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Miljøprojekt

Environmental Impact from Bed Linen in the Production Chain

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Preface

The present report brings the results from the project "Assessment of the environmental impact of textiles in the production chain" (J.nr. M 126-0817), which has been carried out for the Danish Environmental Protection Agency.

The project has been accomplished parallel to an investigation on bed linen products on the Danish market, executed by the Danish Consumers Information Centre.

John Hansen, Danish Technological Institute, Textile, has carried out the project.

Summary and conclusions

A survey of bed linen products (quilt covers and pillow cases) on the Danish market has been carried out with the aim of investigating whether the products comply with the criteria of the EU eco-label (the Flower). Quality aspects of the same products have been investigated by the Danish Consumers Information Centre.

Only 1 of 19 products was in compliance with the criteria, and this particular product already was equipped with the Flower label.

Many of the other products might be in compliance with the criteria but in general there is a lack of documentation regarding

- the consumption of pesticides during cotton growing (10 out of 15)
- chemicals used (12 out of 15)
- waste water discharge (7 out of 15)

to assess whether the criteria are met or not.

Several of the products might be able to obtain the Flower label, if documentation can be provided regarding pesticide consumption during cotton growing, or if the producer switches to a new cotton supplier having such documentation. It might also be necessary to substitute one or more of the chemicals used during wet processing, and documentation regarding waste water conditions must be established, maybe supplemented by an improvement of the waste water treatment.

Further general observations and conclusions regarding the products in question can be mentioned:

- chemicals are not used in the spinning of cotton yarn for this kind of products
- bleaching by means of chlorinated products has ceased. All investigated products were bleached with hydrogen peroxide
- biocides or biostatic products are not used
- plastisol-based printing is not used
- flame retardants are not used in the products.

Sammenfatning og konklusioner

Der er gennemført en undersøgelse af sengelinnedsprodukter (dyne- og hovedpudebetræk) på det danske marked med det formål at fastslå, om de pågældende produkter lever op til kravene i EU's miljømærke Blomsten. Forbugerinformationerne har undersøgt kvaliteten af de samme produkter.

Kun et enkelt produkt levede op til kravene i det kriteriedokument, som var gældende på købstidspunktet. Og dette produkt havde i forvejen Blomstmærket.

Fælles for de fleste af de øvrige produkter er, at det er muligt, at de lever op til flere af kravene; men der mangler generelt dokumentation for

- brugen af pesticider ved bomuldsdyrkningen (10 af 15)
- kemikalier (12 af 15)
- udledning af spildevand (7 af 15)

som umiddelbart kan vise, om kravene er overholdt eller ej.

Flere af de undersøgte produkter vil muligvis kunne opnå Blomsten. Det vil dog kræve, at dokumentationen for pesticidforbruget ved bomuldsdyrkningen bringes i orden, eller at tekstilproducenten går over til en anden bomuldsleverandør, som har dokumentationen i orden. Et eller flere kemikalier vil måske skulle udskiftes, og dokumentationen omkring spildevandsforholdene skal bringes i orden, muligvis suppleret med forbedringer af spildevandsbehandlingen.

Af øvrige konklusioner for de undersøgte produkter og produktionssteder kan nævnes:

- der anvendes ikke kemikalier i forbindelse med spindingen af bomuldsgarn til denne type produkter
- blegning med chlorholdige produkter er ophørt. Samtlige undersøgte produkter er bleget med hydrogenperoxid
- biocider eller biostatistiske produkter anvendes ikke
- plastisoltryk er ikke anvendt
- ingen af produkterne er tilsat flammehæmmende kemikalier.

1 Introduction

1.1 Background

The Danish Consumers Information Centre has carried out a survey of a number of bed linen products (quilt covers and pillow cases) on the Danish market. A total of 19 different products made of 100% woven cotton fabric were purchased for testing during springtime 2003. The aim of the survey was to test the fitness for use of the products, and at the same time to look at environmental and health aspects of the products and their maintenance. The results have been published in the Danish Consumers Information Centre's magazine "tænk+test" (1).

The Danish Environmental Protection Agency (DEPA) was supporting this investigation, and parallel to this DEPA initiated the present survey.

1.2 Purpose

The purpose of the present survey was to investigate and evaluate whether the bed linen products in question would meet the criteria of the EU eco-label to textile products - the Flower, especially regarding the criteria on processes, chemicals and waste water.

1.3 Procedure

The survey was carried out in the following way: The Danish suppliers of the 19 selected products were contacted and asked, if they would inform where the products had been produced and whether they would allow the project executor to contact and visit the individual production facilities. In case of a positive answer the factories were visited, the individual production sites were inspected, and documentation was asked for in order to be able to verify, whether the individual criteria were met or not.

Documentation often consisted of recipes with names of chemicals used in the individual sub-processes in pre-treatment, dyeing, printing and finishing together with the Material Safety Data Sheets (MSDS), issued by the chemical suppliers. Other documentation could be general information from chemical suppliers, certificates and reports from third party bodies like Oeko-Tex institutes, SKAL- or IVN-certification bodies.

The findings were reported to the factories for comments. Finally the overall results were compiled in the present report.

15 out of 19 suppliers accepted to participate in the survey. The four remaining suppliers either did not want to reveal their sub-contractors, or the co-operation regarding the specific product had stopped, or they simply did not want to spend time and effort on the survey.

In order not to reveal any production secrets, no names of textile producing companies - apart from the immediate supplier - are published in the report. All brand names of applied machinery, chemicals and dyestuffs are only published in anonymous form.

The criteria document for the EU eco-label to textile products has recently been revised. The new criteria document became valid from 1 June 2002 (Commission Decision of 15 May 2003) (2). The validity period of the former criteria document (3) was, however, prolonged until 31 August 2003 (Commission Decision of 27 November 2001) (4). This means that producers of products, which had already applied for the eco-label before 1 June 2002, could be awarded the eco-label under the old terms. Thus the products purchased during springtime 2003 could both be assessed towards the old and the revised criteria document, and this is reflected in the report.

Only the criteria, which are relevant to bed linen products made of 100% cotton, are assessed during the survey. The criteria numbers in the following chapter refer to the revised criteria document. The difference in numbers between the two documents can be seen in the table below.

Table 1.1 Numbers used in the two latest criteria documents

Criterion	Number in old document	Number in revised document	Change
Cotton (pesticides and growing)	2	2	Yes
Fibre and yarn (consumption of chemicals)	10a	10a, b	Yes
Biocidal and biostatic products	11	11a, b	Yes
Stripping and depigmentation	12	12	No
Auxiliary chemicals	14a	14	Yes
Detergents, fabric softeners and complexing agents	14b	15	Yes
Bleaching agents	15	16	(No)
Impurities in dyes	16	17	Yes
Impurities in pigments	17	18	Yes
Metal complex dyes	19a, b	20a, b	Yes
Azo dyes	20	21	No
Dyes that are carcinogenic, mutagenic or toxic to reproduction	21	22	Yes
Printing	24a, b	25a, b	No
Formaldehyde	25	26	Yes
Waste water discharges from wet-processing	26	27	(No)
Flame retardants	27	28	(No)
Finishes	(New)	30	

1.4 General observations

From the survey a number of general observations can be collected. They will be presented under the three headings cotton, chemicals and waste water.

1.4.1 Cotton (Criterion 2)

Only few companies have documentation regarding the consumption of pesticides during cotton growing. The exceptions are one Flower-labelled product and one product made of certified organic cotton.

Further three products are made of yarn, which is certified according to Oeko-Tex Standard 100. Even though the criteria regarding pesticides in the two systems are not similar, it seems probable that a raw yarn product

certified according to Oeko-Tex Standard 100 would also meet the EU eco-label criteria.

If the Oeko-Tex certificates and analysis reports only cover end products, one can not be sure that the products have been tested for pesticides prior to wet processing, and thus such reports will not be able to guarantee whether the cotton criterion is met.

For 5 out of 15 products documentation regarding pesticides or organic growing has been provided.

1.4.2 Chemicals

In connection with the production of 9 out of 15 products chemicals have been identified, which shall not be used according to the EU eco-label criteria document, either the old or the revised version.

Such chemicals are

- surface active agents based on APEO
- auxiliaries which are heavily biodegradable
- print paste containing VOCs
- finishing recipes containing R-labelled products, which are not allowed.

A general observation is that chemicals are not used in spinning of cotton yarn used for the products in question.

Almost none of the companies have any knowledge of the use of biocides at their subcontractors.

1.4.2.1 Auxiliaries etc. (criterion 14a and 14b (old), 14 and 15 (new))

In two cases APEO-based products have been identified, which are not allowed according to the revised criteria document. APEO-based products are degraded to substances, which are fish toxic.

