lifespan extension

#### 2.1.4.1 Durability standards

*Technical background to the criteria proposal*

JRC-IPTS's IMPRO Textiles LCA study highlighted the importance of extending the lifespan of textiles in order to minimise life cycle environmental impacts. The importance of the relative durability and 'rate of use' of a product has also been highlighted by Kalliala and Nousiainen (1999). Their LCA analysis of towels and bed linen supplied as textile services found that an extended lifespan resulted in a 42% reduction in production-related impacts.

In the UK a protocol is being developed to support decision-making on how to extend the lifespan of textiles[109]. Developed by WRAP in conjunction with Nottingham Trent University the 'longevity protocol' has been developed based on wash cycle tests and user trials for basic garments. It is proposed as a point of reference in the UK's draft new Government Buying Standards. The protocol includes a set of Core test performance standards which reflect some of the commonly used performance tests used by clothing manufacturers[110]. The following core tests are specified as result of the background study:

- Dimensional stability to washing and dry cleaning
- Colour fastness to washing, water/perspiration, light and rubbing
- Pilling
- Spirality
- Seam slippage
- Seam strength
- Fusible lamination

Dimensional stability, colour fastness and pilling are already established tests for consumer items, as reflected in the criteria of the EU Ecolabel. Dimensional stability and washing colour fastness are relevant for all forms of garments, although in some cases fastness to dry cleaning is more important. For uniforms and presentational wear colour fastness to perspiration and rubbing are of relevance to maintain their appearance. Tear strength and low seam slippage are also identified as being important[111].

ISO 13688 describes general requirements for workwear. This includes performance benchmarks for dimensional change according to ISO 5077 (washing) after domestic and/or industrial wash cycles, as well as referring to ISO 3175-1 (dry cleaning). EN 471 describes general requirements for high visibility clothing and includes requirements on dimensional stability, colour fastness, tensile strength (woven fabrics) and bursting strength (knitted materials). These requirements are to a great extent mirrored by the European Textile Services Associations' requirements for workwear fabrics [112], which are focussed on cotton polyester blends to be washed under industrial conditions. These requirements additionally include crease recovery.

A review of example tender documents, together with feedback from selected work wear manufacturers, highlighted the specification of requirements relating to dimensional stability, appearance after washing, abrasion resistance, tensile and tear strength, seam strength seam slippage and pilling.

A literature search to identify technical literature that could inform a prioritisation of these additional new tests revealed a number of papers analysing work wear durability, including military clothing. Seam efficiency – a combination of fabric and seam strength – is referred

[109] A *Clothing Longevity Protocol* prepared by WRAP and Nottingham Trent University as part of the UK's Sustainable Clothing Action Plan was reviewed in draft form. See also WRAP, *Design for longevity*, May 2013
[110] Intertek (2012) *Textile, apparel and garment testing, http://www.intertek.com/testing/apparel/*
[111] See WRAP (2013)
[112] European Textile Services Association, *ETSA requirements for work wear fabrics*, 19th January 2011.

to as having been used for many decades for military clothing. Crow and Dewar (1986) highlight that this may lead to over-specification of clothing, instead recommending seam strength based on the stresses to which the clothing is likely to be subjected. Bharani and Gowda (2012) highlight the importance of both the seam material and the fabric construction.

The proposed coverage of the criteria, both in terms of product types and performance testing, are specified in Table 7. The proposal is covering a range of different forms of work wear, together with bed linen. The test methods and benchmarks are the specified in the draft Annex 3 matrix referred to in the criteria (see below).

The repellency and flame retardancy tests are understood to be substantially more expensive. These have therefore been made Comprehensive criteria that specialist suppliers would be required to meet. An exemption from these testing requirements was also given in the EU Ecolabel requirements for fabrics which demonstrate 'inherent' repellent or fire protection properties e.g. a polyester fibre has a phosphorus compound incorporated into its structure, giving it inherent flame retardancy[113] or densely woven cotton that is as a result water repellent[114].

*Table 7. Applicability of the textile durability performance requirements*

| **Product type** | **Dimensional change** | **Washing colour fastness** | **Perspiration colour fastness** | **Wet rubbing colour fastness** | **Tensile strength** | **Seam strength** | **Water, dirt and stain repellency** | **Flame retardancy** |
|---|---|---|---|---|---|---|---|---|
| Tests applying to all products | ✓ | ✓ | | | | | | |
| Towels and bed linen | ✓ | ✓ | | | ✓ | | | |
| Uniforms and presentational work wear | ✓ | ✓ | ✓ | ✓ | | | | |
| Heavy duty work wear and PPE for field operations | ✓ | ✓ | | | ✓ | ✓ | | |
| Functional outerwear i.e. jackets, trousers, PPE | ✓ | ✓ | | | | | ✓ | ✓ |

*Summary of stakeholder feedback*

[113] Trevira, *How Trevira CS works*, Accessed 2014, http://www.trevira.com/en/textiles-made-from-trevira/home-textiles/flame-retardant-textiles-trevira-cs/how-trevira-cs-works.html
[114] Ventile Fabrics, Accessed 2012, http://www.ventile.co.uk/

**Stakeholder comments on the proposals**

A number of stakeholders considered the standard for abrasion resistance to be too high based on the specified test method and do not take into account the weight of the fabric. Industry standard poly-cotton shirt material would be able to achieve up to 20,000 cycles and heavier poly-cotton up to 60,000 cycles.

A stakeholder considered the number of wash cycles required for flame retardant articles to be too high. This will in practice depend on the application for the product.

Limited feedback was received as to whether an award criterion could be specified to encourage extended lifespans for products, for example to 25-50 wash cycles.

