

About Nordic Ecolabelled

## **Microfibre cloths and mops**

**Version 2.0**

**Background to ecolabelling**

Draft for comment, 12 March 2010



**Nordic Ecolabelling**

## **Nordic Ecolabelled microfibre cloths and mops Background to ecolabelling**

083/Version 2.0, 2010-03-12

<b>1</b>	<b>Summary .....</b>	<b>1</b>
<b>2</b>	<b>General facts about the criteria .....</b>	<b>3</b>
<b>3</b>	<b>About the revision .....</b>	<b>7</b>
<b>4</b>	<b>Justification of the requirements.....</b>	<b>8</b>
<b>5</b>	<b>Changes from the previous version .....</b>	<b>38</b>
<b>6</b>	<b>New criteria.....</b>	<b>38</b>
<b>7</b>	<b>References .....</b>	<b>39</b>

# 1 Summary

This background document contains a brief description of the product group and its impact on the environment, a market overview and a background to the requirements stipulated in the criteria document.

The criteria document applies to washable cleaning cloths and mops made of microfibre, and their associated cleaning utensils, that are designed for domestic and professional use for cleaning without cleaning chemicals. A microfibre cloth/mop may contain textile materials other than microfibres. Cleaning utensils and fixtures cannot however be ecolabelled separately. They must be part of a series or collection of cleaning products, i.e. be sold along with a cloth or mop.

Microfibre cloths and mops impact on the environment throughout their entire lifecycle. Emissions to air and discharges into water and the ground occur during primary production, the manufacture of the product itself and, finally, during the use of the product. The requirements focus on the environmental impact of microfibre cloths and mops and associated cleaning utensils during manufacture and use, which are the main phases that ecolabelling can influence. The manufacture and use of microfibre cloths and mops involve water, energy and chemicals. The criteria require applicants to describe how the product fulfils the definition of eligible products. This is done to evaluate whether the product is covered by the definition of the product group.

The environmental requirements that are stipulated apply to the textile material and the associated cleaning utensils. The requirements cover fibre and textile production, the quality of the textile, plastics and metals. The function of the product is a further area that is covered. Requirements on labelling and user instructions can be found under “General requirements”.

The requirements on fibre production apply to the synthetic and natural fibres that are the most common in microfibre products (e.g. cotton, polyester, polyamide, polypropylene and viscose). The criteria promote the use of recycled materials. The environmental requirements applicable to fibre production concern emissions to water and air, the environmental impact of which is significant.

The requirements also concern processes and the chemicals used in textile production. Textile production can have a high environmental impact due to significant emissions of water, such as from the splitting of microfibres and dyeing of textile materials in the microfibre product.

These requirements apply only to the wet processes in textile production and concentrate on the use of chemicals, emissions to water and resource consumption (e.g. energy and water).

The use of chemicals can cause environmental and health problems, such as sensitisation. Accordingly, some requirements regard chemicals that are harmful to health and the environment.

Process water that is released during textile production, and the chemicals it contains, impact negatively on the environment. Accordingly, the document contains requirements on waste water and wet processes.

Microfibre cloths and mops must fulfil quality requirements concerning colourfastness and dimensional change. Since a microfibre cloth or mop must be washable in water, requirements are set regarding colourfastness and dimensional changes that influence the performance of the product. Since microfibre products contain various types of fibre, dimensional changes during washing must be checked.

The criteria also contain requirements on materials other than textiles that are used in the cleaning utensils such as a mop handle, mop holder or other fixture that is sold along with the microfibre cloth or mop. The requirements apply to plastics and metals as well as chemical products and additives used for the pre-treatment and surface treatment of metals, as additives in plastics and for bonding. These requirements are based on the proportion by weight of each type of material in the cleaning utensil (excluding textile part) that is intended for sale together with the microfibre cloth or mop. The criteria also contain requirements on additives in chemical products with the intention of prohibiting the use of chemical substances that are most hazardous to health and the environment in surface treatment (such as heavy metals).

Requirements are also set as to the proportion of recycled material, such as metals and plastics. This is considered important to save resources such as energy.

To ensure the effectiveness of the product, the criteria contain functional requirements. The functional requirements cover the cleaning properties of the microfibre cloth or mop, such as the removal of dust and dirt and the reduction of bacteria. Cleaning performance is an important environmental parameter that contributes to the increasing use of microfibre cleaning products. This helps reduce the use of cleaning chemicals and water.

The requirements also include characteristics such as abrasion, durability and absorption.

Requirements are also set on packaging, recycling system, information and environmental and quality control.

The most important changes since version 1.4:

- Change to product group definition.
- Introduction of requirements on textiles.
- Harmonisation with GHS/CLP classification.
- Introduction of requirements on metals.
- Introduction of requirements on plastics.
- Tightening/adjustment of functional requirements.
- New layout.

## **2 General facts about the criteria**

### Products that can be labelled

The product group is limited to washable cleaning cloths and mops comprising microfibres that are used for dry/damp/wet cleaning without the use of cleaning chemicals. Microfibre cloths and mops may also contain fibres other than microfibres. The criteria include both synthetic and natural fibres. Cleaning utensils, such as mop handles, mop holders and other fixtures that are sold along with the mop, are subject to these criteria but are not eligible for a separate Nordic Ecolabel.

### Justification for Nordic Ecolabelling

Cleaning is an important tool in creating a healthy living environment. Traditionally, cleaning involves a significant use of cleaning chemicals, water and energy. The excessive use of chemicals, overdosing and unnecessarily potent cleaning agents result in significant emissions of substances that are hazardous to the environment and health. The use of microfibre cloths and mops enables a reduction in water, chemical and energy consumption.

The use of microfibres reduces environmental impact by reducing the emission of chemicals. Fewer chemicals lower the risk of sensitisation and reduces the use of water and packaging materials. The environmental, health and working environment benefits associated with the use of microfibre cloths and mops means that this type of product is becoming increasingly popular. There are many reasons for choosing environmentally suitable products that help reduce the use of water, energy and chemicals. There are large variations in the microfibre cloths and mops currently available on the market. Ecolabelling shall promote the use of the best products on the market by setting stringent environmental, functional and quality requirements.

Cleaning performance is one major environmental parameter. Microfibre cloths and mops generally offer good cleaning performance, and clean equally as well without the use of chemicals. Good cleaning results allow less frequent cleaning and the number of operations are reduced. It should be noted that the cleaning performance of microfibre cloths is somewhat higher than that of microfibre mops.

Ecolabelled products shall be ergonomically designed. Subsequently, it is required that the cleaning utensils are designed to facilitate ergonomic work that reduces the stress on muscles and joints. Ergonomics does not simply concern the design of the utensil but the interplay between the user and the utensil. It is vital that each utensil quickly and simply can be adapted to the optimum working posture for the task. Several important parameters are considered, such as constituent materials and weight, friction, adjustments and care of the utensil.

The service life of a microfibre cloth or mop is one of the most important environmental parameters. The use of the product over an extended period and under suitable conditions entails many environmental and health benefits. For example, savings with regards to material, energy and water consumption, lower costs, less packaging and waste and lower risks of allergies and strain injuries. Nordic Ecolabelling therefore requires that an ecolabelled microfibre cloth or mop shall display excellent characteristics regarding cleaning, abrasion and durability.

The criteria also contain requirements regarding chemical products that are used during production since Nordic Ecolabelling wishes to limit the use of substances that are hazardous to health and the environment.

## Criteria version and validity

The criteria for the ecolabelling of microfibre cloths and mops were developed as pioneering criteria document. Version 1.0 of the criteria was adopted in 2003 with a validity period from 9 October 2003 to 31 October 2006. During 2005, the criteria were revised and several amendments were made to the criteria. A new version, version 1.1, was released. On 13 December 2005, the Nordic Ecolabelling Board decided to extend the validity of the document 3 years. Version 1.2 was valid until 31 October 2009. Several more amendments were made to the requirements during 2007 and version 1.3 was adopted.

On 4-5 November 2008, the Nordic Ecolabelling Board, following the evaluation of the criteria, decided to extend the validity of the criteria as version 1.4 until 30 June 2011. Further, it was decided to revise the criteria for microfibre cloths and mops in 2009. With this revision, the pioneering criteria document becomes a regular product group. This means that all material and functional requirements are reviewed with the same thoroughness and documental research as other regular criteria. The purpose is to ensure there is a clear environmental difference between the products that are awarded a licence and other products on the market. As of now, the simple fact that cleaning using microfibre products is environmentally beneficial is by itself insufficient grounds for ecolabelling.

12 months prior to the expiry date of this criteria document at the latest, the Nordic Ecolabelling Board provides information on future ecolabelling criteria.

With this revision, the criteria version has been changed to version 2.0 and the expected expiry date is 30 June 2013.

## The Nordic market

Based on current market trends, such as an increasing demand from direct and indirect customers, several new actors on the market and new applications, the potential for this product group is considered significant.

The product group is also lifted by the criteria for chain stores, restaurants, hotels and cleaning services, which all include point score requirements based on the proportion

of ecolabelled microfibre cloths and mops that are used. Many customers, above all at hotels, are environmentally conscious and choose ecolabelled products.

**Number of licences awarded for version 1.0:**

Country	Number of licences awarded for version 1.0:	Number of registrations for version 1.0:
Denmark	0	4
Norway	1	6
Sweden	7	2
Finland	2	4

The products that are currently ecolabelled are used for daily cleaning and are designed for domestic and professional use. The types of products that are ecolabelled varies from licensee to licensee. The market for the product is somewhat influential. The majority of ecolabelled microfibre cloths and mops are sold retail to consumers. There is a clear current trend of increased interest in ecolabelled microfibre cloths and mops on the professional market. An increase in interest leads to an increasing proportion of such products on the Nordic market, which has beneficial environmental effects.