In the old criteria document APEO-based products were only banned if they belong to the group "detergents, fabric softeners and complexing agents". In the revised document APEO-based products are not allowed in any form.

For a number of identified auxiliaries the biodegradability was too low. This was the case in connection with the production of 5 out of 15 products. In other cases not enough information was available to determine whether the criterion was met or not.

1.4.2.2 Bleaching agents (criterion 15 (old), 16 (new))

None of the visited production sites use chlorine-based bleaching agents any more. Previously sodium hypochlorite was widely used as bleaching agent; but today it seems to be completely substituted by the more harmless hydrogen peroxide, at least in case of the bed linen products assessed here. Chlorine-based bleaching agents should be avoided because they can form reactive organic halogen compounds (AOX), which are harmful to aquatic organisms.

It was a general observation that the companies visited had stopped using sodium hypochlorite throughout their whole production, not only for bed linen products.

1.4.2.3 Dyes and pigments (criterion 16,17,19,20,21 (old), 17,18,20,21,22 (new))

The criteria for dyes and pigments are partly dealing with impurities, partly dealing with the banning of specific substances. In no case banned dyes have been identified, neither carcinogenic, nor mutagenic, nor toxic to reproduction.

In no case dyes and pigments have been identified, which contain more than the allowed amount of heavy metals. On the other hand there is a general lack of documentation as to whether the concentration of heavy metals in dyes and pigments are below the fixed limits. In practical terms this documentation can only be given by the suppliers or producers of the dyes and pigments. Heavy metals should be phased out due to their environmental and health properties.

Normally it should be expected that suppliers, who are members of the Ecological and Toxicological Association of Dyes and Organic Pigments Manufacturers (ETAD), meet the requirements regarding impurities in dyes and pigments. ETAD has internal rules for their members regarding impurities, which means that the eco-label criteria are met. It is, however, not clearly documented in the MSDS seen during this survey.

1.4.2.4 Printing (criterion 24 (old), 25 (new))

Printing systems based on organic solvents do not seem to be used any more, at least not for the bed linen products assessed here. Only water based pigment printing has been identified.

There is a limit to the amount of volatile organic compounds (VOCs) allowed in print paste; it can, however, be difficult to evaluate or calculate whether the criterion is met. VOCs have been identified in connection with production of 5 out of 15 bed linen products. VOCs have an impact upon the ozone layer and the greenhouse effect.

Plastisol-based printing is not used for the bed linen products in question. This kind of printing is used mainly for T-shirts, sweatshirts and other clothing products.

1.4.2.5 Formaldehyde (criterion 25 (old), 26 (new))

Many companies have no documentation regarding the release of formaldehyde from their products. This is the case in connection with production of 6 out of 15 products. Formaldehyde can cause allergy, and there is a limited evidence of a carcinogenic effect.

Formaldehyde may be released either from products, which have been pigment printed, products which have been crease or shrink resist finished, or it may originate from other finishing processes. Finally it may originate from chemical products used to improve the colour fastness to washing of certain textiles. Crease or shrink resist finishes are applied to counteract the tendency of cotton to wrinkle and shrink after washing.

By the latest revision of the criteria document this criterion was tightened. In the old criterion 75 ppm formaldehyde was allowed for products for adults. In the revised document only 30 ppm is allowed.

1.4.2.6 Finishing (criterion 27 (old), 28 (new), new criterion 30)

Flame retardant finishing is not used in any of the products in the survey.

The old criteria document from 1999 was still valid, when the bed linen products in the survey were purchased. These criteria expired in August 2003 and were replaced by the revised criteria of May 2002. In this revised criteria document the demands towards finishing chemicals have been made more rigorous. No use of finishes is allowed containing more than 0.1% of substances that are assigned a number of risk phrases, which mean that they are harmful to health, mutagenic or carcinogenic, or harmful to the aquatic environment. In connection with the production of 4 of the 15 bed linen products chemicals in finishing recipes have been identified, which are not allowed according to the revised criteria document:

- crease resist finishes containing formaldehyde, which is assigned R40 (limited evidence of carcinogenic effect)
- softening and crease resist finishes containing ethoxylated isooctylphenol, which is assigned R53 (may cause long-term adverse effects in the aquatic environment)
- anti-foaming agent, which is assigned R52/53 (harmful to aquatic organisms; may cause long-term adverse effects in the aquatic environment).

1.4.3 Waste water (criterion 26 (old), 27 (new))

In general many companies do not have sufficient documentation regarding their waste water conditions, which makes it impossible to calculate whether the criterion is met or not. According to the criterion waste water from wet processing sites shall, when discharged to surface waters after treatment, have a COD content of less than 25 g/kg textile. 8 out of 15 have such documentation.

2 Product survey

In the present chapter the assessment of the individual products and production sites is reported one by one. The criterion numbers used in the chapter refer to the revised criteria document. The products are identified using the same names as in the investigation made by the Danish Consumers Information Centre.

2.1 Home Base from Magasin

The bed linen product is made from a piece-dyed, satin woven fabric. Spinning, weaving, pre-treatment and dyeing is carried out at the same company in Portugal. The company was visited in June 2003. The textile company is certified according to ISO 9000.

Criterion 2 Cotton and other natural cellulosic seed fibres (including kapok)

The company itself is spinning 30-40% of the yarn consumed. The rest is bought from other companies in Portugal or other countries (e.g. Egypt, India). Some of these yarns are delivered with Oeko-Tex certificate, in which case it is likely that the criterion is met. In other cases there are no analyses or documentation to indicate whether the criterion is met. The company is not dealing with organic or transition cotton. The product in question is not Oeko-Tex certified, so it is not possible to verify whether the criterion is met.

Criterion 10 Auxiliaries and finishing agents for fibres and yarns

- a. Size: The basic component is a starch ether, which is readily biodegradable according to the MSDS. There are two other components in the sizeing preparation for which there are no indications of the biodegradability. As the starch component, however, is the dominating part, it is likely that the criterion is met.
- b. In the spinning of cotton yarn no chemicals are applied. The criterion is met.

Criterion 11 Biocidal or biostatic products

- a. It is not known whether biocides are used for the transportation of raw fibres or raw yarns.
- b. Biocides are not applied to the end product.

Criterion 12 Stripping or depigmentation

Such steps are not carried out.

Criterion 14 Auxiliary chemicals

A survey of the applied chemicals did not indicate any violation of this criterion. It must be emphasised, however, that not all the MSDS were very informative.

Criterion 15 Detergents, fabric softeners and complexing agents

A number of chemicals were identified, for which the degradability or eliminability was not sufficient:

One complexing agent is heavily biodegradable. Another complexing agent is partly biodegradable, and a third complexing agent is moderately eliminable. A detergent is heavily biodegradable. For some other products information regarding biodegradability was not available. It is likely that the criterion is not met.

Criterion 16 Bleaching agents

Only hydrogen peroxide bleaching is used. The criterion is met.

Criterion 17 Impurities in dyes

Only one dyestuff is used in the specific product. It does not contain heavy metals in concentrations that would cause problems in waste water, according to the MSDS. As the supplier is a member of ETAD it is likely that the criterion is met, but it is not clearly indicated.

Criterion 18 Impurities in pigments

Only dyestuff is used.

Criterion 20 Metal complex dyes

No metal based dyes are used.

Criterion 21 Azo dyes

Product from this supplier is likely to meet this criterion, as it is compulsory in Germany and the EU.

Criterion 22 Dyes that are carcinogenic, mutagenic or toxic to reproduction

Product from this supplier is likely to meet this criterion.

Criterion 25 Printing

No printing is taking place.

Criterion 26 Formaldehyde

None of the recipes contain formaldehyde-releasing chemicals; hence it is most likely that the criterion is met. No analyses have, however, been provided.

Criterion 27 Waste water discharges from wet-processing

The waste water is pre-treated at the company and subject to a final treatment at a municipal treatment plant, which releases water with a maximum COD of 250 mg/l. As the company produces 80,000 metres of fabric per day (or 28 tonnes) and discharges 2,200 m³ of waste water per day, it can be calculated that the COD content is approx. 20 g/kg product. The criterion is met.

Criterion 28 Flame retardants

No such products are used.

Criterion 30 Finishes

The only finishing is softening and other hand-modifying chemicals. In the recipe for three of the chemicals the MSDS indicated no problematic R-sentences. For three other chemicals no MSDS were available. It is thus not possible to verify whether the criterion is met.

2.2 Finlayson Satin from Juna Design A/S

The bed linen product is made from a pigment printed, satin woven fabric.

Pre-treatment, printing and finishing is carried out at a dyehouse in Finland. The grey fabric is imported. The dyehouse was visited in August 2003.