*Final criterion*

| Core criteria | Comprehensive criteria |
|---|---|
| **TECHNICAL SPECIFICATIONS** | |
| **TS7. Durability standards**<br>*(Same for core and comprehensive criteria)*<br>The textile products must meet the relevant durability requirements identified in Annex 3.<br>In the case of functional work wear that can demonstrate inherent performance characteristics that negate the need for water, dirt or stain repellents and/or flame retardant treatments to be applied to the textile fabric, the product will be exempted from testing requirements 3.7 and/or 3.8 in Annex 3.<br>**Verification:**<br>The tenderer will, for each distinct product design or item of work wear to be supplied, provide upon delivery of the goods reports from tests carried out in accordance with the standards specified in Annex 3. The reports will verify that each product type or model meets the specified durability requirements. | |

*Accompanying Annex 3 durability test methods and associated performance benchmarks*

*Core level of ambition*

| **Durability standard** | **Performance benchmarks** | **Test method(s)** |
|---|---|---|
| 3.1 Dimensional change | Woven fabrics<br>- Cotton and cotton mix +/- 3.0%<br>- Wool mix +/- 2.0%<br>- Synthetic fibres +/- 2.0%<br>- Bed linen and towels +/-8.0% | EN ISO 6330 (domestic washing) or equivalent, *or* ISO 15797 (industrial laundries) or equivalent in combination with EN ISO 5077 or equivalent after 3 washes. |
| 3.2 Washing colour fastness | 3-4 for colour change and staining | ISO 15797 or equivalent (where applicable) in combination with ISO 105 C06 or equivalent |
| 3.3 Perspiration colour fastness | 3-4 for colour change and staining, 4 for dark colours (standard depth > 1/1) | ISO 15797 or equivalent (where applicable) in combination with ISO 105 E04 (acid and alkaline comparison with multi-fibre fabric) or equivalent. |
| 3.4 Wet rubbing colour fastness | Level 2-3 | ISO 15797 or equivalent (where applicable) in combination with ISO 105 X12 or equivalent |
| 3.5 Tensile strength | <50% cotton N/(g/m$^2$) ≥ 2.0<br>≥50% cotton N/(g/m$^2$) ≥ 1.8<br>*Minimum performance 400 N* | EN ISO 13934 (Strip method) or equivalent |
| 3.6 Seam strength | 100 N at breakdown | EN ISO 13935 (Strip method) or equivalent |

*Comprehensive level of ambition*

| | | |
|---|---|---|
| 3.7 Water, dirt and stain repellency | *To be applied as Comprehensive criteria only:*<br><br>The following retention of functionality after either 20 domestic cycles at 40°C or 10 industrial cycles at 75°C:<br><br>- Water repellency: 80 out of 90<br>- Oil repellency: 3.5 out of 4.0<br>- Stain repellency: 3.0 out of 5.0<br><br>Industrial washing temperatures may be reduced to 60°C for garments with taped seams. | ISO 6330 (domestic) or equivalent *or* ISO 15797 (industrial) or equivalent in combination with:<br><br>- Water repellents: ISO 4920 or equivalent<br>- Oil repellents: ISO 14419 or equivalent<br>- Stain repellents: ISO 22958 or equivalent |
| 3.8 Flame retardancy | To be applied as Comprehensive criteria only:<br><br>Washable products shall retain their functionality after 50 wash cycles (Comprehensive criterion). | ISO 6330 (domestic) or equivalent, or as relevant to the contract requirements EN ISO 10528 (industrial) or equivalent in combination with EN ISO 12138 or equivalent. |

| | | |
|---|---|---|
| | Non-washable products shall retain their functionality after a soak test. | Where the textile is non-washable and/or non-removable the test method described in BS 5651, Section 4 or equivalent shall be used [115]. |

*Summary rationale for the requirements and verification:*

- Extending the lifespan of textile products is important to minimise their environmental impact. This can be achieved by specifying design and durability standards, drawing upon the extensive range of textile ISO and EN standards available to support comparability and verification.
- Research into textile durability and resistance to washing and drying cycles suggests that standards can be addressed in three broad areas relating to 1) wash resistance, 2) physical durability, and 3) durability of function.
- A framework of standards has been put together using the EU Ecolabel fitness for use criteria as a starting point, cross referenced with Member State and industry standards for work wear and flat wear.
- Wash resistance has been identified by UK work on longevity standards for clothing as an important factor, with dimensional stability and colour fastness under a range of conditions being already having been specified in industry guidance, EN 13688 and the EU Ecolabel.
- Physical durability is a more difficult area to set benchmarks because of the range of different textiles products and end-uses. Basic requirements relating to fabric and seam strength, as well as crease resistance, have been identified from industry guidance and literature. These are only to be applied to products receiving heavy wear.
- The durability of flame retardants and water, oil and stain repellent functions can be specified in order to extend the life of more costly and mission critical technical clothing items. Benchmarks for wash resistance have been set based on the revised EU Ecolabel criteria.
- Abrasion resistance has been omitted because no current industry consensus appears to exist on benchmarks for performance, which would need to reflect fabric weight, blend and intensity of use, and there are concerns related to the possible choice of test methods.

### 2.1.4.2 Availability of spare parts and accessories

*Technical background to the criteria proposal*

The early failure of closures such as zips, buttons, velcro and fasteners can require expensive repairs or lead to the early discard of work wear and uniforms. This can be the result of poor quality, with early failure occurring as a result of wear and tear, or as a result of laundry conditions [116]. For example, metal fasteners may rust, zips may seize up, elastic materials may not withstand laundry conditions. Zips in particular are understood to have high repair costs.

[115] This test method is based on that described in British Standard 5651*: Method for cleansing and wetting procedures for use in the assessment of the effect of cleansing and wetting on the flammability of textile fabrics and fabric assemblies*

[116] European Textile Services Association, *ETSA requirements for work wear garments*, February 2011

No more specific standards or guidance for the specification of accessories could be identified, so a focus could instead be placed on the continued availability of parts. It is understood from research undertaken on the corporate work wear market in the UK that product planning might typically be based on a 2 year lifespan, with the potential to shift to 3 years through better specification.

*Final criterion proposal*

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **TECHNICAL SPECIFICATIONS** | |
| **TS8. Availability of parts and accessories**<br><br>*(Same for core and comprehensive criteria)*<br><br>The successful tenderer must make spares available of all parts and accessories (e.g. zips, buttons, fasteners) that form part of the products to be supplied for a minimum of two years after product delivery or the duration of the supply contract (whichever is the longest). An indicative price list for these parts and accessories must also be provided.<br><br>**Verification:**<br><br>The tenderer will upon award provide a written commitment to fulfil the requirement as part of the product warranty and an indicative price list for the inventory of parts. | |

*Summary rationale for the requirements and verification:*

- The early failure of accessories can lead to high repair costs or the early discard of work wear and uniforms.
- Whilst no specific standards or guidance appears to exist it is proposed instead to require that spare parts are provided by suppliers for a minimum period of time in order to facilitate repairs. Two years is proposed for the Core criterion and three years for the Comprehensive criterion.
- In addition it is proposed that an indicative price list is provided in order to encourage more competitive pricing for parts and accessories.