**Finland**

There are already several actors on the Finnish market. There are two licensees in Finland (Sinituote Oy and Freudenberg Household Products Oy). Both are active. They have marketed their respective products in media campaigns. According to one licensee, sales have risen over the past years.

Microfibre cleaning products for professional use are commonplace in Nordic Ecolabelled hotels in Finland. The hotels vouch to be satisfied with the performance of Nordic Ecolabelled microfibre cloths and mops. The use of microfibre products reduces the consumption of water and facilitates cleaning. The hotels judge the products to maintain a high quality and provide a long service life. Nordic Ecolabelled cleaning services also most often use Nordic Ecolabelled cleaning products.

The total turnover of ecolabelled microfibre cloths and mops on the Finnish market was €1.7 million in 2008.

**Norway**

The proportion of ecolabelled products in Norway is somewhat lower at around 1-5%. However, the Norwegian market has developed significantly in recent years. The last five years have seen a 38% increase in the turnover of microfibre cloths and mops on the consumer market. Today, roughly 70,000 microfibre cloths are sold each year in the retail trade (source: AC Nielsen).

Some of the actors on the Norwegian market: Lilleborg, Jordan, Verus, Procter & Gamble, Vileda, Nilfisk, Premiere, Ecolab, and Skovly.

## **Sweden**

There are several actors on the Swedish market. There are several smaller actors that sell primarily to consumers and some larger manufacturers who have specialised in the professional market.

The largest producers/suppliers on the professional market include JohnsonDiversey Sverige AB, Vikan AB, Gipeco AB, Nilfisk Advance AB and Freudenberg Household Products OY (Vileda AB).

The suppliers specialising in the consumer market include Smart Products Scandinavia AB, Creative Nordic AB, Klimabolaget AB, AQA Scandinavia AB and many smaller suppliers. Consumer products are primarily sold in retail outlets.

The total turnover of ecolabelled microfibre cloths and mops on the Swedish market was SEK 23.5 million (€2.4 million).

## **Denmark**

The use of microfibre cloths and mops is widespread in Denmark. They are used by both consumers and professional users. The estimated annual turnover of microfibre products in retail trade is currently DKK 20 million. The turnover of microfibre cloths\* on the professional market is roughly DKK 5.2 and that of microfibre mops DKK 13 million.

*\* Source: SPT - Association of Danish Cosmetics, Toiletries, Soap and Detergent Industries.*

The annual turnover of Nordic Ecolabelled products in Denmark is DKK 6 million. The largest actors on the professional market include JohnsonDiversey, Ecolab, Vileda Professional, Locon, Vikan and Stadsing (in no particular order regarding market share).

## **Other labels**

There are no EU Eco-label criteria for this product group and there are no plans to develop such.

The EKU instrument (tool for ecologically sustainable procurement) has not developed health and environmental requirements for this product group.

The Öko-Tex® Standard 100 is a textile label related to the final product. The Öko-Tex® Standard 100 was developed in the early 1990s as a safety norm for companies in the textile and apparel industry. It allows a practical evaluation of the potential danger of substances in textile products. Österreichisches Textil-Forschungsinstitut (ÖTI) and German Forschungsinstitut Hohenstein developed the Öko-Tex® Standard 100 based on their existing test methods.

The Nordic Ecolabel and EU Ecolabel can be found across the Nordic and European markets.

The Nordic Ecolabel is the official ecolabel in the Nordic region and considers the environmental impact of the entire lifecycle of goods and services. The Nordic Ecolabel set stringent requirements related to climate impact and the environment but

also product function and quality. The vision of Nordic Ecolabelling is a sustainable society with sustainable consumption.

The EU Ecolabel is the European Unions official ecolabel, sanctioned by the European Commission. The EU Ecolabel functions in the same way as the Nordic Ecolabel. Products are assessed from a life-cycle perspective, from raw materials to retirement. To be awarded a licence, a product must fulfil stringent requirements regarding the environment, function and quality.

Only Nordic Ecolabelling has criteria for microfibre cloths and mops (currently version 1.4) but both labels have criteria for textiles.

The project group has therefore decided to harmonise the requirements in the criteria document with the Nordic Ecolabel criteria for textiles, skins and leather, version 3.4. The textile criteria are based on 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.

### **3 About the revision**

#### **Purpose of the revision**

The criteria for microfibre cloths and mops, version 1.4 valid from 9 October 2003 to 30 June 2011, are currently being revised. The purpose of the revision is to present proposed revised criteria that are based on the conclusions of the 2008 evaluation.

#### General objectives

The proposed requirements for the criteria for the ecolabelling of microfibre cloths and mops shall ensure a clear differentiation in environmental terms between the products that are awarded a licence and other microfibre cloths and mops that do not fulfil the stringent requirements on:

- Reduced environmental impact, such as a reduction in the use of cleaning chemicals.
- Better material and resource usage.
- Increased demand for environmentally superior microfibre cloths and mops on the market.

#### Environmental objectives

The microfibre cloths and mops within the boundaries of the product group that offer market-leading environmental and quality performance shall fulfil the criteria. This promotes lower environmental impact through cleaning with microfibre cloths and mops, such as through better resource utilisation, superior cleaning performance, the washing process, the manufacturing process and constituent materials.

The revision of these criteria focuses on the following areas and parameters:

- The product definition has been revised so that it also includes microfibre products containing less than 70% microfibre.
- Methods for testing the cleaning performance, durability and abrasion.
- The development of requirements on the manufacturing process of the microfibre, for example the splitting process.
- Development of requirements on other textile fibres with which the microfibre is mixed. Requirements on other materials such as plastic and metals used in the microfibre products and packaging are also reviewed.
- The development of requirements on chemical products for dyeing and processing the microfibre cloth or mop, as well as for the bonding of the microfibre to the cleaning utensil.

### Communication goals

- Nordic Ecolabelled microfibre cloths and mops shall offer exceptional quality regarding cleaning performance, durability and abrasion.
- Nordic Ecolabelled microfibre cloths and mops shall offer lower environmental impact through compliance with environmental requirements on fibres, plastics and metals as well as the chemicals used during production of the microfibre cloth or mop.

### **About this revision**

This revision has been performed by Nordic Ecolabelling under the project management of Svetlana Sopa at Ecolabelling Sweden.

Product group managers in the other Nordic countries during the revision:

Denmark: Sita Fabricius

Finland: Sami Karelaiti

Norway: Aina Seland/Arne Godal

Sweden: Svetlana Sopa

Iceland has not participated in the revision.

Area coordinator, Procurement and Purchasing: Anders Moberg

During this revision, the secretariat has consulted manufacturers, trade organisations and the authorities in the Nordic countries. This has ensured that the requirements are relevant from an environmental perspective.

## **4 Justification of the requirements**

### **Introduction**

Version 1.0 of this criteria was developed as pioneering criteria document and were valid for a long period with few changes: two small amendments, two evaluations and two extensions. There is therefore a clear need to evaluate the requirement levels, which may also necessitate a change in the structure of the requirements.

Environmental issues are in focus and can steer product development towards more environmentally suitable microfibre products. This has led to more extensive changes, in particular regarding materials, design and new areas of use. An increase in the number of stakeholders on the market has resulted in a larger number of licences and a more extensive body of information related to the current requirement definitions. Based on a brief summary of previous RPS studies, it is very clear that all the requirements are sufficiently relevant and that they cover some of the most important environmental and quality aspects such as cleaning performance, abrasion, durability, chemicals and materials.

A product impacts on the environment throughout its lifecycle, from primary production and manufacturing to use and retirement. It may be beneficial in some cases to choose a material that has a greater environmental impact during manufacturing but lower impact during later stages of the products lifecycle, such as during use. This is the case for microfibre cloths and mops used for cleaning.

The potential is the possible environmental benefit within the specific product group, e.g. the difference between existing products and technical innovation that is considered realistic in the short term. Potential answers the question “What environmental benefits can be achieved?” Possible environmental benefits include the limited use of chemicals, water and energy, and a controlled flow of materials (lower emissions of chemicals to nature, and the reduced use of water and packaging). Microfibre cloths and mops reduce waste, provide significantly improved cleaning performance without the use of chemical products and offer longer service life. Further aspects that should be taken into consideration are the beneficial ergonomic, health (allergies) and economic (savings in time and purchases) effects.

All cleaning products have an environmental impact, even if it can be shown that the impact is significantly lower during use. Accordingly, it is also important to investigate whether there is scope for further improvements regarding both the manufacture and use of microfibre cloths and mops and their associated utensils. Nordic Ecolabelling can steer towards further reducing environmental impact by tightening and changing current environmental parameters such as cleaning performance, friction and durability.

Tightened and new product and production requirements are fundamental drivers towards environmental benefits in areas such as:

- Fibre production in view of chemicals used and emissions from the production.
- Textile production in view of chemicals used and emissions from the production.
- Ergonomic design.
- Waste management.
- Further product and packaging requirements.

New requirements and clearer documentation requirements are also an important development in the revision. An updated RPS analysis should also be performed for all new requirements and the adjustment of current requirement levels.

## General facts about microfibre

### What is microfibre?

A microfibre is a fibre weighing less than one gram at a length of 9,000 metres i.e. one denier. A similar definition is a fibre of less than one decitext (Dtex), i.e. weighing one gram per 10,000 metres. A conversion between the units is possible according to DIN 60905, p3.