The dyehouse is certified according to ISO 9001 and ISO 14001.

Criterion 2 Cotton and other natural cellulosic seed fibres (including kapok)

The history of the cotton is not known. The company has an Oeko-Tex certificate on the products, which implies that the end products are tested for pesticides. The grey yarn for the particular product also has an Oeko-Tex certificate, issued by IFP, Sweden. It is thus likely that the criterion is met, although the criteria in the 2 systems are not completely the same.

Criterion 10 Auxiliaries and finishing agents for fibres and yarns

- a. The grey fabric is imported. As desizing is carried out by means of enzymes it is most likely that the size is starch based and thus sufficiently biodegradable. Sometimes PVA (polyvinyl alcohol) size was expected too. No documentation was, however, available.
- b. In the spinning of cotton yarn no chemicals are applied. The criterion is met.

Criterion 11 Biocidal or biostatic products

- a. The company had no information on possible use of pesticides during transportation.
- b. Biocides are not applied to the end product.

Criterion 12 Stripping or depigmentation

Such steps are not carried out.

Criterion 14 Auxilliary chemicals

Recipes and MSDS were presented, and a survey of the applied chemicals did not indicate any violation of the criterion.

Criterion 15 Detergents, fabric softeners and complexing agents

Recipes and MSDS were presented, and a survey of the applied chemicals showed that they all had sufficient biodegradability.

Criterion 16 Bleaching agents

Only hydrogen peroxide bleaching is used. The criterion is met.

Criterion 17 Impurities in dyes

Only pigments are used.

Criterion 18 Impurities in pigments

The MSDS of the used pigments were presented; some of them are metal complex pigments, others are not. There was no information on the impurities. As all the suppliers are members of ETAD it is likely that the criterion is met, but it is not clearly indicated.

Criterion 20 Metal complex dyes

Only pigments are used.

Criterion 21 Azo dyes

Only pigments are used.

Criterion 22 Dyes that are carcinogenic, mutagenic or toxic to reproduction

Only pigments are used.

Criterion 25 Printing

- a. Only water based printing is carried out. In the printing paste a number of chemicals could be identified as VOCs according to the MSDS. A rough calculation seems to indicate that about 15% (w/w) of the recipe are VOCs. It is thus likely that the criterion is not met.
- b. Plastisol-based printing is not used.

Criterion 26 Formaldehyde

An Oeko-Tex analysis report was presented stating that the formaldehyde content is below the detection limit, which is 20 ppm. The criterion is thus likely to be met.

Criterion 27 Waste water discharges from wet-processing

Regular samples of the total waste water are taken and one result showed a COD concentrations around 2,100 mg/l. A phone call to the municipal waste water treatment plant provided the information that the water leaving the treatment plant has a COD concentration between 30 and 64 mg/l. The company stated a water consumption of around 33 l/kg. As the limit in the criterion is 25g/kg, the COD concentration should be less than 750 mg/l. It is thus likely that the criterion is met.

Criterion 28 Flame retardants

Are not used.

Criterion 30 Finishes

Only finishes used are crease resist finishes and softening. Recipes and MSDS were presented, and a survey of the applied chemicals showed that some of them contain formaldehyde, which is assigned R40. One of those is said to contain 0.1 – 0.2 % formaldehyde, and as only 0.1% is allowed it is likely that the criterion is not met.

2.3 Madison from Borås Cotton

The bed linen product is made from a pigment printed, satin woven fabric.

Spinning, weaving, pre-treatment, printing and finishing is carried out at the same company in Estonia. The company was visited in December 2003.

The company is certified according to ISO 9000 and is planning to apply for certification according to ISO 14000.

Criterion 2 Cotton and other natural cellulosic seed fibres (including kapok)

The company itself is spinning the yarn for the product in question. The company holds an EU eco-label for specific cotton products made of organic cotton, which does not include the product in question. The company holds Oeko-Tex certificates for all its products, also for yarn and grey fabric. Test reports were presented showing that no pesticides had been detected above the detection limit. Although the criterion for pesticides in the EU eco-label is not completely the same as in Oeko-Tex Standard 100 it is likely that the criterion is met.

Criterion 10 Auxiliaries and finishing agents for fibres and yarns

- a. Size: The basic component is potato starch ether, which is likely to be easily biodegradable, although no MSDS was presented. It is thus likely that the criterion is met.
- b. In the spinning of cotton yarn no chemicals are applied.

Criterion 11 Biocidal or biostatic products

- a. It is not known whether biocides are used during transportation of the raw cotton, but the Oeko-Tex test reports show that PCP and TeCP had not been detected in concentrations above the detection limit. It is likely that the criterion is met.
- b. Biocides are not applied to the end product.

Criterion 12 Stripping or depigmentation

Such steps are not carried out.

Criterion 14 Auxiliary chemicals

A survey of the MSDS of the applied chemicals did not indicate any violation of the criterion.

Criterion 15 Detergents, fabric softeners and complexing agents

One complexing agent used in scouring and bleaching did not have any information regarding the biodegradability. It is thus not possible to verify whether the criterion is met.

Criterion 16 Bleaching agents

Only hydrogen peroxide bleaching is carried out. The criterion is met.

Criterion 17 Impurities in dyes

Only pigments are used.

Criterion 18 Impurities in pigments

The MSDS of the pigments used were presented. Some of them are metal complex pigments, others are not. There was no quantitative information regarding the impurities. One of the two suppliers stated that "the products

does not contain heavy metals in concentrations of concern to waste water." As both suppliers are members of ETAD it is likely that the criterion is met, but it is not clearly indicated.

Criterion 20 Metal complex dyes

Only pigments are used.

Criterion 21 Azo dyes

Only pigments are used.

Criterion 22 Dyes that are carcinogenic, mutagenic or toxic to reproduction

Only pigments are used.

Criterion 25 Printing

- a. Only water based printing is carried out. In the printing paste recipe a number of chemicals could be identified as VOCs according to the MSDS. A rough calculation seems to indicate that around 4% of the recipe is VOC. For some of the other chemicals, however, no vapour pressure was mentioned. It is thus not possible to verify whether they are VOCs and whether the criterion is met.
- b. Plastisol-based printing is not used.

Criterion 26 Formaldehyde

Some Oeko-Tex test reports were presented. In some cases the formaldehyde was found to be below the detection limit of 20 ppm; in one case 52 ppm was found. This indicates that the product meets the criterion in the old criteria document (limit 75 ppm) but not in the revised criteria document (limit 30 ppm).

Criterion 27 Waste water discharges from wet-processing

The company carries out pH regulation of the collected waste water before discharge to municipal waste water treatment. The company takes waste water samples for analyses on a regular basis. The average water consumption is calculated to be around 110 l/kg. The municipal waste water treatment plant has informed that the COD concentration in the water leaving the treatment plant is below 125 mg/l. In this case the COD content in the waste water after treatment is below 14 g/kg, and as the limit in the criterion is 25 g/kg the criterion is met.

Criterion 28 Flame retardants

Are not used.

Criterion 30 Finishes

Only softening is carried out. The MSDS of the softening products used indicate no violation of the criterion.

2.4 Night Time from Dansk Supermarked

The bed linen product is made from a pigment printed, plain woven fabric.

The cotton for this product is grown in Pakistan, the spinning and weaving is carried out in Pakistan, and the dyeing/printing/finishing is carried out at the company in Pakistan, which was visited August 2003.

The company is certified according to ISO 9002.

Criterion 2 Cotton and other natural cellulosic seed fibres (including kapok)

Cotton is bought at a central in Pakistan according to technical specifications. It is all grown in Pakistan with the use of pesticides from Western Europe, approved by the Pakistan Government. The standard is not known to the company. Organic growing is not yet an issue in Pakistan. Consequently it is not possible to verify whether the criterion is met.

Criterion 10 Auxiliaries and finishing agents for fibres and yarns

- a. Size is informed to be starch based. The MSDS for the desizing chemicals confirm that they contain enzymes, which is only the case when starch based size is used. It is likely that the criterion is met.
- b. In the spinning of cotton yarn no chemicals are applied. The criterion is met.

Criterion 11 Biocidal or biostatic products

- a. Before shipment the transporting company fumigates and cleans the containers. It is likely that the criterion is met.
- b. Biocides are not applied to the end product.

Criterion 12 Stripping or depigmentation

Such steps are not carried out.

Criterion 14 Auxiliary chemicals

Going over the MSDS two pigment products have been identified, which contain alkylphenol ethoxylate (APEO). This is not allowed according to the revised criterion, but it was accepted in the old criteria document.

Criterion 15 Detergents, fabric softeners and complexing agents

The products for which MSDS have been presented do have sufficient biodegradability. It is thus likely that the criterion is met.