### 2.1.5 Energy conservation during use

#### 2.1.5.1 Fabric selection to minimise drying and ironing energy use

*Technical background to the criteria proposal*

Energy use for washing, drying and ironing were identified by JRC-IPTS's IMPRO textiles study as being associated with the most significant life cycle impacts of a textile product. This finding was based on domestic washing whereas in the public sector work wear and linen may be washed in industrial laundries at temperatures greater than 75°C. Whilst evidence suggests that even though industrial laundries operate at higher temperatures they are still more efficient than domestic washing, the overall life cycle environmental and economic significance of industrial laundries is still greater than for product manufacturing.

Industrial laundry surveys highlight that the processes of drying and ironing account for around 85% of the energy consumption in industrial laundry operations, as illustrated by Figure 6 [117] The energy consumed in these processes is directly proportional to the amount of water remaining absorbed by a fabric after the process of mechanical extraction, usually

[117] The Carbon Trust (2011) *Industrial energy efficiency accelerator – guide to the laundries sector,* CTG 064, UK

by spinning[118]. This, in turn, is a complex function of the fibre selection and the fabric construction and weaving process, which influence the fabric's water absorption capacity and wicking properties and, consequentially, the amount of water retained after spinning and the drying time.

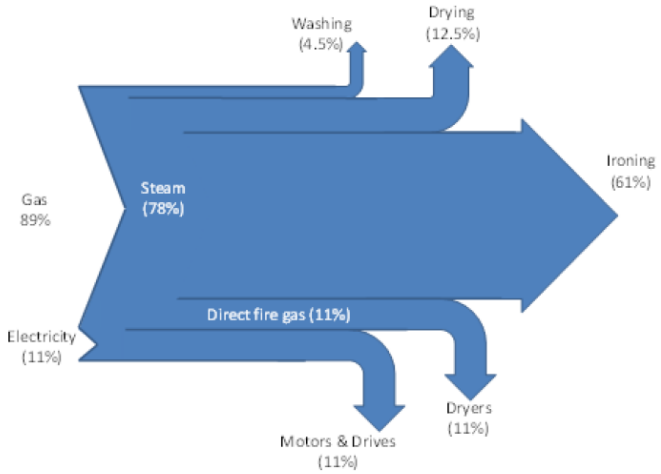



*Figure 7. Sankey diagram of primary energy use in an indicative flatwear laundry*

Source: The Carbon Trust (2011)

The potential to specify fabrics in order to save energy use in laundries is known, for example as documented in the LCA study carried out by Kalliala and Nousiainen (1999) and is actively pursued as a cost saving strategy in the textile service sector. Work in the laundry sector by the UK's Carbon Trust highlighted the use of energy saving fibres and fabrics as the second most significant energy saving measure out of the six major opportunities identified and of these it was the lowest cost measure[119].

The potential to address this issue within the GPP was therefore further explored, with literature and discussions with industry stakeholders suggesting that there are options to specify criteria on:

- The water absorption of a fabric;
- Measure the drying time of a fabric;
- The incorporation of hydrophobic synthetic fibres into a fabric;
- Residual water in the fabric after spinning.

Water absorption can be measured but would prejudice alternatives to cotton such as viscose which absorb more water but are claimed to have a shorter drying time because of the fibre structure. Whilst a shorter drying time is equated to less laundry energy use by some fibre manufacturers, a direct correlation could not be identified from technical literature. The incorporation of hydrophobic fibres, in particular polyester, has become standard practice to reduce drying and ironing energy, but because the blending varies a fibre specific threshold would need to be determined, which may be too prescriptive.

This leaves the last and preferred option – the water remaining after spinning, which is specified in ISO 15797. This may be the simplest option as it would leave the choice of fibre blend and fabric construction open to the bidder, although there may still be an issue for man-made cellulosic fibres which are claimed to still retain water after spinning but because of their greater evaporative surface require less energy to dry than cotton.

[118] Kalliala, E.M., and P. Nousiainen. 1999. Life cycle assessment. Environmental profile of cotton and polyester-cotton fabrics. AUTEX Research J. 1(1):8–20.
[119] See footnote 91

The amount of ironing required to prepare a textile, and therefore the amount of additional energy use, will depend on the easy care properties of the fabric. Easy care can be achieved through fibre blends – for example, polyester cotton – or the application of a cross linking finishing treatments. The resulting smoothness, or retention, of appearance after washing and drying can be evaluated according to the EN ISO standard 15487, which establishes a rating based on expert comparisons against a reference fabric.

*Final criterion*

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **TECHNICAL SPECIFICATIONS** | |
| **TS9. Fabric selection to minimise energy use for drying and ironing**<br>*(Same for core and comprehensive criteria)*<br>*(For textiles that will be washed on a daily or weekly basis)*<br>The fabric will be selected to have a moisture retention content after spinning of less than 35 % and a fabric smoothness grade after drying of SA3 for fabrics with cotton content of ≥50 % and SA4 where the cotton content is <50 %.<br>**Verification:**<br>The tenderer will upon delivery of the goods provide a test report demonstrating the fabric(s) performance according to the following methods:<br>- moisture retention content: EN ISO 15797 (or equivalent) washing procedure.<br>- easy care: EN ISO 15487 (or equivalent) appearance after washing and drying. | |

*Summary rationale for the requirements and verification:*

- Energy use for washing, drying and ironing is associated with the most significant life cycle impacts of textile products.
- The energy required for drying can be minimised by fabric selection. This is because different fibres and fabric constructions absorb different quantities of water, perform differently after spinning and have different drying times.
- Fabric specification to reduce laundry energy use is already understood to be common in textile services providing work wear, towels and bed linen, with the use of polyester cotton blends representing a common practice.
- Options for specifying a criterion that is not prescriptive on the fibre or blend to be used include setting requirements on water absorption capacity, the drying time, the blending with hydrophobic fibres and residual water after spinning.
- The preferred approach is, based on the laundry procedures in ISO 15797, to specify a maximum residual water content after spinning.
- The energy required for ironing can also be minimised by either chemical treatment or fabric blending, with the latter being more durable. It is proposed that a rating of a fabric's crease free appearance after washing and drying is specified based on EN ISO 15487 in order to minimise ironing requirements.