Listed below is a brief description of classification in Dtex:

>7 coarse fibre

7.0-2.4 fine fibre

2.4-1 very fine fibre

1.0-0.5 microfibre

0.5-0.1 super microfibre

<0.1 ultramicrofibre

The thickness of a microfibre determines its characteristics.

There are different types of microfibres, of which ultramicrofibres are one example. The fibres bind dirt at a microscopic level. The fibres are so thin that one gram of ultramicrofibre is 42,000 metres long.

A microfibre is most often produced from two polymers that are inter spun. The two most common polymers are polyester and polyamide (nylon). A microfibre is 100 times thinner than a human hair, even before splitting. Once split, a microfibre is 1,500 times thinner than a human hair.

### How microfibres are manufactured

The manufacture of microfibre is a very complicated process that requires expensive equipment. Accordingly, microfibre textiles are expensive. Microfibre is often manufactured from a fluid mass of 70% polyester and 30% polyamide that is melted in hi-tech equipment. The mass is then injected through a filter in the splitting process.

Splitting can be performed both before and after the product is finished, depending on its application. Some fibres, so-called round fibres, are not split. Round fibres have lower friction than a triangular profile and are less suitable for stubborn dirt but ideal for polishing glass and for floor mops.

The splitting process can be chemical, thermal or mechanical. The chemical method involves using a solvent and/or alkali (such as lye) at temperatures above 100°C in conjunction with dyeing (often in the same bath). The process frees the microfibres from each other. It is carefully contained and performed under controlled conditions. Thermal splitting is performed during production directly after cleaving using 200°C water at high pressure. With mechanical splitting, the fibre passes a further process that scratches and distresses the fibre. This is done to make the material softer.

## How microfibres work

### Cleaning with microfibres

Each cloth or mop made of microfibre contains millions of microscopic fibres that offer exceptional absorptive and cleaning properties. In cross section, each fibre has a circle of wedges (like an exploded orange) with interspersed core sections. Dust, bacteria and fluids are trapped in the grooves between the wedges by static electricity and capillary effect.

Microfibres are ten times more absorptive and offer more than ten times better cleaning performance than standard fibres. The grooves between the polyester and polyamide act as small traps for dirt.

The thinness of the fibres means more fibres per unit area. This means that more fibres come into contact with the surface being cleaned, which means quicker, more efficient cleaning.

Three factors that make microfibres so efficient:

- **Static electricity.** Microfibres contain a polyester-polyamide mix that has a positive charge. This attracts negatively charged dust and dirt.
- **Capillary force.** This force is created by the split surface of the fibre and means that microfibre products can absorb up to 6-7 times their own weight.
- **Uneven surface.** The uneven surface of the fibre breaks surface tension and enables cleaning with water alone.

Microfibres, like other synthetic fibres, are produced from fossil raw materials. Further, process chemicals (e.g. surfactants and spinning lubricants) and the emission of volatile organic compounds (VOC) during production are some of the most significant environmental aspects. Chemicals, water and energy used during knitting, weaving, pre-processing and dyeing also impact on the environment.

## What can carry the Nordic Ecolabel?

The goal of these criteria is to promote the best microfibre cloths and mops on the market.

Cleaning with microfibre products can reduce environmental impact by lowering the consumption of water and chemicals. Ecolabelled microfibre products save resources and materials, and the products offer outstanding cleaning performance. Consumer and professional products are available for dry, damp and/or wet cleaning. The criteria ensure the maximum environmental benefits during both production and use phases. The goal is that only the best products shall fulfil the environmental, health and quality requirements, and that through ecolabelling these shall gain market share.

### **Microfibre content**

The proportion of microfibre required in the current criteria (version 1) limits the product group. The parts of a microfibre cloth or mop that comes into direct contact with the surface to be clean may comprise a maximum of 30% by weight of non-microfibre textiles. Parts of a microfibre cloth or mop that do not come into direct contact with the cleaned surface are exempt from this requirement (i.e. not included in the percentage calculation). Such parts include backing textile and attachments.

It has become apparent that the proportion of microfibre in the final product is not the controlling parameter for cleaning performance. A damp mop for professional use with a low proportion of microfibre may produce equally good cleaning results as a dry mop with much higher proportion of microfibre.

The requirement of a high proportion of microfibre has shown to be a barrier for ecolabelling. The requirements is too high for many products, in particular damp and wet mops for professional use, where the proportion of microfibre must be lower for ergonomic reasons. A high proportion of microfibre increases friction, which can cause problems for cleaners. The amount of water also influences the coefficient of friction. Damp use produces the greatest amount of friction. The type of flooring also affects the amount of friction.

The coarser the microfibre, the greater the proportion of microfibre in the final product. However, the proportion of microfibre does not need to be that high to achieve an acceptable level of cleaning performance. There is no any obvious connection between cleaning performance and the proportion of microfibre. It is primarily the function of the product, e.g. damp, wet or dry cleaning, that determines the type and proportion of microfibre that is suitable. In general, the proportion of microfibre depends on whether a mop is to be used for dry, damp or wet cleaning. Dry mops generally have a significantly higher proportion of microfibre.

The structure and size of the fibres have the most influence on their cleaning characteristics. The best ultramicrofibres (which are extremely thin) offer high cleaning performance even in low amounts. They are 2-3 times more effective than standard microfibres. Traditional microfibre mops are designed for floors with a smooth surface and to avoid the use of water (due to damage, risk of slipping, long drying time or bacterial growth). The finer the fibre in the cleaning textile, the lower the proportion of microfibre in a product intended for damp or wet cleaning. The size of fibre (thickness) is not the only parameter. The fibre structure (cross section) influences how a fibre collects dirt and moisture.

A mop is subject to hard wear. A fine microfibre must be designed to offer good durability. Other fibres are necessary in this case to hold the product together.

The proportion of microfibre in damp and wet mops varies between roughly 10-50% by weight. This proportion varies depending on the product's intended use (dry, damp or wet cleaning) and how fine (thick) the fibres are. A lower proportion of microfibre makes it significantly easier to use the mop. Capillary force has little significance for damp and wet mopping and thus the proportion of microfibre is also less important. Of greater significance is the location of the fibres, their fineness (thickness) and their

degree of splitting. Good damp and wet mops for professionals use finely split fibres, which reduces friction and offers improved cleaning performance. Super microfibres (0.5-0.1 Dtex) and ultramicrofibres (<0.1 Dtex) are much lighter and often split, which means that the proportion of microfibre can be kept low.

To control the friction of the product and improve its design, different weaves and fibre mixes are used. For example, polyester reduces friction in damp applications while cotton provides better water retention for heavy-duty cleaning. The current criteria set few requirements on the other fibres in the product.

In view of the above, we propose to change the requirement as to a minimum proportion of microfibre in the product. Instead of a mandatory minimum limit, we propose the introduction of requirements on the fibre mix in the product to ensure environmental benefits during production. Further, we propose that the manufacture is required to specify the proportion of microfibre in the product. It is not possible to ecolabel a product that is not containing the microfibres. This is to ensure that the product offers good cleaning performance and ensure that cleaning can be performed using little water and chemicals.

### **Fibre requirements**

Since today's microfibre products often contain a variety of fibres, it is proposed to introduce requirements on the production of a range of fibres. The requirements apply to all the fibres in the fibre mix, including the microfibres.

It is proposed that the requirements should apply to 80% by weight of the total fibre mix in the finished product. This means that all fibre material is subject to the requirement. The previous constraint of "active part of the mop", i.e. fibres that come into direct contact with the cleaned surface has proved ambiguous and has been interpreted differently by different manufacturers and depending on the type of microfibre mop.

The limit value of 80% is proposed to apply to all fibres in the product. The limit value is based on information from various products on the market.

### **The proportion of fibres subject to fibre requirements**

The revised criteria set requirements of the most common fibre types. To give the manufacture scope for product development (e.g. design) a lower limit of 5% has been introduced for fibres that do not need to fulfil any form of requirement. This means, for example that it is not always necessary to document the fasten appliances (devices).

### **Amount of recycled fibre**

At least 80% by weight of all fibres in the product must either fulfil the fibre-specific requirements or be derived from recycled materials. Recycled material refers to waste materials from the textile and clothing industry or from waste (textiles and similar).

From the view of resource saving, it is important to promote the use of recycled materials. Since good function is a prerequisite for ecolabelling, requirements on recycled fibre can only be introduced if the cleaning performance of the product can be maintained. This requirement applies both to the microfibre and other types of

fibre, such as polyester. The investigation has shown that the use of recycled fibre is commonplace for the other fibres that are mixed with the microfibre in the product. It has therefore been chosen to promote the use of recycled fibres in the criteria.

### **Prohibited fibre material**

The review process investigated whether there were certain fibres that from an environmental or health perspective should not be permitted in ecolabelled microfibre products. The investigation has not found sufficient evidence to introduce such a requirement. Accordingly, this issue has been left open and we welcome further information.

### **Ecolabelling of a complete cleaning set**

Consumer microfibre mops are often sold together with a mop handle, mop holder and other fixture. Manufacturers often wishes to ecolabel the entire set. The new criteria introduce this possibility by setting specific material requirements applicable to utensils, fixtures and other details. The most common materials are metals and plastics. The most common metal used in cleaning utensils is aluminium. The most common plastics are polypropylene, polyethylene, polyester, styrene, PVC and polyamide.

For example, a mop holder often comprises plastic, textile and metal. The draft criteria set environmentally relevant and steerable requirements regarding these materials. It should however be noted that these utensils cannot be ecolabelled separately, since the main purpose of the criteria is the ecolabelling of microfibre cleaning product, not the associated utensils.