Criterion 16 Bleaching agents

Only hydrogen peroxide is used. The criterion is met.

Criterion 17 Impurities in dyes

Only pigments are used.

Criterion 18 Impurities in pigments

No documentation was presented regarding this criterion. The company stated, however, that only pigments from ETAD members are used, so it is likely that the criterion is met.

Criterion 20 Metal complex dyes

Only pigments are used.

Criterion 21 Azo dyes

Only pigments are used.

Criterion 22 Dyes that are carcinogenic, mutagenic or toxic to reproduction

Only pigments are used.

Criterion 25 Printing

- a. No products in the printing paste recipe were identified as VOCs. The criterion is met.
- b. Plastisol-based printing is not used.

Criterion 26 Formaldehyde

Only formaldehyde free or formaldehyde poor products are used. The end products meet customer requirements of max 20 ppm. The customer does the testing. It is likely that the criterion is met, but it cannot be verified as no analyses were at hand.

Criterion 27 Waste water discharges from wet-processing

According to the company there is no enforcement of the law on waste water in Pakistan, and consequently no regular analyses of the waste water from the dyehouse are carried out. It is thus not possible to determine whether the criterion is met.

Criterion 28 Flame retardants

Are not used.

Criterion 30 Finishes

The only finishing is softening and mechanical calendering. The MSDS for the softening chemical showed no violation of the criterion.

2.5 Millie May Rose from Lene Bjerre Design A/S

The bed linen product is made from a pigment printed, plain woven sheeting fabric.

Lene Bjerre Design A/S did not want to participate in the survey, as the company did not want to reveal their sub-contractors. Lene Bjerre Design forwarded an information sheet, from which it could be seen that the printing is taking place in the UK. It was not informed where spinning, weaving and pre-treatment is carried out.

From the sheet it could also be seen that an APEO-based surfactant is part of the printing paste. This is not allowed according to the revised criteria document, whereas it was accepted in the old criteria document.

2.6 Cornelia from Inspiration

The bed linen product is made from a pigment printed, plain woven fabric.

The product is made of cotton mainly originating from the USA. Spinning, weaving and dyeing/printing/finishing is carried out at the same company in Turkey, but at different production sites. The company was visited in September 2003. All products are certified according to Oeko-Tex Standard 100.

Criterion 2 Cotton and other natural cellulosic seed fibres (including kapok)

Cotton is bought mainly in the USA, some times in Turkey. Only the mechanical/physical characteristics of the fibres are known. There is no information on cotton growing or pesticide consumption. The company holds an Oeko-Tex certificate for its products, so analyses of pesticides exist showing compliance with Oeko-Tex, but this does not guarantee compliance with the eco-label, as tests must be made prior to wet processing. It is thus not possible to verify whether the criterion is met.

Criterion 10 Auxiliaries and finishing agents for fibres and yarns

- a) The company is using a CMC (carboxymethyl cellulose) based sizeing product. It was agreed that an MSDS would be forwarded after the visit. It is, however, likely that a CMC based product has a sufficient biodegradability, and it is thus likely that the criterion is met.
- b) In the spinning of cotton yarn no chemicals are applied. The criterion is met.

Criterion 11 Biocidal or biostatic products

- a. The company stated that biocides are not used for transportation reasons. The criterion is met.
- b. Biocides are not applied to the end product. The criterion is met.

Criterion 12 Stripping or depigmentation

Such steps are not carried out.

Criterion 14 Auxiliary chemicals

A survey of most of the used chemicals did not reveal any violation of the criterion. Not all MSDS were, however, presented; it is thus not completely possible to verify whether the criterion is met.

Criterion 15 Detergents, fabric softeners and complexing agents

The MSDS of the products presented all showed a sufficient biodegradability. It was, however, a bit uncertain if all chemicals were presented, as the bed linen product in question had not been produced for some months.

Criterion 16 Bleaching agents

Only hydrogen peroxide bleaching is carried out. The criterion is met.

Criterion 17 Impurities in dyes

Only pigments are used.

Criterion 18 Impurities in pigments

Various statements from pigment suppliers were presented in some of the MSDS. "<50 ppm free copper" and "does not contain copper". It is thus not possible to verify whether the criterion is met.

Criterion 20 Metal complex dyes

Only pigments are used.

Criterion 21 Azo dyes

Only pigments are used.

Criterion 22 Dyes that are carcinogenic, mutagenic or toxic to reproduction

Only pigments are used.

Criterion 25 Printing

- c. Only water based pigment printing is carried out. Some of the MSDS for the pigments used stated "no VOC". In the printing paste a fixing agent was used, which contains max. 2% formaldehyde, but the product as such was characterised as non-volatile at working temperature. Not all MSDS for products in the printing paste could, however, be found. It is thus not possible to verify, whether the criterion is met.
- d. Plastisol-based printing is not used.

Criterion 26 Formaldehyde

As the company holds Oeko-Tex certificates for its products it is likely that the criterion is met regarding the old criteria document, where the limit was 75 ppm. In the revised document the limit is 30 ppm, and it is thus not possible to verify, whether the criterion is met.

Criterion 27 Waste water discharges from wet-processing

The waste water from the production facilities is treated by an external waste water treatment company. There was no available information of the content of COD in the water after treatment. The company consumes 8,000 m³ water per day and produces 60-70 tonnes of textiles per day. This means a specific water consumption of 114-133 l/kg. As the discharge limit in the criterion is 25 g COD per kg textile produced, the COD concentration in the waste water after treatment should be below 188-219 mg/l. It is not possible to verify whether the criterion is met.

Criterion 28 Flame retardants

No such products were used.

Criterion 30 Finishes

The only finishing used for the product in question is softening. The MSDS of the product did not reveal any violation of the criterion.

2.7 Loops Classic from Södahl Design A/S

The bed linen is made from a dyed, jacquard woven satin fabric.

The bed linen product is produced in the Czech Republic. The company did not want to participate in the survey.

2.8 Nordisk Tekstil from COOP Danmark A/S

The bed linen product is made from a pigment printed, plain woven fabric.

The bed linen product is produced in Pakistan, and the company was visited in August 2003. During a meeting it became obvious, however, that the company was not able to supply any of the information needed to make the assessment. The company in question carries out some weaving plus pre-treatment and dyeing. Spinning, parts of the weaving and the printing is carried out by other companies in Pakistan. The products from the company are certified according to Oeko-Tex Standard 100 by BTTG, England.

It was agreed during the meeting that the consultant should forward a written questionnaire to the company, which then in turn would collect the information and forward it to the consultant. In spite of several inquiries no information has till now been received, leading to the conclusion that it is not possible to document whether the product in question meets the requirement in the EU eco-label.

2.9 Barbie from Hugo Kragh A/S

The bed linen product is made from a pigment printed, plain woven fabric.

The bed linen product is produced in Turkey and the factory was visited in September 2003. Spinning, weaving, pre-treatment, printing and finishing is all carried out at the same production site. The products are certified according to Oeko-Tex Standard 100 by FI Hohenstein, Germany.

The textile company is certified according to ISO 9001.

Criterion 2 Cotton and other natural cellulosic seed fibres (including kapok)

Cotton is bought at the cotton exchange in Izmir, mainly from the USA. The physical/mechanical characteristics of the cotton are known, but there is no information on the consumption of pesticides during cotton growing. The company holds an Oeko-Tex certificate for its bed linen products, so analyses of pesticides exist showing compliance with Oeko-Tex, but this does not guarantee compliance with the eco-label, as tests must be made prior to wet processing. It is thus not possible to verify whether the criterion is met.

Criterion 10 Auxiliaries and finishing agents for fibres and yarns

- a) The company is using 3 different starch based sizeing products. For all products the MSDS declare that the biodegradability is more than 80% in OECD Test Method 302B. The criterion is met.
- b) In the spinning of cotton yarn no chemicals are applied. The criterion is met.

Criterion 11 Biocidal or biostatic products

- a. The company stated that biocides are not used for transportation reasons. The criterion is met.
- b. Biocides are not applied to the end product. The criterion is met.

Criterion 12 Stripping or depigmentation

Such steps are not carried out.

Criterion 14 Auxiliary chemicals

Recipes and MSDS were presented, and a survey of the applied chemicals did not indicate any violation of the criterion.

Criterion 15 Detergents, fabric softeners and complexing agents

In the pre-treatment recipe 2 products were identified for which it is difficult to say whether the criterion is met. For a detergent the MSDS stated that ecological data were not available. For a complexing agent the elimination was informed to be 20–70%, which is just not meeting the criterion. It is thus likely that the criterion is not met.