### 2.1.5.2 Care labelling textile maintenance

*Technical background to the criteria proposal*

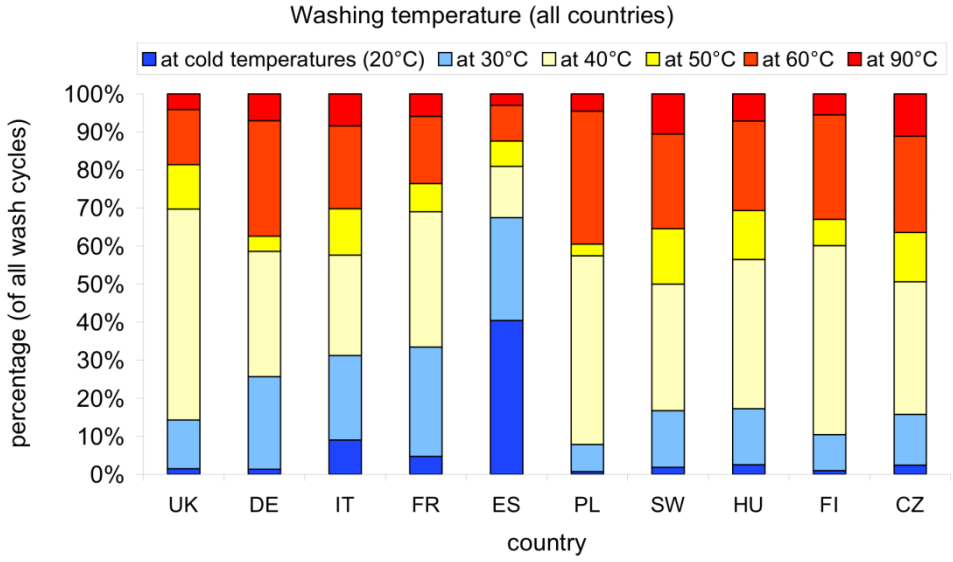
As has already been highlighted energy use in the textile use phase is an important focus for environmental improvement. Whilst interior textiles and work wear may be washed in industrial laundries as part of managed services, particularly where hygiene requirements dictate the need for controlled washing conditions, the majority of work wear (95%) is understood to be washed, dried and ironed at home by employees in domestic conditions[120].

The JRC-IPTS IMPRO textile study modelled the improvement potential associated with measures in a domestic scenario[121].

- Washing: Washing frequency, selected programme/options, programme temperature and load size;
- Drying: Drying frequency, selected programme/options, programme temperature and load size;
- Ironing: Ironing frequency, ironing time and ironing temperature.

Three measures were selected for further detailed modelling on the basis of the potential highlighted by literature – washing temperature, tumble drying frequency and optimised loading of washing machines and tumble dryers. Ironing was considered to be more readily influenced by the use of easy-care finishes and the introduction of fibre blends. Running full wash loads and reduced washing temperatures were reported to have the greatest improvement potential.

Survey results used to inform the Ecodesign implementing measures for domestic washing machines suggests that there exists significant potential to reduce washing temperatures, although the potential varies across Europe and is not always consistent with climatic variations [122]. The estimated average washing temperature in the EU 27 was estimated at the time to be 45.8°C, although 60°C was used for 23% of washes. The average load was estimated as being 3.2 kg based on an average of 4.6 wash cycles per household per week. Figure 8 summarises temperature-setting choices for selected European countries.




[120] *Simplified Life Cycle Assessment: Home washing and industrial washing of blue work wear*, LCA report prepared for ETSA, 3rd June 2010

[121] JRC-IPTS European Commission, *Environment Improvement Potential for Textiles (IMPRO)*, Publication draft, May 2012

[122] ISIS, *Lot 14: Domestic washing machines and dishwashers*, Preparatory study for Ecodesign, December 2007

*Figure 8 Temperature settings of domestic washing machines in European countries*

Source: ISIS (2007)

More recently, in 2012, the European Textile Services Association (ETSA) commissioned GfK to carry out a survey looking at employee habits when washing work wear at home. This revealed the following, reflecting some of the issues highlighted by the 2007 survey:

- 59% washed clothing in a partly loaded washing machine;
- 51% did not follow the detergent dosing instructions of the machine manufacturers;
- 35% did measure the amount of powder and/or liquid detergent;
- Between 30% and 40% were unaware of the energy class and consumption of their washing machine, while 60% to 70% did not know the energy class or consumption level of their dryer;

In some of the countries surveyed, for example Germany, employees noted that their employer had provided guidance on work wear washing. In contrast to these general findings evidence, ETSA has highlighted that modern industrial laundries operate energy efficiently and optimise their use of detergent and water – as confirmed by their published member performance results.

Tumble drying is, according to ISIS (2007), influenced by ownership levels, which on average were at the time 35%, and climatic conditions[123]. With drying being more costly because of the associated electricity use there is a greater incentive to make more efficient use of the machine and to line dry whenever feasible. Optimisation of washing machine or tumble drying loads is, to some extent, also influenced by perceptions of cleanliness and convenience.

Whilst consumer research suggests that habits relating to perceptions of cleanliness are difficult to change, and that convenience and cost are also important factors, there is evidence that they can be influenced[124].

## *Final criterion proposal*

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **TECHNICAL SPECIFICATIONS** | |
| **TS10. Care labelling**<br><br>*(Same for core and comprehensive criteria)*<br><br>*(For textiles intended to be washed at home)*<br><br>The textile care labelling must promote washing at lower temperatures, if possible at 30oC or less and using the washing machine's low energy programme, unless there is a technical reason otherwise (e.g. hygiene, safety, soiling).<br><br>**Verification:**<br><br>The tenderer must provide examples of the care labelling and additional instructions to the user and provide, if applicable, information on why textiles should be washed at higher temperatures than 30°C. | |

[123] Price Waterhouse Coopers, *Lot 16 - Ecodesign of dryers, Preparatory studies for Ecodesign requirements*, March 2009

[124] Fisher T., Cooper T., Woodward S., Hiller A., and Goworek H. (2008) *Public Understanding of Sustainable Clothing*, A report to the Department for Environment, Food and Rural Affairs

*Summary rationale for the requirements and verification:*

- Energy use for washing, drying and ironing is associated with the most significant environmental impacts along the life cycle of textile products.
- Evidence suggests that measures relating to washing have the greatest improvement potential, with running full wash loads and reduced washing temperatures identified specifically.
- Work wear may be washed at home where the age and efficiency of the washing machine and drying equipment may vary considerably. Survey results also suggest that employees, unless provided with guidance, may not always follow care instructions.
- It is therefore proposed that, where applicable, domestic washing instructions on the GINETEX care labelling promote lower temperature washing unless there is a technical reason not to do so – for example, for hygiene purposes in the case of health services.