### **Recommended washing temperature**

Nordic Ecolabelling considered the possibility to introduce a limit to the maximum recommended washing temperature of 60°C. However, since washing temperature was not one of the points of the review and since detailed information on this has not been received, the project group has been unable to apply any limitations in this version of the criteria.

Nordic Ecolabelling is grateful for any comments on this issue in particular so that a position can be adopted as soon as possible. Information that is received during this review will be used by Nordic Ecolabelling for the continued development of these criteria.

### **Ecolabelling of pre-prepared cleaning utensils/systems**

Nordic Ecolabelling has considered whether to include pre-prepared cleaning utensils/systems in the product group (e.g. mops that are pre-impregnated with a cleaner or floor care product). The criteria for microfibre products will, if possible, later be extended to such products.

## Requirements

### 1 Environmental requirements

The environmental requirements contained in this section apply to the product that is intended for Nordic Ecolabelling.

Section 1.1 requires applicants to describe how the product fulfils the definition of eligible products. Section 1.2 contains environmental requirements applicable to textile materials (natural and synthetic) used in microfibre cloths and mops. The requirements apply to the most common textile fibres such as cotton and other natural cellulosic fibres, polyimide, polyester, polypropylene and viscose. Requirements are also set of processes and chemicals, though limited to the wet processes in textile production. This section also includes requirements on the quality of textiles.

Section 1.3 contains environmental requirements on materials other than textiles that are used in the cleaning utensils (e.g. handle, holder or other fixture) that are sold along with the microfibre cloth or mop. The requirements apply to plastics and metals as well as chemical products and additives used for the pre-treatment and surface treatment of metals, as additives in plastics and for bonding. These requirements are based on the proportion by weight of each type of material in the cleaning utensil (excluding textile part) that is intended for sale together with the microfibre cloth or mop.

#### 1.1 Product information

##### Product details (R1)

The applicant shall provide details of the microfibre cloth or mop and associated cleaning utensils that are the subject for Nordic Ecolabelling. To evaluate whether the product is eligible for the product group, the criteria require a description of the product and its area of use.

##### 1.2 Textiles (R2-R19)

Textiles include both synthetic and natural fibres. All textile materials that are used in microfibre cloths and mops must fulfil the requirements.

##### Textiles carrying the Nordic Ecolabel or EU Eco-label (R2)

The applicant shall specify whether the textiles that are used in a microfibre cloth or mop carry the Nordic Ecolabel or EU Eco-label.

Textiles that carry the Nordic Ecolabel or EU Eco-label fulfil requirements R3-R15 and R17-R19 in Section 1.2. If the textiles are not labelled, all the applicable requirements in Section 1.2 of this criteria document for microfibre cloths and mops must be fulfilled.

Textile requirements R3-R15 and R17-R19 in this criteria document are harmonised with the Nordic Ecolabel requirement for textiles, skins and leather, version 3.4. The textile criteria are based on Commission Decision of 15 May 2009 establishing the ecological criteria for the award of the Community eco-label to textile products. This means that textiles that carry the Nordic Ecolabel or EU Ecolabel already fulfil the requirements of this section. Ecolabelled textiles are promoted in the production of Nordic Ecolabelled microfibre cloths and mops.

## **1.2.1 Textile fibres (R3-R8)**

### **Proportion of fibre in the product (R3)**

Fibre-specific requirements have been established for cotton and other natural cellulosic seed fibres, polyamide, polyester and polypropylene, and viscose. Other fibres, for which no specific requirements have been set, may also be used. If the product contains less than 5% of a certain type of fibre in proportion to the total weight of textile fibres, it is not necessary to fulfil the requirements of Section 1.2.1 for this fibre. These requirements are not applicable either if the fibres are derived from recycled material. Recycled material refers to waste materials from the textile and clothing industry or from post-consumer waste (textiles and similar).

At least 80 per cent of all fibres in the product must either fulfil the fibre-specific requirements or be derived from recycled materials. Requirements are set of the most common types of fibre materials in microfibre cloths and mops. Polypropylene, polyester and polyamide are examples of fibres that are used both in the production of microfibres and as standard fibres. Cotton and viscose are the most common fibres mixed in microfibre products. We have therefore chosen to set requirements on these fibres.

### **Cotton and other natural cellulosic seed fibres (R4)**

Pesticides, which impact on the environment and health, are often used in the cultivation, transport and storage of cotton and other natural fibres. Pesticides are a group of chemicals that are designed to kill, limit the development of or in some other way regulate the growth of harmful organisms. Microfibre products, such as mops, can contain a high proportion of cotton (70-90%). It is therefore important to set requirements on this type of fibre. Cotton and other natural cellulosic seed fibres (hereinafter referred to as cotton) shall not contain more than 0,05 ppm (sensitivity of the test method permitting) of each of the following substances: aldrin, captafol, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, hexachlorocyclohexane (total isomers), 2,4,5-T, chlordimeform, chlorobenzilate, dinoseb and its salts, monocrotophos, pentachlorophenol, toxaphene, methamidophos, methylparathion, parathion, phosphamidon. These substances are pesticides used during the production of cotton and other natural fibres. (Background report to the ecological criteria for the award of the

Community eco-label to textile products, 15 May 2002). These substances are also found on the list chemicals subject to the PIC Procedure (Prior Informed Consent)\*.

*\* The PIC procedure helps participating countries learn more about the characteristics of potentially hazardous chemicals that may be shipped to them, initiates a decision-making process on the future import of these chemicals by the importing countries themselves, facilitates the dissemination of this decision to other countries, and encourages exporting countries to take measures to ensure that unwanted exports do not occur. (<http://irptc.unep.ch/pic/volpic/h2.html>) The PIC procedure is voluntary - it has been unanimously accepted by member countries of FAO and UNEP and is supported by the leading chemical industry associations and a variety of non-governmental organisations. The PIC procedure was adopted at the Rotterdam Convention in 1998. 80 countries signed the convention, and by August 2001 16 of these countries have ratified the convention. Pesticides, industrial and consumer chemicals that have been banned or severely restricted for health or environmental reasons by the participating governments can be included in the procedure. In addition acutely toxic pesticide formulations, which present a hazard under the conditions of use in developing countries, may also be included.*

This requirement does not apply where more than 50% of the cotton content is organically grown cotton or transitional cotton, that is to say certified by an independent organisation to have been produced in conformity with the production and inspection requirements laid down in Council Regulation (EEC) No 2092/91 of 24 June 1991 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs (1)\*.

*\*(1) EGT L 198, 22.7.1991, p1*

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

Kapok (*Ceiba pentandra*) is a species in the mallow family that most probably originates from tropical America and possibly also Africa but that can be found all over the world in all climate zones. Kapok is exempt from this harmonised requirement since the project group has not come across this type of fibre in microfibre cloths and mops. It is a weak fibre that cannot be spun which makes it impossible to use in microfibre products that are subject to heavy-duty wear. This is a new requirement in the criteria.

### **Polyamide (R5)**

The emissions to air of nitrogen dioxide (N<sub>2</sub>O) during monomer production, expressed as an annual average, shall not exceed 10 g/kg polyamide 6 fibre produced and 50 g/kg polyamide 6,6 produced.

Nordic Ecolabelling sets requirements limiting the emission of nitrogen dioxide (N<sub>2</sub>O) from polyamide production. Nitrogen dioxide is a greenhouse gas that is 270 times more damaging than carbon dioxide. Nitrogen dioxide also depletes the ozone layer. The two greatest industrial sources of N<sub>2</sub>O are the production of nitric acid (HNO<sub>3</sub>) and adipic acid. Adipic acid is created in a two-stage process where HNO<sub>3</sub> is used in the second stage and is the cause of the N<sub>2</sub>O emissions. Adipic acid is primarily used in the production of polyamide. Emissions of N<sub>2</sub>O have been reduced in recent years

through thermal and catalytic cracking, especially in the production of adipic acid. This is a new requirement in the criteria.

### **Polyester (R6)**

Antimony is a toxic semimetal. The quantity of antimony in the polyester fibre must not exceed 260 ppm. The emissions of VOCs during polymerisation of polyester, expressed as an annual average, shall not exceed 1.2 g/kg of produced polyester resin.

Nordic Ecolabelling requires that polyester fibre is produced with limited amounts of antimony. Antimony is used in the plastics industry as a catalyst, pigment and stabiliser. Antimony-free polyester fibre exists, but the supply is currently so low that Nordic Ecolabelling cannot demand the use of such polyester.

Organic solvents give rise to volatile organic compounds (VOC) which in turn produce ground ozone. Ground ozone is produced by a photochemical reaction between volatile hydrocarbons and nitrous oxides. Ozone is one of several photochemical oxidants. Ground ozone is harmful to vegetation, materials and human health. This is a new requirement in the criteria.

### **Polypropylene (R7)**

The use of lead-based pigments is prohibited by this requirement.

Plastics are dyed to make a product more appealing. Pigments can also increase the service life of a plastic by acting as a stabiliser.

Lead chromate/molybdate is used as both a stabiliser and pigment (plastic additive) in thermoplastic products. Pigments based on lead chromate/molybdate are for example used in some types of plastics such as polypropylene.

Products that contain lead, if burnt, increase lead fallout from the air. The greatest environmental hazard that has been identified regarding the use of products containing lead is its direct toxic effect on birds and other animals that ingest it directly or through organisms lower in the food chain. The lowest level of lead in the blood that has been shown to have general health effects is 0.3 µmol/l. Such levels disrupt the metabolism, kidneys and cardiovascular system. Lead can also damage the nervous system at low levels. Sensitivity is great in foetuses and small children during the development of the brain. Paediatric studies have shown that blood levels of 0.5 µmol/l can impair development, result in lower IQ and cause behavioural disorders. This is a new requirement in the criteria.