Criterion 16 Bleaching agents

Only hydrogen peroxide bleaching is used. The criterion is met.

Criterion 17 Impurities in dyes

Only pigments are used.

Criterion 18 Impurities in pigments

Various statements from pigment suppliers were presented in the MSDS. "The content of heavy metals is of no concern to the waste water", "< 50

ppm free copper”, “does not contain copper”. It is thus not possible to verify whether the criterion is met.

Criterion 20 Metal complex dyes

Only pigments are used.

Criterion 21 Azo dyes

Only pigments are used.

Criterion 22 Dyes that are carcinogenic, mutagenic or toxic to reproduction

Only pigments are used.

Criterion 25 Printing

- a. Only water based printing is carried out. In the printing paste chemicals, which contain formaldehyde, but in very small quantities, could be identified. One bonding agent seems to have a vapour pressure, which would characterise it as a VOC. As it is often used in large proportion it is likely that the criterion is not met.
- b. Plastisol-based printing is not used.

Criterion 26 Formaldehyde

A number of analyses from Oeko-TEX test reports were presented, where the amount of formaldehyde was found to be between 5 and 18 ppm. It is thus likely that the criterion is met.

Criterion 27 Waste water discharges from wet-processing

The company is running a waste water treatment plant. Regular samples are taken and the results showed COD concentrations between 1600 and 1800 mg/l before treatment and between 35 and 132 after treatment. The limit set by the local authorities is 250 mg/l. The company stated a water consumption of around 150 m³/h and a production of 6000 m/h at an average weight of 150 g/m, giving 900 kg/h or 167 l/kg. As the limit in the criterion is 25 g/kg, the COD concentration should be less than 150 mg/l. It is thus likely that the criterion is met.

Criterion 28 Flame retardants

Are not used.

Criterion 30 Finishes

The only finishing process is softening. The MSDS of the two softening products indicated no violation of the criterion.

2.10 Gallery from Nordisk Tekstil Produktion A/S

The bed linen product is made from a pigment printed, plain woven fabric.

The bed linen product is pre-treated, printed and finished in Denmark. The company was visited in June 2003. The raw woven cotton fabric is imported, and the spinning and weaving is taking place in one of the Gulf States. The cotton is grown in Africa. The product is equipped with an Oeko-Tex certificate, issued by DTI Denmark.

Criterion 2 Cotton and other natural cellulosic seed fibres (including kapok)

The weaving mill has informed that it has no information regarding the use of pesticides in cotton growing. It can thus not be verified whether the criterion is met.

Criterion 10 Auxiliaries and finishing agents for fibres and yarns

The spinning mill has informed that no chemical auxiliaries are used during the spinning process. The size used is based on starch. It is thus expected to be readily biodegradable. It is thus most likely that the criterion is met.

Criterion 11 Biocidal or biostatic products

The weaving mill has not informed whether biocides are added. It can thus not be verified whether the criterion is met.

In the print paste some biocides have been identified which are added in order to avoid bacterial growth during production. One of the products is assigned the risk phrase R50/53. This use does not violate the criterion, however, as the biocides are only added in connection with the production.

Criterion 12 Stripping or depigmentation

Only dithionite or hypochlorite is used for such purposes, but very seldom. The criterion is met.

Criterion 14 Auxiliary chemicals

No products have been identified, which are violating the criterion.

Criterion 15 Detergents, fabric softeners and complexing agents

An emulsifier in the printing paste was identified, for which the biodegradability was 40-50% after OECD 302B. As the product is neither a detergent, nor a softener, nor a complexing agent the criterion is, however, not violated.

Criterion 16 Bleaching agents

Only hydrogen peroxide bleaching is used. The criterion is met.

Criterion 17 Impurities in dyes

Only pigments are used.

Criterion 18 Impurities in pigments

For pigments from one supplier it is informed that the content of heavy metals is below 26 ppm. For one exception it is mentioned that the content of Ba is below 100 ppm.

For pigments from another supplier it is informed that the content of heavy metals does not cause problems.

One MSDS from a third supplier was missing. It was thus not completely possible to verify whether the criterion is met.

Criterion 20 Metal complex dyes

Only pigments are used.

Criterion 21 Azo dyes

Only pigments are used.

Criterion 22 Dyes that are carcinogenic, mutagenic or toxic to reproduction

Only pigments are used.

Criterion 25 Printing

One product in the printing paste has been identified, which contains a substance with a vapour pressure of 130 mbar at 40°C, where the limit is 0.1 mbar (0.01 kPa). It was not possible to verify by looking at the recipe whether this product is violating the criterion.

Criterion 26 Formaldehyde

Formaldehyde is identified in the printing paste and in the preparation for crease resist finishing. No analyses of content of free or partly hydrolysable formaldehyde were presented. It is not known whether the criterion is met.

Criterion 27 Waste water discharges from wet-processing

As the dyehouse is not met with a formal requirement for the maximum content of COD in the waste water, this parameter is not measured. The local authorities are only interested in pH, temperature, amount and some heavy metals. The dyehouse meets all these requirements.

It can thus not be verified whether this criterion is met.

Criterion 28 Flame retardants

Such products are not used.

Criterion 30 Finishes

A recipe with crease resist finish and softening preparations is used. It contains a substance with more than 0.1% formaldehyde, labelled R40 as well as another substance labelled R53. The usage of these two substances means that the criterion is not met.

2.11 Rapunzel from Jysk A/S

The bed linen product is made from a pigment printed, plain woven fabric.

The bed linen product is produced in Turkey and the factory was visited in September 2003. Spinning, weaving, printing and finishing is all carried out at the same production site. The product is equipped with an Oeko-Tex certificate, issued by FI Hohenstein, Germany.

The textile company is certified according to ISO 9001.

Criterion 2 Cotton and other natural cellulosic seed fibres (including kapok)

Cotton is bought at the cotton exchange in Izmir, mainly from the USA. The physical/mechanical characteristics of the cotton are known, but there is no information on the consumption of pesticides during cotton growing. The company holds an Oeko-Tex certificate for its bed linen products, so analyses of pesticides exist showing compliance with Oeko-Tex, but this does not guarantee compliance with the eco-label, as tests must be made prior to wet processing. It is thus not possible to verify whether the criterion is met.

Criterion 10 Auxiliaries and finishing agents for fibres and yarns

- a) The company is using 3 different starch based sizeing products. For all products the MSDS declare that the biodegradability is more than 80% in OECD Test Method 302B. The criterion is met.
- b) In the spinning of cotton yarn no chemicals are applied. The criterion is met.

Criterion 11 Biocidal or biostatic products

- a. The company stated that biocides are not used for transportation reasons. The criterion is met.
- b. Biocides are not applied to the end product. The criterion is met.

Criterion 12 Stripping or depigmentation

Such steps are not carried out.

Criterion 14 Auxiliary chemicals

Recipes and MSDS were presented, and a survey of the applied chemicals did not indicate any violation of the criterion.

Criterion 15 Detergents, fabric softeners and complexing agents

In the pre-treatment recipe 2 products were identified for which it is difficult to say whether the criterion is met. For a detergent the MSDS stated that ecological data were not available. For a complexing agent the elimination was informed to be 20–70%, which is just not meeting the criterion. It is thus likely that the criterion is not met.

Criterion 16 Bleaching agents

Only hydrogen peroxide bleaching is used. The criterion is met.

Criterion 17 Impurities in dyes

Only pigments are used.

Criterion 18 Impurities in pigments

Various statements from pigment suppliers were presented in the MSDS. "The content of heavy metals is of no concern to the waste water", "< 50

ppm free copper”, “does not contain copper”. It is thus not possible to verify whether the criterion is met.

Criterion 20 Metal complex dyes

Only pigments are used.

Criterion 21 Azo dyes

Only pigments are used.

Criterion 22 Dyes that are carcinogenic, mutagenic or toxic to reproduction

Only pigments are used.

Criterion 25 Printing

- c. Only water based printing is carried out. In the printing paste chemicals, which contain formaldehyde, but in very small quantities, could be identified. One bonding agent seems to have a vapour pressure, which would characterise it as a VOC. As it is often used in large proportion it is likely that the criterion is not met.
- d. Plastisol-based printing is not used.

Criterion 26 Formaldehyde

A number of analyses from Oeko-Test reports were presented, where the amount of formaldehyde was found to be between 5 and 18 ppm. It is thus likely that the criterion is met.

Criterion 27 Waste water discharges from wet-processing

The company is running a waste water treatment plant. Regular samples are taken and the results showed COD concentrations between 1600 and 1800 mg/l before treatment and between 35 and 132 after treatment. The limit set by the local authorities is 250 mg/l. The company stated a water consumption of around 150 m³/h and a production of 6000 m/h at an average weight of 150 g/m, giving 900 kg/h or 167 l/kg. As the limit in the criterion is 25g/kg, the COD concentration should be less than 150 mg/l. It is thus likely that the criterion is met.