### 2.1.6 Design for re-use and recycling

#### 2.1.6.1 Design for re-use

*Technical background to the criteria proposal*

Research in the UK for the organisations WRAP and the Centre for Remanufacturing and Reuse has highlighted that a key barrier to the re-use of uniforms and work wear are logos and distinct identification features. In some cases these pose security issues if the garments were to be re-used. In order to facilitate re-use these features of the work wear must therefore be readily removable without damaging the garment.

The variety of different ways in which logos are attached or imprinted onto garments makes it difficult to generalise as to the best design strategy. Embroidered and heat sealed logos have been identified as being particularly problematic because they may require overprinting[125].

A case study of the UK Royal Mail Group's system for the preparation of old work wear for re-use and recycling illustrates some of the practical issues[126]. A team of operatives working for a specialist recycling sub-contractor remove logos by cutting them from the garment. This can result in significant damage to the garment, in which case it is placed in the recycling or disposal stream instead of the re-use stream. The unpicking of logos is too costly and can also damage the appearance of the garment.

*Final criterion*

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **AWARD CRITERIA** | |
| **AC5. Design for reuse and recycling**<br>*(Same for core and comprehensive criteria)*<br>Garments must be designed so that any logos or distinctive identification features can be easily removed or overprinted without damaging the item. | |

[125] Uniform re-use project, *Logo removal in corporate wear to enhance re-use potential, Centre for Remanufacturing and Re-use*, February 2009
[126] Uniform re-use project, *Case study: Royal Mail Group*, www.uniform-re-use.co.uk

**Verification:**

The tenderer must upon delivery of the goods provide clear, easy to understand instructions for reuse contractors on how to remove or overprint logos or branding.

*Summary rationale for the requirements and verification:*

- Logos and unique identifiers on work wear and uniforms can prevent re-use of garments, either for security reasons or because their design means they cannot be removed without damaging the garment.
- Overprinting can be a solution but is more costly and implies a planned preparation and rebranding of the garment. This option is, however, recommended as the preferred option based on experience in the UK.
- Because of the complexity of this issue it is proposed that it is addressed as an award criterion, with tenderers asked to demonstrate ease of removal or efficiency of overprinting for logos and/or identifiers.

## 2.2 Textile service related criteria

The procurement of textile services is gaining growing importance in the context of public procurement, both where the procurer retains the ownership of the products, *e.g.*, laundry services, and where the textile products are owned by the service provider, *i.e.*, renting.

In both cases, significant environmental gains can be achieved because such services can better enable the correct management of the most relevant parts of the process. These can include maintenance and repair of the asset stock, energy consumption during cleaning, drying and ironing, and end-of-life (with emphasis on collection for reuse and recycling).

The potential role of textile services has gained increased importance following adoption of the European Commission's revised 'Circular Economy' package in December 2015 [127]. The Package highlights the importance of addressing the whole materials cycle, from raw material extraction to production and consumption, including product lifetime extension, through to waste management and the use of recycled (secondary) raw materials, with the aim of contributing to 'closing the loop' of product lifecycles through greater recycling and re-use.

The following new set of criteria is therefore meant to promote the improvement potential of different aspects of textile services.One additional criterion on the environmental impact of the laundry detergent used has been added for completeness and alignment with the current set of GPP criteria.

### 2.2.1 Scope of the textile service criteria

From the background research three broad areas of focus regarding environmental improvement can be identified in the context of textile services provision:

- For Laundry services: the potential for textile composition and labelling to minimise energy use was already highlighted in product criteria TS9 and TS10. The specification of textile composition to minimise laundry energy and detergent use and competencies in managing and auditing energy consumption at production sites are considered to offer the most significant improvement potential.

  *Relevant textile service criteria:* TS1, AC1-2

[127] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - *Towards a circular economy: A zero waste programme for Europe, COM/2014/0398 final*

- For Maintenance services: the importance of extending the useful life of textile products through adequate maintenance of garments and fabrics was highlighted in product criteria TS7 and TS8. These areas of focus remain equally valid when textiles are managed (whether owned or not) by a textile service provider. Therefore competencies in the field of extending the lifetime of contract textiles and minimising waste by repairing worn or damaged products are fundamental. Tracking systems to manage the inventory throughout its lifecycle and to identify common reasons for failure of fabrics or garments can be useful in this regard.

  *Relevant textile service criteria:* TS2

- For Take-back services: the importance of a sound end-of-Life management of textile products (namely ensuring either re-use or recycling) was initially highlighted in product criterion AC5. Service systems allow for much greater control of the end-of-life phase for textiles. Competencies in designing tracking and collection systems (Take-back), or the membership of a Take-back scheme, are fundamental for facilitating greater re-use/recycling levels and establishing contracts with end-markets.

  *Relevant textile service criteria:* TS3

### 2.2.2 Selection criteria for tenderers

It is proposed that competencies associated with the three main areas of textile service improvement potential identified in section 2.2.1 are reflected in the Selection Criteria. These would then be applied to each potential part of the textile service contract.

*Final criterion*

| **SC1. SELECTION CRITERIA** | |
|---|---|
| **SC1. Providers of textile services**<br><br>Tenderers must be able to demonstrate the resources, expertise, documented procedures and management systems that they have in place in order to address the following aspects of the services to be provided [128]: (to be selected as appropriate to the tender):<br><br>• For maintenance services:<br>– The implementation of asset management systems for inventories of textiles. This will allow for data and feedback from end users on the condition and lifespan of the textiles to be collected on an ongoing basis. These systems will have been actively used to identify the frequency and causes of fabric and garment failure.<br>– The management of services to repair and maintain garments and fabrics in order to maximise their lifespan. | **SC1. Providers of textile services**<br><br>Tenderers must be able to demonstrate the resources, expertise, documented procedures and management systems that they have in place in order to address the following aspects of the services to be provided[128]: (to be selected as appropriate to the tender):<br><br>• For laundry services: at laundry sites the implementation of energy management systems according to ISO 50001 or equivalent and including:<br>– staff training and awareness programmes at each site;<br>– equipment and procedures at each site in order to maximise process energy efficiency;<br>– sub-metering that allows for the management and reporting of specific energy consumption for the laundry processes and type of textiles handled at each site (i.e. electricity, gaseous and liquid fuels consumed expressed in kWh |

[128] The explicit possibility to require supply chain management capabilities was introduced by Part II (d) of Annex XII to Directive 2014/24/EU on public procurement, to be transposed into national law at latest by April 2016.