### **Viscose (R8)**

Regenerated fibres are produced by breaking down the molecules in cellulose and transforming – regenerating – these using chemicals. The fibres acquire a new molecular structure that is suitable for textile fibre production. The most common cellulosic fibre in microfibre products is viscose. The method of manufacturing viscose was developed at the turn of the twentieth century. Paper pulp is the most common primary material for producing viscose fibre.

Viscose production thus shares environmental issues with paper production. Large quantities of carbon disulphide are used to convert the cellulosic pulp into viscose fibre. Some of the carbon disulphide can be reused but significant sulphur emissions to the air are unavoidable. Further, zinc salts and other chemicals that produce large quantities of polluted water are created during the manufacturing process. Viscose fibres are often bleached twice. First, the raw material (paper pulp) is bleached and later the viscose fibre itself is bleached to remove impurities from the manufacturing process.

The halogenated organic compounds that are released into nature are often persistent. They build up in the fatty tissue of organisms and accumulate in the food chain. AOX is only used as a measure to monitor and control organic halogens (including chlorine). AOX are spread by the pulp and paper industries during bleaching. These substances are fat soluble and therefore accumulate readily in fatty tissue in animals and humans. AOX can affect reproduction, the endocrine system, the metabolism and the immune system. Accordingly, the criteria stipulate that the amount of AOX in fibres may not exceed 250 ppm.

The viscose solution is extruded through nozzles into a coagulation bath. The coagulation bath contains sodium sulphate, sulphuric acid and zinc salts. The wet spinning of viscose produces emissions of zinc into water, which can cause damaging long-term effects on the aquatic environment. Accordingly, the emission to water of zinc from the production site during the production of viscose fibre, expressed as an annual average, is limited to 0.3 g/kg.

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

Nordic Ecolabelling set requirements emissions of sulphur compounds to air from the processing during viscose fibre production, expressed as an annual average, since such compounds cause the acidification of soil and water. This is a new requirement in the criteria.

## **1.2.2 Processes and chemicals (R9-R17)**

These requirements apply only to wet processes during textile production, which can have a high environmental impact due to significant emissions of water, such as from the splitting of microfibrils and dyeing of textile materials in the microfibre product.

These requirements are new and concern chemicals used and other production requirements, such as the purification of waste water and resource consumption during textile production.

The primary environmental aspect of the textile industry is the quantity of water that is released and the chemical load of this water. Other important issues are energy

consumption, emissions to air, solid waste and odours, which in some treatments can cause a significant disturbance.

### **Formaldehyde (R9)**

The amount of free and partly hydrolysable formaldehyde in the final fabric shall not exceed 30 ppm. This limit is set since mops and cloths come into direct contact with the skin. The limit value is unchanged from the present criteria for microfibre cloths and mops (version 1.4) since the limit is considered stringent for such products. I.e. there are products on the market that have formaldehyde content in excess of 30 ppm. This requirement is harmonised with the Nordic Ecolabel criteria for textiles, skins and leather (version 3.4).

The level is set to control the use of chemical products that contain formaldehyde during production, especially in Asia which produces the majority of microfibre. Both in gaseous form and as a solution, formaldehyde is highly acutely toxic above all damaging the kidneys, liver and nervous system. It accumulates in the body and is in the long term carcinogenic. Accordingly, requirements are set to minimise the risk of exposure.

### **Biocides and biostatic products (R10)**

Biocides are often used during the cultivation, transport and storage of fibres, in particular natural fibres. Pesticides are a group of chemicals that are designed to kill, limit the development of or in some other way regulate the growth of harmful organisms.

Pesticides can be categorised as plant protectants and biocides. Plant protectants (e.g. herbicides, insecticides and fungicides) are primarily used in farming while biocides are most often used in industrial applications.

Biostatic products can also be used during fibre and textile production. Such products have a biostatic effect, that is act as a mild disinfectant when disturbing the biofilm but with the recommendation of subsequent disinfection. Since natural fibres, such as cotton, are common in mops designed for professional use, there is a risk that these fibres contain residues of pesticide used during cultivation. Further, biocides, such as chlorophenols (their salts and esters), PCB and organic tin compounds can be used during transport and storage to prevent the growth of microorganisms. The criteria therefore stipulate the non-use of chlorophenols (their salts and esters), PCB and organic tin compounds to regulate their use during the production, transport and storage of natural fibres. Such biocides are uncommon in Europe but in Asia, where most fibres are produced, their use is commonplace.

Products from raw cotton to finished textiles are often transported long distances. It is sometimes clear that chlorophenols are not used. For such cases the criteria allow an exemption from testing for chlorophenols. Several organic substances, such as chlorophenols, PCBs and organic tin compounds, also present a serious health risk and can cause long-term damage to flora and fauna. The risk of negative effects to animals and humans increases if a substance is persistent in nature, and in particular if it accumulates in living tissue. Cancer, liver damage and behavioural disturbances are examples of problems caused by organic environmental toxins.

### **Chlorophenols**

Chlorophenols are produced industrially for use directly as pesticides and impregnating agents but also as an intermediary product in the production of other pesticides. In many parts of the world, chlorophenols are still used as a biocide within the textile industry. In Hong Kong and China, for example, chlorophenols (their salts and esters) are also used during dyeing and fibre reinforcement and can be used as preservatives for transportation and storage. Current evidence suggests that exposure to chlorophenols can cause endocrine disruption and liver and kidney damage, and that chlorophenols are very toxic to aquatic organisms.

### **Polychlorinated biphenyls (PCB)**

Polychlorinated biphenyls (PCB) are a group of persistent substances. Large quantities of these environmental toxins have been released into nature. Since PCBs have an affinity to fats (are hydrophobic), they are often attracted to organic materials such as living organisms and organic coal in sediment. The production of PCBs has been phased out but large quantities are still found in sediment and spread from there. Polychlorinated biphenyl (PCB) is a generic name for a number of similar substances that contain a considerable amount of chlorine. A biphenyl comprises two aromatic rings.

The use of PCBs in Sweden was banned in 1978 and PCBs have since been phased out, most recently through regulation SFS 2007:19. PCBs are still a global environmental problem. PCBs are stable and bioaccumulate. PCBs are very toxic to aquatic organisms and impair the fertility of fish and aquatic mammals such as seals.

### **Organic tin compounds**

There are four main classes of organic tin compounds, classified by the number of constituent groups: tetra-, tri-, di- and mono-organic tin compounds. For example, triorganic tin compounds act as biocides and are used as preservatives. They have serious health and environmental properties. Some organic tin compounds can affect the immune system following repeated exposure. They can cause skin and eye corrosion or irritation and have reproduction toxic and mutagenic effects. There is also evidence that suggests that some organic tin compounds should be classified as environmentally hazardous and persistent.

Organic tin compounds, such as TBT, have been used in textiles as toxins with broad spectrum biocidal effects. Under favourable, oxygen-rich conditions, such compounds decompose to less toxic dibutyl tin (DBT), further to monobutyl tin (MBT) and finally to free tin ions ( $\text{Sn}^{4+}$ ). Under anaerobic conditions, such as in sediment or locations with oxygen-free water, virtually no decomposition occurs. Such conditions can mean half-lives of many years or even decades. The sediment acts as a depot from which TBT can later be released. TBT contaminated sediment can over a long period of time act as a secondary source of toxins and ecotoxins. TBT changes and disrupts the production of hormones that control development, growth and fertility in animals and humans.

It must also be ensured that biocides and biostatic products, such as triclosan, are not used in such a way that they are emitted during use of the product.

Triclosan ( $C_{12}H_7Cl_3O_2$  or 5-chloro-(2,4-dichlorophenoxy)phenol or 2,4,4'-trichloro-2'-hydroxydiphenyl ether) is an organic antibacterial substance that has functional groups that make it both a phenol and an ether. It is an antibacterial substance that counteracts bad odours such as in textiles and cleaning products. It is a skin irritant and can cause long-term effects on the aquatic environment. Triclosan's environmental hazard assessment according to KIFS 2001:3 is Dangerous for the environment, N (the substance must be marked with the environmental danger symbol), R50 - Very toxic to aquatic organisms and R53 May cause long-term adverse effects in the aquatic environment. Triclosan has the highest risk quotas for water, which indicates that these substance can have a negative impact on the environment. Nordic Ecolabelling considers triclosan to be bioaccumulating and prohibits its use in products. This is a new requirement in the criteria.

### **Impurities in dyes (R11)**

Organic dyes are often used to dye textiles, e.g. plant dyes or synthetic dyes that are soluble in water, alcohol or similar. Insoluble, generally inorganic, pigments are also used, primarily for printing on the textile. This means that the requirement regarding impurities is not relevant to the product group. Subsequently, no requirements are set for impurities in pigments. The project group has decided to set requirements of organic dyes, which are most often used for the dyeing of the fibre types within the product group (e.g. vegetable fibres such as cotton and synthetic fibres such as polyester, polypropylene and polyamide).

Different fibres have different affinities to different dyes. Accordingly, different organic dyes are used to colour different fibres. Examples are direct dyes and reactive dyes, disperse dyes, basic dyes and sulphur dyes that are used for animal, vegetable and synthetic fibres. Reactive dyes are used for animal, synthetic and vegetable fibres (most often for cotton).