Criterion 28 Flame retardants

Are not used.

Criterion 30 Finishes

The only finishing process is softening. The MSDS of the two softening products indicated no violation of the criterion.

2.12 2-del t sæt from Dansk Supermarked A/S

The bed linen product is made from a pigment printed, plain woven fabric.

The bed linen product is produced in India, and the company was visited in August 2003. This particular company carries out wet processing (pre-treatment, printing, finishing) and making-up. The spinning and weaving is carried out by sub-contractors, also in India. Products for the German market are equipped with an Oeko-Tex certificate.

Criterion 2 Cotton and other natural cellulosic seed fibres (including kapok)

The company has no information about cotton growing. The raw material comes from numerous spinners and weavers in India, and the cotton is grown in India. The situation about organic or transitional cotton in India is not known. It is thus not possible to verify whether the criterion is met.

Criterion 10 Auxiliaries and finishing agents for fibres and yarns

- a. As the desizing is said to be carried out with enzymes the size must be starch based. Although the company has no knowledge of the nature of the size, it is likely that the criterion is met.
- b. In the spinning of cotton yarn no chemicals are applied. The criterion is met.

Criterion 11 Biocidal or biostatic products

- a. It is not known whether biocides are used for the transportation of raw fibres or raw yarn.
- b. Biocides are not applied to the end product.

Criterion 12 Stripping or depigmentation

Such steps are not carried out.

Criterion 14 Auxiliary chemicals

The MSDS of the chemicals used were not available. Afterwards the company collected a number of MSDS and sent them to the consultant. In none of the MSDS prohibited chemicals were identified, but in general the MSDS were not very informative. It is, however, likely that the criterion is met.

Criterion 15 Detergents, fabric softeners and complexing agents

The MSDS of the chemicals used were not available. Afterwards the company collected a number of MSDS and sent them to the consultant. In none of the MSDS biodegradability was mentioned. The only information on environmental issues was that the products were "Not Classified". It is thus not possible to verify whether the criterion is met.

Criterion 16 Bleaching agents

Only hydrogen peroxide bleaching is used. The criterion is met.

Criterion 17 Impurities in dyes

Only pigments are used.

Criterion 18 Impurities in pigments

The MSDS of the pigments were not available. So far no MSDS for pigments have been received. It is thus not possible to verify whether the criterion is met.

Criterion 20 Metal complex dyes

Only pigments are used.

Criterion 21 Azo dyes

Only pigments are used.

Criterion 22 Dyes that are carcinogenic, mutagenic or toxic to reproduction

Only pigments are used.

Criterion 25 Printing

- a. Only water based pigment printing is carried out. The MSDS of the chemicals used were not available. Afterwards the company collected a number of MSDS and sent them to the consultant. It was not possible to conclude whether any of the products should be classified as VOCs. It is thus not possible to verify whether the criterion is met.
- b. Plastisol-based printing is not used.

Criterion 26 Formaldehyde

Analyses were presented showing formaldehyde contents no higher than 18 ppm. The criterion is met.

Criterion 27 Waste water discharges from wet-processing

There are local regulations of waste water, which have to be met. The company runs a waste water treatment plant, and analyses of the waste water after treatment are carried out by a third party on a regular basis. Reports presented showed COD concentrations between 64 and 75 mg/l. The water consumption is likely to be around 33 l/kg. As the limit in the criterion is 25g/kg, the COD concentration should be less than 758 mg/l. It is thus likely that the criterion is met.

Criterion 28 Flame retardants

Are not used.

Criterion 30 Finishes

The only finishing used is softening. The MSDS of the chemicals used were not available. The MSDS for the softening product was received. The product is categorised as "Not Classified", and based on the few information in the MSDS it is likely that the criterion is met.

2.13 Sally from Inbodan A/S

The bed linen product is made from a pigment printed, plain woven fabric.

The bed linen product is produced in Turkey. The company did not want to participate in the survey.

2.14 Lönn from IKEA A/S

The bed linen product is made from a yarn dyed, plain woven fabric.

The bed linen product is produced in India. After the selection of the products for the survey, the retailer had however stopped the co-operation with this particular manufacturer and therefore did not want to participate in the survey.

2.15 Strandfräne from IKEA A/S

The bed linen product is made from a pigment printed, plain woven fabric.

The bed linen product is produced in Pakistan, and the company was visited in August 2003. This particular company carries out wet processing (pre-treatment, printing, finishing) and making-up. The cotton is grown in Pakistan and spinning and weaving is carried out by sub-contractors, also in Pakistan. The products are equipped with an Oeko-Tex certificate issued by FI Hohenstein, Germany.

The wet processing company is certified according to ISO 9000 and is planning to apply for certification according to ISO 14000.

Criterion 2 Cotton and other natural cellulosic seed fibres (including kapok)

The company is not involved in spinning. There was no immediate documentation regarding fibre production. All cotton is from Pakistan, but the company does not set out requirements regarding cotton. The company holds Oeko-Tex Standard 100 certificates for its products, meaning that the final product has been tested for pesticides. The company has to ask spinner or weaver for documentation. Organic growing is not yet an issue in Pakistan. Consequently it is not possible to verify whether the criterion is met.

Criterion 10 Auxiliaries and finishing agents for fibres and yarns

- a. Size is informed to be starch based (maize). The MSDS were not available. It is likely, however, that the criterion is met.
- b. In the spinning of cotton yarn no chemicals are applied. The criterion is met.

Criterion 11 Biocidal or biostatic products

- a. It was not known whether biocides are used for transportation reasons.
- b. No biocides are applied to the end product.

Criterion 12 Stripping or depigmentation

Such steps are not carried out.

Criterion 14 Auxiliary chemicals

Recipes and MSDS were presented, and a survey of the applied chemicals did not indicate any violation of the criterion.

Criterion 15 Detergents, fabric softeners and complexing agents

One complexing agent has a biodegradability of 20-70% in a modified Zahn Wellens Test (= OECD 302B). It does not seem like a sufficient biodegradability. It is likely that the criterion is not met.

Criterion 16 Bleaching agents

Only hydrogen peroxide bleaching is used. The criterion is met.

Criterion 17 Impurities in dyes

Only pigments are used.

Criterion 18 Impurities in pigments

Only 3 pigments are used in the product. According to the pigment producers they can be used in all Oeko-Tex labelled products. There was, however, no immediate documentation on impurities in the products. As the suppliers are

members of ETAD it is likely that the criterion is met, but it is not clearly indicated.

Criterion 20 Metal complex dyes

Only pigments are used.

Criterion 21 Azo dyes

Only pigments are used.

Criterion 22 Dyes that are carcinogenic, mutagenic or toxic to reproduction

Only pigments are used.

Criterion 25 Printing

- a. Only water based printing is carried out. In the printing paste no chemicals could be identified as VOCs according to the MSDS. The criterion is likely to be met.
- b. Plastisol-based printing is not used.

Criterion 26 Formaldehyde

Several analyses of formaldehyde were presented, where the content was always below 20 ppm. The criterion is likely to be met.

Criterion 27 Waste water discharges from wet-processing

According to the company there is no enforcement of the law on waste water in Pakistan. The company is, however, on its own initiative planning a 2-step waste water treatment plant with chemical and biological treatment. Regular samples are taken and the results showed COD concentrations between 1200 and 3200 mg/l. The company stated a water consumption of around 100 l/kg. As the limit in the criterion is 25g/kg, the COD concentration should be less than 250 mg/l. It is thus likely that the criterion is not met.

Criterion 28 Flame retardants

Are not used.

Criterion 30 Finishes

The only finishing is softening. The MSDS of the softening chemical did not indicate any violation of the criterion.

2.16 Moments from Södahl Design A/S

The bed linen product is made from a pigment printed, satin woven fabric.

The bed linen product is printed and made-up in Denmark. The factory was visited in June 2003. Spinning, weaving and pre-treatment is informed to be carried out in India. The pre-treated cotton fabric as well as the bed linen product are equipped with the EU eco-label (the Flower) issued by Ecolabelling Denmark.

The Danish manufacturer is working according to ISO 14001 and EMAS.

The supplier of the pre-treated fabric did not wish to participate in the survey, so the verification is only dealing with criteria, which are relevant for the printing process.

Criterion 2 Cotton and other natural cellulosic seed fibres (including kapok)

As the fabric is equipped with the EU eco-label the old criterion is met. It is likely that the product also meets the revised criterion, but as some more pesticides are added, it is not sure.