| | |
|---|---|
| **Verification:**<br><br>Tenderers must confirm that they have the required systems and capabilities. Relevant examples from previous contracts must be compiled.<br><br>Moreover they must describe the internal resourcing, management systems and infrastructure that will be used to manage compliance and provide the services.<br><br>Where it is deemed appropriate, the contracting authority reserves the right to carry out site visits and inspections, or to request third party inspections, in order to confirm the tenderer's capabilities. | per kg of textile products processed, assigned to processes used for flatware or work wear).<br><br>• For maintenance services:<br>– The implementation of asset management systems for inventories of textiles. This will allow for data and feedback from end users on the condition and lifespan of the textiles to be collected on an ongoing basis. These systems will have been actively used to identify the frequency and causes of fabric and garment failure.<br>– The management of services to repair and maintain garments and fabrics in order to maximise their lifespan.<br><br>• For take-back (end-of-life management) services:<br>– The implementation of asset management systems and infrastructure that support the segregation into specific different streams, storage and sale of specific textile products and fabrics in order to maximise their reuse and recycling.<br>– The provision of design advice to contracting authorities in order to facilitate ease of reuse and recycling. The provision of training in how to segregate end-of-life textiles to employees of the contracting authority.<br><br>**Verification:**<br><br>Tenderers must confirm that they have the required systems and capabilities. Relevant examples from previous contracts must be compiled. |

*Summary rationale for the requirements and verification:*

- As stated before, significant environmental gains can be achieved through the correct management of the most relevant parts of the process: maintenance and repair of the asset stock, energy consumption during cleaning, drying and ironing, and maximising value at the end-of-life (with the emphasis on collection for reuse and recycling).
- In the absence of capabilities in process management focussing specifically on these areas, the service providers' ability to implement these measures, or provide for verification of implementation, may be impaired.

- Therefore, it is requested at the selection stage that the tenderers demonstrate the technical capabilities described in the criterion above.
- Verification is to be based on a description of the bidder's capabilities supported by the possibility of third party inspections and examples of previous contracts .

### 2.2.3 Asset management systems for textile services

#### 2.2.3.1 Maintenance of the textile assets

*Technical background to the criteria proposal*

In the context of textile renting services, it has been demonstrated (in LCA based studies, e.g., JRC-IPTS's IMPRO study [20] or Kalliala and Nousiainen (1999) [118] that the durability of the products used will have a determinant influence in the final impact of the service provided. In the context of textile services provision, a significant increase in lifespan can be obtained through basic maintenance operations provided that an asset management system is in place that allows the service manager to keep track of the products that require maintenance, *e.g.*, reproofing or retreating of functional coatings.

This criterion is of fundamental importance in the reduction of environmental impacts and understood to be commonly implemented by full service providers, who as a result are able to minimise replacement costs. Therefore, it is suitable for both core and comprehensive levels of ambition.

Verification is straightforward, based on a simple description of the maintenance services offered, facilities available (with the support of photographic evidence) and description of previous track record in this field.

*Summary of stakeholder feedback*

**Stakeholder comments on the proposals**

A stakeholder commented that there does not appear to be a requirement of the service provider to assist contracting authorities to reduce environmental impacts on an ongoing basis as part of the service delivery. This could include the production of the textiles, their durability and associated packaging.

*Final criterion*

| **Core criteria** | **Comprehensive criteria** |
|---|---|
| **TECHNICAL SPECIFICATION** | |
| **TS2. Maintenance of the textile assets**<br>*(Same for core and comprehensive criteria)*<br>*This could also be combined with or formulated as an award criterion rewarding the most ambitious maintenance approach.*<br>The tenderer of textile services, as part of their asset management plan, will extend the useful life of workwear and interior textiles by providing ongoing maintenance and repair services. This will, as a minimum, include (*as relevant to the textiles to be provided*):<br>– provision of basic repairs, including repairing seam splits and stitching, the replacement of broken/lost parts and the fixing/replacement of zips and fastenings;<br>– fabric panel replacement for workwear; | |

- the retreating and proofing of functional coatings.

**Verification:**

The tenderer will provide a detailed specification for the maintenance services offered including, where appropriate, documented evidence from the maintenance facilities that they have under operation or under sub-contract arrangements.

*Summary rationale for the requirements and verification:*

- This criterion intends to promote the increase of the useful life of the products used in the provision of the service.
- An increased longevity of the products will reduce their replacement rate and, consequentially, reduce the impacts per annum associated with the provision of the service.
- As the 'maintenance of the textile assets' is considered to be one single service the criterion is the same for both core and comprehensive part
- Verification is proposed as being based on a simple description of the maintenance services offered, facilities available (with the support of documented evidence) and description of previous track record in this field.

### 2.2.3.2 Take-back systems

*Technical background to the criteria proposal*

As stated before, significant environmental gains can be achieved through the correct management of the end-of-life process. Within this scope, and in the framework of textile service provision, emphasis is best placed on the collection process, either for reuse or recycling. In order to implement a solid collection process, a take-back system should be in place.

Indeed, a selective collection system that enables a swift and trouble–free sorting of the textile products that have reached their end of life is fundamental for managing the End-of-Life environmental impacts of textile services. This will allow for the maximisation of the re-use and recycling of the said products.

It is important to have this system in place both in the case that the contracting authority has the ownership of the products, or where the service provider retains ownership of the products associated with the service provision. However, it requires substantial investment to put in place such a system, so this is appropriate only for comprehensive level of ambition.

Examples of specialist contractors in the market include Berendsen (Denmark), Dimensions (UK), Fishers (UK), Iturri (Spain) and Textilian (Sweden). Asset management systems include the use of unique identifiers and bar coding for all items issued to employees and the management of warehousing for storage, distribution and collection.

Verification can be based on a simple description of the take back services offered, facilities available (with the support of photographic evidence) and description of previous track record in this field. Invoices from sales of recovered textile products and site inspections can provide additional verification means. The extra burden on the service provider associated with this verification is better suited for the comprehensive criteria level.