Disperse dyes, which are sparingly soluble in water, are used for polyester fibres and some other synthetic fibres. Polyester fibres are almost exclusively coloured using disperse dyes. Other types of dye, such as basic dyes and sulphur dyes, are also used to a limited extent for cotton. Metal complex dyes, which in practice are chelated acid dyes, are primarily used to dye animal fibres such as wool and silk and are exempt from this requirement. This type of dye is named after the acid environment used for dyeing ( $pH < 7$ ). Pure acid dyes produce the most brilliant colours.

Metal complex dyes are one type of acid dye. These dyes give a subdued colour. Since animal fibres are not used in microfibre cloths and mops and since synthetic fibres (such as polyester, polyamide and polypropylene) and vegetable fibres (such as cotton) are most common, the project group considers that requirements on metal complex dyes are not relevant to this product group.

The use of different types of dyes for dyeing fibres has a negative impact on the environment and health. Issues arise both during the dyeing process, when dye residues end up in waste water, and when the textile becomes waste and is incinerated or sent to landfill. For example, there are disperse dyes that may cause skin irritation. The biodegradability of individual dyes is not well documented. In general, dyes have a high absorptive power, which means that the components of dyes (including other

ionic metal compounds) in the waste water from dye works to a high degree accumulate in the sewage sludge. Accordingly, from an environmental, health and cost perspective, it is vital to reduce dye residues in the dye bath and on the fibres. It is important that the dye fastens to the textile so that so little dye as possible ends up in the waste water. In general, the deeper the colour, the more dye residues in the dye bath. The release of these residues leads to the concentration of heavy metals in sediment. To reduce the use of heavy metals in dyes and the emission of these into nature during the dyeing process, requirements are set regarding metal compounds in the dyes that are used during fibre dyeing. This is a new requirement in the criteria.

### **Azo dyes (R12)**

Azo-based dyes that through reductive cleavage produce carcinogenic aromatic amines (see Appendix 3) are prohibited. The Ecological and Toxicological Association of Dyes and Organic Pigments Manufacturers (ETAD) has compiled a list of aromatic amines that are formed during the reductive cleavage of certain azo dyes and that are suspected to be carcinogenic. These are prohibited within the European Union. Some dyes are also allergens. This list is generally accepted and well known throughout Europe.

The requirement on azo dyes in the final product is included to prohibit the use of such dyes for the dyeing of textiles. Azo dyes are organic compounds that contain the colouring azo function (N=N-). Often, the azo group is bound to an aromatic ring and the azo dye can decompose to the aromatic amine arylamine.

This can occur chemically by reductive cleavage or through the body's enzymes. Some azo dyes can also decompose to arylamines during storage due to light or high temperatures. Some arylamines are considered carcinogenic. The most well known is aniline. It is important to remember that not all azo dyes are based on arylamines.

Azo dyes are used to dye textile fibres, in particular cotton but also viscose and other synthetic fibres. They are considered easy to use and comparatively cheap, and they produce clear, strong colours. There are roughly 2,000 azo dyes on the market. The majority of azo dyes are water soluble and considered easily absorbed by the body. This may occur through the inhalation and ingestion of dust and aerosols and through skin contact.

Azo dyes can also be toxic to aquatic organisms and may cause long-term effects in aquatic environments. It is probable that arylamines, that are given off by the dye, can be absorbed through the skin and accumulate in the body. Some arylamines are classified as sensitising on skin contact, irritating to the eyes and toxic through inhalation and ingestion, or very toxic through inhalation, skin contact and ingestion. Some arylamines are also classified as toxic or very toxic to aquatic organisms and as causing long-term effects in aquatic environments. This is a new requirement in the criteria.

### **Dyes that are carcinogenic, mutagenic or reproduction toxic (R13)**

Dyes or preparations that are carcinogenic, mutagenic or reproduction toxic are prohibited from use or may not contain more than 0.1% by weight of CMR substances that at the time of application are or may become subject to any of the specified risk

phrases (or combination of risk phrases). One of the goals is that the environment should be free of substances that are detrimental to human health. Accordingly, the requirement prohibits the use of these substances. Both the Dangerous Substances Directive 67/548/EEC (EU, 1967) and the CLP Regulation 1272/2008 (EU, 2008) are cited since the CLP Regulation comes into force during the validity period of the criteria. Directive 67/548/EEC will be phased out successively. The classification requirement includes a translation to the GHS. This is a new requirement in the criteria.

#### **Potentially sensitising dyes (R14)**

Dyes that are potentially sensitising may not be used. This requirement is set to limit the risk of users experiencing allergic reactions following the use of the product.

Full C.I. and CAS numbers have been added to the list of dyes. It should also be noted that the list of potentially sensitising substances has been extended to include the dye C.I. Disperse Brown 1 CAS 23355-64-8, which is not included in the current Nordic Ecolabel criteria for textiles. The product group has chosen not to include this substance in the list of prohibited substances due to the harmonisation of requirements. This is a new requirement in the criteria.

#### **Auxiliary chemicals (R15)**

There are several problematic substances that are difficult to prohibit through requirements on the product's chemical composition. Accordingly, Nordic Ecolabelling has compiled a list of substances that may not be added to the product or be found in compounds at concentrations above 100 ppm. The aim of the list is to prohibit only the substances that are not covered by other requirements.

#### **Alkylphenoethoxylates (APEO) and alkylphenol derivatives (APD)**

Alkylphenoethoxylates (APEO) and alkylphenol derivatives (APD) are a group of surfactants that shown endocrine disruptive characteristics. Further, their products of decomposition are not biodegradable and are considered dangerous to the environment. Accordingly these substances are prohibited.

Phenol comprises an aromatic ring and a hydroxyl group. The alkyl chain may vary in length, for example butyl, nonyl or dodecyl which have four, nine and twelve carbon atoms respectively. Alkylphenols are used to produce derivatives such as alkylphenol-ethoxilate. Alkylphenoethoxilates are surface active substances that are used as surfactants. The majority of all nonylphenol is used in the production of nonylphenol-ethoxilate. The use of nonylphenoethoxilate dropped in Sweden during the 1990s. Nonylphenoethoxilate is comparatively readily biodegradable to produce nonylphenol. Nonylphenol is are persistent and bioaccumulates.

Many alkylphenols are toxic to aquatic organisms. Most toxic are those with a long alkyl chain, i.e. octyl, nonyl and dodecylphenol. Nonylphenol is classified as very toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment. Nonylphenol has also been shown to have oestrogenic effects. Feminisation of male fish has been observed. An EU risk (program for existing substances) evaluation of octylphenol is currently underway. Data in the risk evaluation suggests that octylphenol has similar properties to nonylphenol, both

regarding its danger to the environment and oestrogenic effects. Nonylphenol and nonylphenoethoxilate are prohibited in some applications in the European Union through Council Directive 2003/53/EC.

### **Diallyl dimethyl ammonium chloride (DADMAC)**

Diallyl dimethyl ammonium chloride (DADMAC) is a group of highly ecotoxic substances. They are often used as plasticisers. DADMAC is a collective term for DSDMAC and DTDMAC, which are also prohibited from use.

### **LAS**

Linear alkylbenzene sulphonates (LAS) are anionic surfactants that are not anaerobically biodegradable and are therefore undesirable. LAS dissolve fats and oils, which is a desirable property for detergents. However it is very unsuitable for them to be released into nature where they can accumulate in animal tissue. They work best in a base environment and dissolve best in warm water. LAS are readily biodegradable in an aerobic environment.

The results from OECD tests for biodegradability:

Readily biodegradable >70% after 28 days. (OECD 301A)

Readily biodegradable >60% after 28 days. (OECD 301B)

Biodegradable >90% (OECD 301A)

OECD tests for ecotoxicity give the following values:

Acute fish (LC50) 96 h 1-10 mg/l *Cyprinus carpio* (OECD 203)

Acute Daphnia (EC50) 48 h 1-10 mg/l *Daphnia magna* (OECD 202)

Acute algae (EC50) 72 h 10-100 mg/l *Scenedesmus subspicatus* (OECD 201)

Previously, only LAS that contained carbon chains of a certain length were prohibited due to high acute fish toxicity. All LAS are persistent in anaerobic environments and/or low temperatures.

### **EDTA, NTA and DTPA**

Ethylene diamine tetraacetate (EDTA) and its salts, nitrilotriacetate (NTA) and DTPA are suspected to mobilise heavy metals in certain environments due to the formation of complexes. EDTA is also not readily degradable. The toxicity to aquatic organisms of NTA is moderate to low and the results of degradability tests have been varied.

NTA is classified as Carc Cat.3 (EU, 2008b). NTA is therefore prohibited in these criteria due to its classification and to simplify and clarify in the application process it is prohibited from all compounds and preparations that are used. Accordingly, these substances are banned.

DTPA has the same properties as EDTA. Ethylene-diamine-tetra-acetate (EDTA) and dithylene triamine pentaacetate (DTPA) are not readily biodegradable and, according to the EU's risk evaluation, in conditions found in municipal wastewater treatment EDTA is non-biodegradable or poorly biodegradable (Cefic, 2009). This is a new requirement in the criteria.

### **Nanoparticle additives (R16)**

Nanoparticles (particles <100 nm in one or more dimensions based on metal, chlorine and/or fluorine compounds) may not be actively added to the final product or the chemical products that are used.