Criterion 10 Auxiliaries and finishing agents for fibres and yarns

As the fabric is equipped with the EU eco-label the old criterion is met. As this criterion is not changed regarding the parts relevant for cotton products, it is likely that it also meets the revised criterion.

Criterion 11 Biocidal or biostatic products

As the fabric is equipped with the EU eco-label the old criterion is met. As this particular criterion is changed, it can not be verified whether the revised criterion is met.

In the print paste a biocide has been identified which is added in order to avoid bacterial growth during production. This use does not, however, violate the criterion, as the biocide is only added in connection with the production.

Criterion 12 Stripping or depigmentation

Such steps are probably not carried out.

Criterion 14 Auxiliary chemicals

In the print paste recipe a thickener was identified, which contains APEO, which is not allowed according to the revised criteria document. It was, however, allowed according to the old criteria document.

Criterion 15 Detergents, fabric softeners and complexing agents

Going over the MSDS two products in the print paste recipe were identified, for which the biodegradability is low. An auxiliary has a biodegradability of 40-50% after OECD 302B, and a thickener has a biodegradability of 58% after OECD 303.

As the products are neither detergents, nor softeners, nor complexing agents the criterion is not violated.

Criterion 16 Bleaching agents

As the fabric is equipped with the EU eco-label the criterion is met. As this criterion has not been essentially changed, the product complies with both the old and the revised document.

Criterion 17 Impurities in dyes

Only pigments are used.

Criterion 18 Impurities in pigments

Pigments from one supplier are equipped with a statement that the content of heavy metals does not create any problems.

One product from another supplier does not contain heavy metals.

The documentation provided is thus not completely clear, but as the product holds the eco-label the criterion is met.

Criterion 20 Metal complex dyes

Only pigments are used.

Criterion 21 Azo dyes

Only pigments are used.

Criterion 22 Dyes that are carcinogenic, mutagenic or toxic to reproduction

Only pigments are used.

Criterion 25 Printing

Some components in the print paste have been identified, which have a vapour pressure above 0.1 mbar. As the bed linen product, however, is equipped with an eco-label the criterion is met. As this criterion has not been changed, the product also complies with the revised criteria document.

Criterion 26 Formaldehyde

Formaldehyde has been identified in the print paste and in the crease resist finish, but the bed linen product meets the demand for max. 75 ppm free and partly hydrolysable formaldehyde in the old criteria document. Whether it meets the demand for max. 30 ppm in the revised document is not known.

Criterion 27 Waste water discharges from wet-processing

Based on waste water analyses and a calculation according to the User's Manual the COD content in the discharge from the factory is 10 g COD/kg product. After this the waste water is treated further by the municipal waste water treatment plant. The criterion is met.

Criterion 28 Flame retardants

Are not used.

Criterion 30 Finishes

A recipe is used containing crease resist finishing (and softening). This recipe contains an anti-foaming substance assigned R43 and 52/53. This is not allowed according to the revised criteria document, but in the old criteria document this particular criterion did not exist.

2.17 Rosa from Bon'A Parte A/S

The bed linen product is made from a pigment printed, plain woven fabric.

Spinning, weaving, pre-treatment and printing is carried out at the same company in Portugal. The company was visited in June 2003. The bed linen product is equipped with an Oeko-Tex certificate issued by CITEVE, Portugal.

The textile company is certified according to ISO 9000.

Criterion 2 Cotton and other natural cellulosic seed fibres (including kapok)

The company itself is spinning 30-40% of the yarn consumed. The rest is bought from other companies in Portugal or other countries (e.g. Egypt, India). Some of these yarns are delivered with Oeko-Tex certificate, in which case it is likely that the criterion is met. In other cases there are no analyses or documentation to indicate whether the criterion is met. The company is not dealing with organic or transition cotton. The product in question is Oeko-Tex certified, so it is likely that the criterion is met.

Criterion 10 Auxiliaries and finishing agents for fibres and yarns

- a. Size: The basic component is a starch ether, which is readily biodegradable according to the MSDS. Another component is > 80% biodegradable. For the last component there are no indications of the biodegradability. As the starch component, however, is the dominating part, it is likely that the criterion is met.
- b. In the spinning of cotton yarn no chemicals are applied. The criterion is met.

Criterion 11 Biocidal or biostatic products

- a. It is not known whether biocides are used for the transportation of raw fibres or raw yarns.
- b. Biocides are not applied to the end product.

Criterion 12 Stripping or depigmentation

Such steps are probably not carried out.

Criterion 14 Auxiliary chemicals

A survey of the applied chemicals did not indicate any violation of this criterion. It must be emphasised, however, that not all MSDS were very informative.

Criterion 15 Detergents, fabric softeners and complexing agents

A complexing agent was identified, which is heavily biodegradable. For some other products information regarding biodegradability was not available. It is likely that the criterion is not met.

Criterion 16 Bleaching agents

Only hydrogen peroxide bleaching is used. The criterion is met.

Criterion 17 Impurities in dyes

Only pigments are used.

Criterion 18 Impurities in pigments

About 8 different pigments are used, and they do not contain heavy metals in concentrations that would cause problems in waste water, according to the MSDS. As the suppliers are members of ETAD it is likely that the criterion is met, but it is not clearly indicated.

Criterion 20 Metal complex dyes

Only pigments are used.

Criterion 21 Azo dyes

Only pigments are used.

Criterion 22 Dyes that are carcinogenic, mutagenic or toxic to reproduction

Only pigments are used.

Criterion 25 Printing

a. In the printing paste two products have been identified, which must be defined as VOCs:

Thickener (2.4% in recipe, vapour pressure 120 mbar at 50°C).

Bonding agent (17% in recipe, vapour pressure 150 mbar at 50°C).

For the other products the vapour pressure was not indicated. It is thus likely that the criterion is not met.

b. Plastisol-based printing is not used.

Criterion 26 Formaldehyde

Formaldehyde releasing chemicals were identified both in the printing paste and in the finishing recipe. Analyses of free formaldehyde were presented with results varying between 34 and 40 ppm. It is thus likely that the old criterion is met, but that the revised criterion is not met.

Criterion 27 Waste water discharges from wet-processing

The waste water is pre-treated at the company and subject to a final treatment at a municipal treatment plant, which releases water with a maximum COD of 250 mg/l. As the company produces 80,000 metres of fabric per day (or 28 tonnes) and discharges 2,200 m³ of waste water per day, it can be calculated that the COD content is approx. 20 g/kg product. The criterion is met.

Criterion 28 Flame retardants

Are not used.

Criterion 30 Finishes

The only finishing is crease resist finishing and softening. The recipe contains a cross linking agent, which in turn contains 0.1 – 0.2% formaldehyde labelled R40, which is not allowed. For another chemical, a fluorescent whitener, there are no R-sentences, whereas for three other chemicals (a polyacrylate, a catalyst and an unidentified chemical) no MSDS were available. It is thus likely that the criterion is not met.

2.18 Blue Stripe from Vivatex

The bed linen product is made from a yarn dyed, plain woven fabric.

The bed linen product had originally been equipped with the EU eco-label the Flower, but the certification had been given up before the product had been purchased for the survey.

The manufacturers of the product are situated in Germany, but did not want to participate in the survey. Documentation had been presented through certificates from IVN (Internationaler Verband der Naturtextilwissenschaft - International Natural Textile Association) and SKAL (Inspection Organisation for Organic Production Methods) for parts of the production.

The product in question is yarn dyed, and the yarn dyer holds an IVN-certificate, only covering the period 2001/2002, however. The weaving mill holds a SKAL-certificate for the products. The assessment below is therefore based on the certificates mentioned.

Criterion 2 Cotton and other natural cellulosic seed fibres (including kapok)

IVN has certified the spinning and dyeing mill, and as IVN only allows organically grown cotton or transitional cotton, the criterion is met.

Criterion 10 Auxiliaries and finishing agents for fibres and yarns

- a) The IVN rules demand starch based or synthetic size, but the biodegradability is not specifically mentioned. It is not clear whether SKAL has any rules regarding size. It can thus not be verified whether the criterion is met.
- b) Regarding yarn auxiliaries products based on natural raw materials, which can easily be washed out, are allowed, but the biodegradability is not mentioned. It is, however, not likely that auxiliaries have been added during spinning of 100% cotton yarn.

Criterion 11 Biocidal or biostatic products

It is difficult to interpret the IVN-rules; products used during transportation and storage shall be in accordance with EG-Bio VO 2092/91. Finishing with biocidal or biostatic products is not allowed. It is, however, likely that the criterion is met.

Criterion 12 Stripping or depigmentation

Not mentioned, neither in IVN nor in SKAL.