*Final criteria*

| Core criteria | Comprehensive criteria |
|---|---|
| **TECHNICAL SPECIFICATION** | |
| | **TS3. Take-back system**<br><br>*This could also be combined with or formulated as an award criterion rewarding the most ambitious take-back approach.*<br><br>The tenderer as part of their asset management system must operate a take-back system, or have formal arrangements with a take-back scheme, for the textiles supplied for use within the contract, to include the following elements:<br><br>collection systems installed in the contracting authority's own premises to facilitate (where appropriate) the sorting and classification of textiles;<br><br>– training and guidance material to ensure that staff of the public authority have a clear understanding of how to use the system;<br>– post-collection sorting activities in order to maximise the value obtained from reuse or recycling. This will, at a minimum, include segregation based on fibre, colour and condition of garment.<br>– The tenderer will provide an indication of the likely end markets for the textiles recovered.<br><br>**Verification:**<br><br>The tenderer must provide a description of the proposed system including, where relevant, documentation for post-collection systems they operate, including specifications for sorting lines and site photographic evidence. |
| **CONTRACT PERFORMANCE CLAUSE** | |
| | **CPC2. Take-back system**<br><br>The tenderer must report on the performance of their take-back system in accordance with the following requirements:<br><br>• Surveys will be carried out of staff at the contracting authority's facilities to determine how easy it has been to use the collection/segregation systems. These will be carried out within the first six months of the services and the findings used to |

| | |
|---|---|
| | identify/implement potential improvement measures.<br>• The proportion by weight of the collected textiles that have been reused or recycled and the associated value/kg of textiles obtained from the destination end markets to which they are sent will be determined and recorded on an annual basis.<br>The tenderer will provide a short summary of the staff survey findings and the potential improvement measures identified. An annual report providing a breakdown of the destination of the textiles and the value obtained from each end market will be provided. |

*Summary rationale for the requirements and verification:*

- Significant environmental gains can be achieved through the correct management of the end-of-life process.
- In the framework of textile service provision, emphasis is best placed on the collection process, either for reuse or recycling.
- In order to implement a solid collection process, a take-back system should be in place. This will allow for the maximization of the re-use and recycling of the said products.
- It is important to have this system in place both in case the contracting authority has ownership of the products, and where the service provider retains ownership of the products associated with the service provision.
- Verification can be based on a simple description of the take back services offered, facilities available (with the support of photographic evidence) and description of previous track record in this field.
- A contract performance clause is proposed focussing on two aspects of service delivery: 1) surveying of employee's experience of using the collection system and identification of potential for improvement, and 2) on the proportion by weight of the textiles sent for disposal, re-use or recycling and the value/kg obtained from the end-markets to which they are sent.

### 2.2.4 Fabric selection to minimise drying and ironing energy use

*Technical background to the criteria proposal*

Please refer to product-related criterion TS7 in Section 2.1.4.1 for the background for this criterion proposal.

*Final criterion proposal*

| Core criteria | Comprehensive criteria |
|---|---|
| **TECHNICAL SPECIFICATION** | |
| **TS1. Fabric selection to minimise energy use for drying and ironing**<br>*(For textiles that will be washed on a daily or weekly basis)*<br><br>The textile fabrics shall be selected to have a moisture retention content after spinning of less than 35% and a fabric smoothness grade after drying of SA3 for fabrics with cotton content of ≥ 50% and SA4 where the cotton content is <50%.<br><br>**Verification:**<br>The tenderer shall provide a test report demonstrating the fabric(s) performance in accordance with the following methods:<br>• Moisture retention content: EN ISO 15797 (or equivalent) Washing procedure<br>• Easy care: EN ISO 15487 (or equivalent) Appearance after washing and dying | **TS1. Fabric selection to minimise energy use for drying and ironing**<br>*(For textiles that will be washed on a daily or weekly basis)*<br><br>The textile fabrics shall be selected to have a moisture retention content after spinning of less than 35% and a fabric smoothness grade after drying of SA3 for fabrics with cotton content of ≥ 50% and SA4 where the cotton content is <50%.<br><br>**Verification:**<br>The tenderer shall provide a test report demonstrating the fabric(s) performance in accordance with the following methods:<br>• Moisture retention content: EN ISO 15797 (or equivalent) Washing procedure<br>• Easy care: EN ISO 15487 (or equivalent) Appearance after washing and dying |

*Summary rationale for the requirements and verification:*

Please refer to product-related criterion TS7 in Section 2.1.4.1 for the rationale for this criterion proposal.

### 2.2.5 Laundry energy and detergents use

*Technical background to the criteria proposal*

Energy consumption in the use phase is a source of major environmental impact in textiles life cycle, as was identified by JRC-IPTS's IMPRO Textiles study [20]. When textiles services are the focus of interest, and whether the service provider owns or not the products, this aspect assumes a particular relevance since the service provider, and by extension the contracting authority for the service, may be able to exert direct control over the energy used in the use phase of the product.

Data collated by the Carbon Trust as part of an initiative to support the laundry industry illustrates how the specific energy consumption difference between laundry sites that are streamlined from an energy point of view and others that are not (mainly smaller facilities)

can be significant (see Figure 9), which, compounded with the intensity of laundering operations can result in large variations in overall energy consumption. The data suggests that there can be up to a factor of five or six difference between the best and worst performing sites.

The Carbon Trust also illustrate how sub-metering of discrete processes, such as drying, as well as associated process machinery lines, such as tunnel finishers, can be readily used to accurately monitor energy use. Moreover, they also highlight that sites tend to handle laundry on an accurately sorted and weighed batch basis for specific types of laundry, grouping them into flatware (towels and linen), work wear and healthcare.

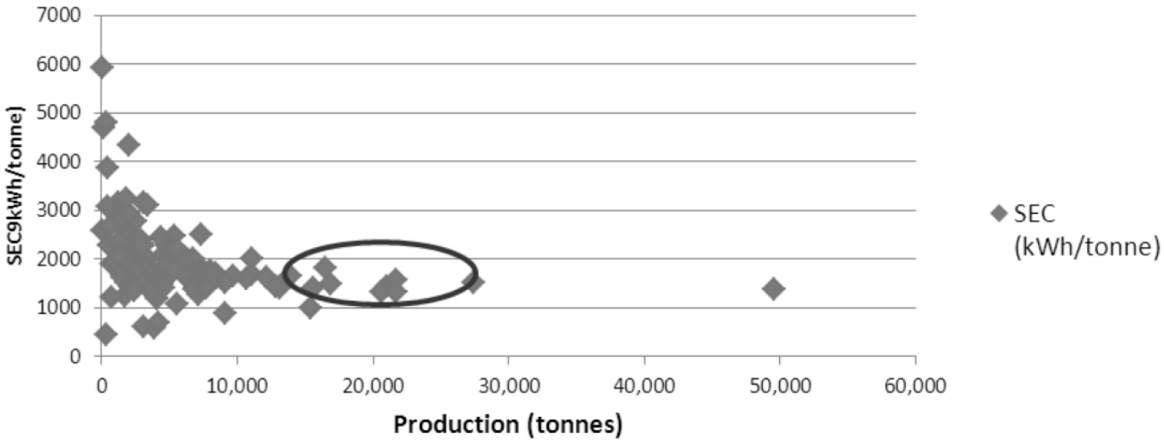



*Figure 9 Specific Energy Consumption (SEC) of industrial laundry sites*

Source: The Carbon Trust (2011)

However, a large proportion of the possible energy performance optimisation measures that can be implemented are rather straightforward to carry out. Equipped with nothing more than concern for the subject, basic book keeping practices, accurate metering and a mind-set focused on continuous improvement, a manager of a laundry site can go a long way in terms of energy savings [117].