*(A nanoparticle acts as a whole unit in terms of its transport and may exhibit properties that differ significantly from those observed in fine particles or bulk materials. A nanoparticle can also be classified by size, in terms of diameter between 1 and 100 nanometres. A nanometre, nm, is the same as one billionth of a metre. The SI prefix "nano" (n) is equivalent to  $10^{-9}$ .  $1 \text{ nm} = 10^{-9} \text{ metre} = 0.000\ 000\ 001 \text{ metre}$ .)*

The prohibition of nanomaterials in Nordic Ecolabelled products is based on a cautionary principle (Nordic Ecolabelling, 2009b). Nanomaterials are defined as microscopic materials that in at least one dimension are smaller than 100 nm. Nanometals, for example, include nanosilver, nanogold and nanocopper. Nanometals such as nanosilver and nanocopper are under particular scrutiny today. Nanosilver is categorised as a biocide by the American Environmental Protection Agency. Nanotechnology utilises unique properties that occur at atomic and molecular level. For example, many substances become far more reactive at nano-level. One example is gold, which is normally extremely stable but at nano-level is chemically reactive.

Particles at nano-level have particular properties that may be harmful to the environment or health. Simply put, products may emit nano-particles which in turn may be able to penetrate deep into the lungs or penetrate the skin or other barriers in the body or nature. The reactive properties of nanoparticles can damage the tissue of organisms that are exposed to such particles. In general, knowledge about the health and environmental effects of nano-particles is very limited.

Nanosilver is effective against bacteria and other microorganisms. Accordingly, an increasing number of products contain nanosilver particles. Nanosilver particles are one of many examples. Nanoparticles of carbon have very different properties from those carbon normally has. Often, a substance becomes more toxic and can cause damage to the lungs that can lead to cancer. Nanoparticles can also migrate from the lungs to other parts of the body. They are not trapped by the filter that the lungs constitute. They have the capacity to enter the blood stream and from there reach other organs, such as the heart. Researchers have demonstrated with fish swimming in contaminated water that nanocarbon particles accumulate in their gills.

Nanoparticles can also reach the brain via the olfactory nerve which connects the nose to the brain. Researchers have shown that both nanoparticles of manganese oxide and gold can enter this way. Above all it is dangerous for individuals who work with nanoparticles who may inhale such particles in the working environment. Based on a precautionary principle, Nordic Ecolabelling prohibits the use of nanoparticles. These requirements are new since the currently valid criteria.

### **Chrome mordant dyeing**

It has been discussed whether it is relevant to set requirements on chrome mordant for this product group. Mordant is used to open the washed fibres and improve their receptiveness to dyeing. Following this treatment, the fibres are dyed in a dye bath at a set temperature for a set time. To achieve good colourfastness, post-mordanting with

metals is required. Dyeing occurs through the conjoining of certain substances such as iron, chrome, zinc oxide and other alkali.

Mordanting produces large emissions of metals. This treatment is only applicable to certain types of fibre, such as wool and silk. On the other hand, cotton cannot be treated with metal oxides. Since this mordanting is primarily used on fibres that are not used in microfibre cloths and mops, it has been determined that chrome mordant dyeing is not relevant to the product group. Chrome mordant dyeing is no longer performed in the Nordic region.

### **Waste water from wet processes (R17)**

The chemical oxygen consumption in waste water from wet processes must not exceed 25 g/kg, calculated as an annual average. Further, if the waste water is released directly into surface water, it must have a pH value within the range pH 6-9 and have a temperature of below 40°C.

This requirement has been proven relevant regarding emissions from textile production. The primary environmental aspect of the textile industry is the quantity of water that is released and the chemical load of this water. Emissions to water are often amassed at source. Waste water from various processes is mixed in a common waste flow. The characteristics of the waste water depend on a complex combination of factors such as the type of fibre, wet processing, the technical solution and the chemicals and auxiliary chemicals that are used.

A large proportion of the total emissions from the textile industry are from substances contained in the raw material when it enters the preparation plant (impurities and associated materials in natural fibres, finishing agents, spinning lubricants, adhesives, etc.). All these substances are generally removed from the fibre during pre-treatment prior to dyeing and finishing. Auxiliary agents such as spinning lubricants, knitting lubricants and finishing agents that are removed through wet processing can result in the emission of that are persistent (e.g. mineral oils) and dangerous compounds (e.g. polyaromatic hydrocarbons, alkylphenolethoxylates (APEO) and biocides). The COD load associated with oxygen consuming organic substances is in general 40-80 g/kg fibre. The washing water from desizing of cotton and cotton-mix weaves can contribute to 70% of the total COD load in the final waste water. The emission factor can be as high as 95 g COD/kg textile.

The contribution from auxiliary dyeing agents (e.g. dispersants and setting agents) to the COD is particularly significant for dyeing processes that use disperse dyes. Since emissions from wet textile processes account for a large proportion of the environmental impact from textile production, the criteria include this requirement. The requirement on wet processes is set to enable local industries to be used and with regard to the possible environmental benefits during textile production. Particularly with regard to textiles, which are often produced in less developed countries with poor waste water treatment, there are large environmental benefits if industries in the third world are stimulated to comply with Nordic Ecolabel requirements. The emission requirement applies to wet textile processes, that is processes that produce waste water. This is a new requirement in the criteria.

## **Energy and water consumption**

Information on energy and water consumption in wet processes. The requirement could be formulated so that it only applies to the production units that perform wet processes since it is these processes that consume the most water and energy. In general, the temperatures of wet processes are so high that the authorities require that process water is cooled to the same temperature as the waste water. There is therefore great potential for energy savings using a heat exchanger, recirculation or similar. But since the requirements are harmonised with the Nordic Ecolabel requirements on textiles, skins and leather, version 3.4, (which is based on Commission Decision of 15 May 2002 establishing the ecological criteria for the award of the Community ecolabel to textile products and amendments to decision 1999/178/EC) there is insufficient justification for an information requirement on energy and water consumption to increase awareness of the problem. Accordingly, the project group has decided not to set an information requirement on energy and water consumption in this version of the criteria.

### **1.2.3 Textile quality (R18-R19)**

The requirements apply to either the dyed yarn, the dyed cloth or the finished product. Where applicable, analyses shall be performed.

Microfibre cloths and mops must also fulfil quality requirements concerning colourfastness and dimensional change. Since it is required that microfibre cloths and mops are washable in water, there is a requirement on colourfastness. Colourfastness is an important quality parameter that influences the use and washing of the dyed product. The requirement is on colourfastness to washing, which is considered most relevant for the product group.

Colourfastness to washing shall at a minimum be level 3-4 for change in colour and at least level 3-4 for staining. This requirement does not apply to uncoloured and/or white products. Other requirements, such as colourfastness to water and colourfastness to dry or wet rubbing have also been evaluated during the criteria revision. These requirements have been omitted since the requirement on colourfastness to washing was considered the toughest and most relevant requirement to this product group.

Since microfibre products contain various types of fibre, including natural fibres, dimensional changes during washing must be checked. Dimensional change is an important quality parameter that influences the use of microfibre mops in particular. Mops must fit the utensils even after repeated washing. This is a new requirement in the criteria.

## **1.3 Other materials**

The requirements also include cleaning utensils such as mop handles, mop holders and other fixtures that are sold together with a mop. These cleaning utensils cannot be ecolabelled separately but must fulfil requirements on the constituent materials. The criteria also apply to materials such as plastics and metals as well as chemical products and additives used for the pre-treatment and surface treatment of metals, as additives in plastics and for bonding.

### **1.3.1 Material composition**

The cleaning utensil is separated into different materials and small parts (screws, hinges, pins, etc.) by specifying the weight of each part. Small parts are omitted here.

Small parts, which are exempt from the requirement, must not comprise more than 5% by weight of the total. A cleaning utensil must not contain more than 10% by weight of such type of material.

### **1.3.2 Chemical products (R20-R22)**

The requirements apply to chemical products and additives used for the pre-treatment and surface treatment of metals (e.g. coatings), as additives in plastics and for bonding.

This is a new requirement that is harmonised with the Nordic Ecolabel requirements for furniture and fitments, version 4.0, though to a far lesser extent since the requirements on other materials in microfibre cloths and mops are considered supporting requirements in comparison to the textile requirements, which relate to the primary function. In view of this, requirements on chemical products classified as R59, R39, R49 and R43 have been omitted.

#### **Ecolabelled chemical products (R20)**

It is unnecessary to demonstrate fulfilment of the requirements under Section 1.3.2 for chemical products that carry the Nordic Ecolabel since these already comply.

Ecolabelled chemical products, such as adhesives, are promoted in the production of Nordic Ecolabelled microfibre cloths and mops.

#### **Classification of chemical products (R21)**

Chemical products refers to products in the form in which they are purchased, since these are the products handled by workers. A large number of additives and chemical products are used for the pre-treatment and surface treatment of metals. These products contain varying amounts of substances that are classified as environmentally dangerous and/or harmful. The most serious health aspects are associated with substances that are acutely toxic and substances with long-term effects such as substances that are carcinogenic, mutagenic and toxic to reproduction.

Another serious aspect, which is primarily associated with the use of chemical products, is sensitisation. Regarding environmental aspects, consideration must be taken to both substances that have acute toxicity and those that are bioaccumulating or not readily biodegradable. The requirement specifies which hazard classes and risk phrases that are prohibited during the production of Nordic Ecolabelled microfibre cloths and mops.

Products must not be classified as a danger to the environment, very toxic, toxic, carcinogenic, reproduction toxic or mutagenic. The criteria require a material safety data sheet with sufficient environmental and health information for all chemical products used for the pre-treatment and surface treatment of metals (e.g. coatings) and as additives in plastics and adhesives.

The reason for this change is that a material safety data sheet is a well-known and recognised way in industry to check the environmental and health hazard of products. Both the Dangerous Substances Directive 67/548/EEC (EU, 1967) and the CLP Regulation 1272/2008 (EU, 2008) are cited since the CLP Regulation comes into force during the validity period of the criteria. Directive 67/548/EEC will be phased out successively.