Criterion 14 Auxiliary chemicals

APEO, LAS, EDTA and DTPA are not allowed. The other specific chemicals in the criteria are not mentioned. It is thus not possible to verify whether the criterion is met.

Criterion 15 Detergents, fabric softeners and complexing agents

In IVN biodegradability is compared to toxicity. A high toxicity is allowed if the product is readily biodegradable. No concrete demands exist, making a comparison with the Flower impossible.

Criterion 16 Bleaching agents

Only peroxide bleaching is allowed. The criterion is met.

Criterion 17 Impurities in dyes

The ETAD rules have to be followed. It is likely that the criterion is met.

Criterion 18 Impurities in pigments

Only dyestuffs are used.

Criterion 20 Metal complex dyes

The situation is not clear. Metal complex dyes are not allowed in the strictest part of the IVN-rules (BEST), but in BETTER Cu is allowed. It is thus not possible to verify whether the criterion is met.

Criterion 21 Azo dyes

The rules are the same as in the Flower label. The criterion is met.

Criterion 22 Dyes that are carcinogenic, mutagenic or toxic to reproduction

Carcinogenic dyes are not allowed. Dyes that are mutagenic or toxic to reproduction are not specifically mentioned. It is not clear whether the criterion is met.

Criterion 25 Printing

Printing is not carried out.

Criterion 26 Formaldehyde

Products containing formaldehyde shall not be used. The limit value is 20 ppm using the Japanese Law method. The criterion is met.

Criterion 27 Waste water discharges from wet-processing

According to IVN waste water must be treated in a two-step treatment plant. No specific limit values are mentioned. It is thus not possible to verify whether the criterion is met.

Criterion 28 Flame retardants

Flame retardants are not allowed. The criterion is met.

Criterion 30 Finishes

Most chemical finishes are prohibited. Those allowed must be based on natural raw materials, which does not verify whether the criterion is met. The product in question has, however, probably not been subject to a finishing procedure.

2.19 Candy Light Blue from Ilva A/S

The bed linen product is made from a piece-dyed and pigment printed, plain woven fabric.

The bed linen product is produced in Portugal, and the company was visited in June. During the visit it became clear, however, that the company only carries out embroidery and cutting. Spinning, weaving, wet processing and sewing is carried out elsewhere.

It was not informed where yarn spinning is taking place, but weaving is mostly done in Belgium. The raw fabric is imported to Portugal, where the wet processing and making-up is taking place.

It was agreed during the meeting that the consultant should forward a written questionnaire to the company, which then in turn would collect the information and forward it to the consultant. In spite of several inquiries no information has till now been received, leading to the conclusion that it is not possible to document whether the product in question meets the requirement in the EU eco-label.

3 Summary of results of the survey

In the table below it is summarised, how the individual products were assessed towards each criterion in the old criteria document.

Table 3.1 Assessment results with respect to **the old criteria document**

Product	Criterion number																	
	2	10	11	12	14 a	14 b	15	16	17	19 a	19 b	20	21	24 a	24 b	25	26	27
Home Base	-	(+)	-	+	(+)	÷	+	(+)	o	+	+	(+)	(+)	o	o	(+)	+	+
Finlayson	(+)	(+)	-	+	+	+	+	o	(+)	o	o	o	o	(÷)	+	(+)	+	+
Madison	(+)	(+)	(+)	+	+	-	+	o	(+)	o	o	o	o	-	+	+	+	+
Night Time	-	(+)	(+)	+	+	(+)	+	o	(+)	o	o	o	o	+	+	(+)	-	+
Millie May Rose																		
Cornelia	-	(+)	+	+	-	(+)	+	o	-	o	o	o	o	-	+	+	-	+
Loops Classic																		
Nordisk Tekstil	-	-	-	-	-	-	-	o	-	o	o	o	o	-	-	-	-	-
Barbie	-	+	+	+	+	(÷)	+	o	-	o	o	o	o	(÷)	+	+	+	+
Gallery	-	(+)	-	+	+	+	+	o	(+)	o	o	o	o	-	+	-	-	+
Rapunzel	-	+	+	+	+	(÷)	+	o	-	o	o	o	o	(÷)	+	+	+	+
2-delt sæt	-	(+)	-	+	(+)	-	+	o	-	o	o	o	o	-	+	+	+	+
Sally																		
Lönn																		
Strandfräne	-	(+)	-	+	+	(÷)	+	o	(+)	o	o	o	o	+	+	+	÷	+
Moments	+	+	+	+	+	+	+	o	(+)	o	o	o	o	+	+	+	+	+
Rosa	(+)	(+)	-	+	(+)	÷	+	o	(+)	o	o	o	o	÷	+	+	+	+
Blue Stripe	+	-	(+)	-	-	-	+	+	o	-	-	+	-	o	o	+	-	+
Candy Light Blue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Legend:

- The producer did not want to participate in the survey
- +
- ÷ Documentation that the criterion is not met
- (+)
- (÷)
- No documentation
- o Not relevant for the product in question.


Only the Flower-labelled product Moments meets all the criteria.

The following table summarises, how the individual products were assessed towards each criterion in the revised criteria document.

Table 3.2 Assessment results with respect to **the revised criteria document**

Product	Criterion number																				
	2	10 a	10 b	11 a	11b	12	14	15	16	17	18	20 a	20 b	21	22	25 a	25 b	26	27	28	30
Home Base	-	(+)	+	-	+	+	(+)	÷	+	(+)	o	+	+	(+)	(+)	o	o	(+)	+	+	-
Finlayson	(+)	(+)	+	-	+	+	+	+	+	o	(+)	o	o	o	o	(÷)	+	(+)	+	+	÷
Madison	(+)	(+)	+	(+)	+	+	+	-	+	o	(+)	o	o	o	o	-	+	÷	+	+	+
Night Time	-	(+)	+	(+)	+	+	÷	(+)	+	o	(+)	o	o	o	o	+	+	(+)	-	+	+
Millie May Rose																					
Cornelia	-	(+)	+	+	+	+	-	(+)	+	o	-	o	o	o	o	-	+	-	-	+	+
Loops Classic																					
Nordisk Tekstil	-	-	-	-	-	-	-	-	-	o	-	o	o	o	o	-	-	-	-	-	-
Barbie	-	+	+	+	+	+	+	(÷)	+	o	-	o	o	o	o	(÷)	+	+	+	+	+
Gallery	-	(+)	+	-	+	+	+	+	+	o	(+)	o	o	o	o	-	+	-	-	+	÷
Rapunzel	-	+	+	+	+	+	+	(÷)	+	o	-	o	o	o	o	(÷)	+	+	+	+	+
2-delt sæt	-	(+)	+	-	+	+	(+)	-	+	o	-	o	o	o	o	-	+	+	+	+	(+)
Sally																					
Lönn																					
Strandfråne	-	(+)	+	-	+	+	+	(÷)	+	o	(+)	o	o	o	o	+	+	+	÷	+	+
Moments	(+)	+	+	-	-	+	÷	+	+	o	(+)	o	o	o	o	+	+	-	+	+	÷
Rosa	(+)	(+)	+	-	+	+	(+)	÷	+	o	(+)	o	o	o	o	÷	+	÷	+	+	÷
Blue Stripe	+	-	(+)	(+)	(+)	-	-	-	+	+	o	-	-	+	-	o	o	+	-	+	(+)
Candy Light Blue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Legend:

-  The producer did not want to participate in the survey
- +
- ÷ Documentation that the criterion is not met
- (+)
- (÷)
- No documentation
- o Not relevant for the product in question.

None of the products comply with the requirements in the new and revised criteria document, not even the product with the eco-label.

This shows that the revision has tightened the requirements so that those producers, who earlier had products certified according to the criteria document, will have to adjust their documentation and sometimes even their production in order to meet the revised criteria. This is very well in accordance with the whole idea of eco-labelling that continuous improvements regarding environmental aspects are necessary.

4 Reference list

- (1) "En holdbar sengekammerat" ("A durable bedfellow"). tænktest no. 39, November 2003. (Only in Danish).
- (2) Commission Decision of 15 May 2002 establishing the ecological criteria for the award of the Community eco-label to textile products and amending Decision 1999/178/EC. (2002/371/EC).
Official Journal of the European Communities 18.5.2002, L 133/29-41.
- (3) Commission Decision of 17 February 1999 establishing the ecological criteria for the award of the Community eco-label to textile products. (1999/178/EC).
Official Journal of the European Communities 5.3.1999, L 57/21-30.
- (4) Commission Decision of 27 November 2001 prolonging the period of validity of Decision 1999/178/EC establishing the ecological criteria for the award of the Community eco-label to textile products. (2001/831/EC).
Official Journal of the European Communities 28.11.2001, L 310/29.