The new ISO 50001 standard applies the principles of continuous improvement to energy management. If an energy management system along those lines is implemented, significant energy savings could be realised. In addition to that, half hourly metering, control systems for laundry equipment and heat recovery are identified as basic measures to achieve energy savings that should be implemented at all sites. There are, however, several additional energy saving measures that could also be implemented and that would result in a further improvement of the site's energy efficiency [117].

The proper energy management of the site and the use of appropriate textile products – both of which are covered either in the selection criteria or in the technical specifications - will, in the end, be reflected in a decreased overall specific energy consumption of the laundry facility. Therefore it is reasonable, fair and beneficial to reward laundries that do so.

There is however a trade-off between energy consumption (which can be decreased by lowering the washing temperature of the products) and the amount and aggressiveness of detergent use (use more detergent, or a more aggressive detergent, in order to compensate the lower washing temperature). Therefore a risk arises that if an award criterion is set on energy consumption alone this could provide an undesirable incentive to increase the environmental impacts associated with detergent use (mainly aquatic toxicity effects, according to JRC-IPTS's IMPRO Textiles study [20]).

An additional risk relates to the persistence of the detergent products in the aquatic environment, being desirable that the product degrades in as short an interval of time as possible, therefore, it is considered appropriate to include criteria on both aquatic toxicity and biodegradability.

Taking into consideration all of the above, we propose a set of three award criteria and a contract performance clause that are designed to work in tandem, rewarding simultaneously low energy use, low detergent use and the use of environmentally friendly detergents. The objective of this proposed approach is to address the aforementioned trade-off between environmental impacts associated with energy and detergent use.

The award criterion is proposed as comprising criteria addressing energy use and the environmental impact of detergent use. A contract performance clause would then enforce compliance with commitments made by bidders.

*Summary of stakeholder feedback*

**Stakeholder comments on the proposals**

A stakeholder commented that metering of water consumption was not addressed within the scope of the criteria. It was proposed that attention should be focussed on also managing and reducing water consumption as part of the processes.

*Final criteria*

<table>
<tr><th>Core criteria</th><th>Comprehensive criteria</th></tr>
<tr><td colspan="2">AWARD CRITERIA</td></tr>
<tr><td colspan="2">Guidance note on laundry energy and detergent use<br><br>It is recommended to combine the criteria on energy consumption and detergent environmental impact and to weigh the total points awarded on the following basis:<br><br>– Criterion AC1: Energy consumption, 75%<br>– Criterion AC2: Detergent environmental impact, 25%<br><br>Monitoring shall be carried out according to contract performance clause CPC1.</td></tr>
<tr><td></td><td>AC1. Specific energy consumption<br><br>Tenderers will be awarded points according to the proposed specific energy consumption in kWh (electricity plus gaseous and liquid fuels) per kg of flat wear and work wear textile product washed, dried and finished (as appropriate) that will be achieved during provision of the service.<br><br>The points will be awarded in linear proportion to the proposals received, from the lowest (100 % available points) to the highest (zero points).<br><br>Verification:<br><br>The tenderer will provide specifications for the sub-metering of each washing, drying and finishing process line, distinguishing between flat wear and work wear, that will be used in providing the service. They will also describe the arrangements for verification of the sub-meter readings.</td></tr>
</table>

| | |
|---|---|
| | **AC2. Detergent environmental impact**<br><br>Tenderers will be awarded points if they commit to the use of detergents in execution of the contract that meet the aquatic toxicity and biodegradability criteria of the EU Ecolabel for Institutional Laundry Detergents or their equivalent. The criteria can be found here:<br><br>http://ec.europa.eu/environment/ecolabel/products-groups-and-criteria.html<br><br>Tenderers making the commitment will be awarded the maximum available points.<br><br>**Verification:**<br><br>The tenderer must provide details of the system of verification to be used for the purchase of compliant detergents for use in the individual washing process lines that will provide the service. |
| **CONTRACT PERFORMANCE CLAUSE** | |
| | **CPC1. For textile services that include laundering**<br><br>The successful tenderer must carry out the services according to the proposed specific energy consumption and compliant detergent use which it committed to in its tender.<br><br>The tenderer must provide the following forms of verification:<br><br>– monthly metered energy consumption data aggregated from the sub-metered process lines at related sites, reflecting the fabric type/weight and divided by the weight of textiles processed;<br>– copies of invoices for detergent purchases together with proof that the detergent(s) either:<br><br>i. has the EU Ecolabel; or,<br>ii. has a Type I ecolabel which contains equivalent criteria; or,<br>iii. meets the specified EU Ecolabel criteria [129].<br><br>– Proof must comprise valid Ecolabel licences and/or third party verified test data for the detergents used.<br><br>The contracting authority reserves the right to request third-party verification at any point during the contract and the contractor will be obliged to provide this at their own expense. |

[129] European Commission, Industrial and Institutional Laundry Detergents, http://ec.europa.eu/environment/ecolabel/products-groups-and-criteria.html.

*Summary rationale for the requirements and verification:*

- There can be a factor of between five and six difference in the specific fuel and electricity consumption between laundry sites that are streamlined from an energy point of view and others that are not.
- A basic energy management system developed along the lines of a continuous improvement strategy can go a long way in terms of energy savings.
- Several energy saving measures can be put in place in addition to the basic ones that are the subject of technical specifications (energy management systems and appropriate choice of textile products). These will be later reflected in the overall specific energy consumption of the laundry facility.
- Award criteria are proposed based on laundry energy use and the environmental performance of the detergent in terms of aquatic toxicity.
- Verification is proposed as being based on a combination of energy management system records, detergent purchase invoices and detergent licenses and/or test data, supplemented by (on request) third party verification of energy and detergent use at the contractors expense.
- Verification of energy and detergent use would need to be provided at the level of the individual process lines at each site used to provide the textile service. This would require sub-metering and detergent records for batches of laundry put through individual process lines.

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