This is a new requirement in the criteria. The requirement on the classification of products has been adapted to the Global Harmonized System of the Classification and Labelling of Chemicals in these criteria.

### **Additives in chemical products (R22)**

The following substances are prohibited from use in chemical products and additives used for the pre-treatment and surface treatment of metals (e.g. coatings) and additives in plastics and adhesives:

halogenated organic compounds; phthalates, aziridine and polyaziridines; alkylphenols, alkylphenolethoxylates (APEO) or other alkylphenol derivatives; pigments and additives based on lead, tin, cadmium, chromium VI and mercury or their compounds. The current criteria also contain requirements on additives in chemical products with the intention of prohibiting the use of the chemical substances that are the most hazardous to health and the environment in surface treatment (such as heavy metals and other dangerous substances).

This is a new requirement and is harmonised with the criteria for furniture and fixtures, version 4.0, but to a lesser extent. Section 1.2.2 regarding processes and chemicals has requirements on the contents of chemical products and is therefore not included in the requirement.

### **1.3.3 Metals (R23-R25)**

Metals are used in cleaning utensils that are sold along with microfibre mops, such as the mop holder and mop handle. The proportion of metal varies between utensils. It is required that metal in a product must be separable from the other materials (surface treatment exempt) without the use of special tools. This is to facilitate the handling of this waste fraction. Utensils that are sold along with a microfibre mop or cloth must not inhibit waste processing. This requirement is new and is harmonised with the requirements on material recycling in the criteria for furniture and fitments, version 4.0.

The current criteria also contain requirements on metal coatings with the intention of prohibiting the use of chemical substances that are most hazardous to health and the environment in surface treatment (such as heavy metals and other dangerous substances).

Metals shall not be coated with cadmium, chromium, nickel, zinc or compounds of these. Cadmium is a very toxic heavy metal and its use in ecolabelled products cannot be justified.

During the review, it was found that recycled aluminium is used in cleaning utensils, such as mop handles and mop holders. Accordingly, the criteria contain a requirement

on the proportion of recycled aluminium. This is considered important from the viewpoint of resource and energy conservation as well as emissions. This requirement is new and is harmonised with the requirements on the surface treatment of metals in the criteria for furniture and fitments, version 4.0.

### **1.3.4 Plastics (R26-R28)**

It is required that plastics are marked to facilitate recycling. Nordic Ecolabelling wishes to require that non-renewable materials are recycled. This requirement prevents the use of plastic materials that can be problematic during manufacturing and incineration.

If a product comprises a large proportion of plastic, it is required that recycled plastic is used in the product. Recycled plastic refers to plastic that has been recovered from a product at the end of its service life. Waste from production is not classified as recycled plastic. Plastics are non-renewable, which means that the raw material will not regenerate within a foreseeable future. The availability of the raw material declines as the raw materials are consumed. Design for reuse and recycling are beneficial design concepts. During the review, it was found that recycled plastic is used in other cleaning utensils, such as mop handles and mop holders. Accordingly, the criteria contain a requirement on the proportion of recycled plastic. This is considered important from the viewpoint of resource and energy conservation as well as emissions.

Further, the use of PVC and other halogenated plastics is prohibited from the associated cleaning utensils and fixtures. During the criteria revision it was found that PVC plastics are used in some cleaning utensils such as mop holders. Accordingly, the project group has chosen to include this requirement in the criteria. When incinerated, PVC produces very toxic chlorinated hydrocarbons (due to the chlorine content of the plastic) which in turn form dioxins. The quantity of halogenated dioxins that forms also depends on the temperature of combustion. Further, stabilisers, plasticisers and flame retardants are also released during incineration. Many of these are dangerous to the environment and health. This requirement is new and is harmonised with the requirements on the surface treatment of metals in the criteria for furniture and fitments, version 4.0.

## **2 Functional requirements**

The functional requirements cover the cleaning properties of the microfibre cloth or mop, such as the removal of dust and dirt and the reduction of bacteria. Cleaning performance is central to the product group and a vital environmental parameter that means that the use of microfibre cleaning products is continually growing. This helps reduce the use of cleaning chemicals and water. Accordingly, the criteria require that microfibre cloths and mops offer high cleaning performance both regarding the removal of dust and dirt and the reduction of bacteria. The requirements also include characteristics such as abrasion and durability.

### **Removal of dust and dirt (R29)**

It must be demonstrated that a microfibre cloth removes at least 85% of dust and dirt and a microfibre mop at least 70% following a number of washes and without the use of cleaning chemicals.

If a microfibre cloth or mop is designed for both wet and dry use, its performance regarding dust and dirt removal must be documented for both applications. This requirement is harmonised with the previous version of the criteria for microfibre products. The requirement levels have been evaluated and are considered to be sufficient and to work well. The updated criteria therefore stipulate the same requirement levels.

Microfibre cloths and mops generally offer good cleaning performance. Investigations have shown changes to the cleaning efficiency of some microfibre products following a number of washes. According to one manufacturer, some microfibre products are pre-treated with chemicals to improve their performance, such as with salts/absorbers to improve their absorptive ability. This performance diminishes with each wash and the chemicals are washed out. The performance of the product can drop considerably. To avoid this situation, cloths and mops must be tested following several washes.

To ensure that the unique properties of microfibre do not diminish following washing, it is proposed that cleaning performance is tested following a number of washes to demonstrate the product's optimum service life. According to information received during the revision period, consumer products are washed considerably less than professional products (50-100 times/year compared to 200+ times/year). This is since professional products are used in significantly dirtier environments. In view of the above, the number of washes required in these criteria differs for consumer and professional products.

Consumer products shall be tested after 50 washes at 60°C while professional products shall be tested following at least 200 washes at 60°C.

The number of washes is equivalent to the number of washes during one year of use. It has been discussed whether tests should be performed on microfibre products that have been used for a period of one year. However the manufacturer/supplier is unable to control use (especially consumer use) and there is a risk that the manufacturer's/supplier's recommendations are not followed. As a result, it has been decided to perform tests on new products. No changes have been made to the limit values but testing shall be performed on new products following the applicable number of washes and without the use of cleaning agents.

The limit value in version 1.0 of 99% for hygiene requirements is in theory good but there is uncertainty as to the definition of the term hygiene. This should be clarified and exemplified, such as operation rooms or hospital stairways and corridors. Due to the ambiguous definition of hygienic conditions in the current criteria, the limit values for dust removal for products designed for hygienic requirements have been omitted. There is however a requirement on the reduction of bacteria that must be demonstrated for cleaning to which hygienic requirements applies.

There are currently few test methods that provide an objective evaluation of cleaning performance. A subjective, visual evaluation is still the most common. The methods that are used differ greatly and few are standardised. The areas of use for microfibre cloths and mops are wide and finding a standardised method is difficult.

Standards such as SS 627801:2006 (equivalent to INSTA 800) describe one measurement system that is based on visual inspection and that can be used for all types of buildings and premises, irrespective of cleaning method and frequency. Using this measurement system, the expected quality of cleaning can be unambiguously defined and the quality of the cleaning that is performed can be evaluated. The standard also contains an in-depth description of various methods for evaluating cleaning quality using test instruments. The standard is widely used in the Nordic area and has been shown to facilitate the relationship between customers and service suppliers.

Measurements are performed to gain an objective evaluation of the quantity of dust and biologically active material (organic material and microorganisms) on all types of hard and semi-hard floors and equivalent horizontal surfaces. Other test methods may also be used if the recommendations of Appendix 2 are followed.

### **Reduction of bacteria (R30)**

It must be demonstrated that microfibre cloths reduce bacteria levels (colony forming units per 100 cm<sup>2</sup>) by 85% and mops by 70% following a specified number of washes. If a microfibre cloth or mop is designed for both wet and dry use, its performance regarding bacterial reduction must be documented for both applications. This requirement applies to products intended for special hygienic applications.

Satisfactory cleaning is important to prevent allergies and other health issues. Dust contains many substances such as bacteria, and for a good indoor environment it is therefore important to keep dust and bacteria levels low. Accordingly, the removal of dust and dirt and reduction of bacteria are two of the most important parameters when assessing cleaning quality.

Bacteria levels can be presented as the individual levels of common bacteria or as a total quantity of bacteria for a certain area (25 cm<sup>2</sup>). The bacteria are often cultivated from samples taken from a variety of cleaned surfaces to determine either the quantity or whether a certain type of bacteria is present. Cultivation must take place at room temperature. The majority of pathogenic bacteria grow best at 37°C, but there are bacteria that grow at temperatures as high as 80°C and as low as 4°C. Bacteria must also have access to the right nutrients to multiply. Bacteria are commonly cultivated on Petri dishes with agar nutrient.

Some tests have shown that microfibre cloths and mops can significantly reduce levels of bacteria. Accordingly, the criteria require that microfibre cloths and mops shall reduce bacteria levels when used without cleaning agents. Dust comprises a mix of particles. Dust contains particles from the surrounding environment, mites and bacteria. Dust forms a layer on furniture and other indoor objects. This layer becomes thicker over time in the absence of cleaning. Since bacteria are bound in the dust, the criteria stipulate levels for the removal of dust and dirt. This is a new requirement in this version of the criteria.

### **Abrasion (R31)**

A microfibre cloth or mop, when used as recommended, must not cause any type of damage to the cleaned surface.

Low abrasion is an important quality parameter for ecolabelled microfibre cloths and mops. The use of such products must not cause permanent damage to surfaces, and the manufacturer must guarantee this.

### **Ergonomics (R32)**

Monotonous and strained working postures make cleaning a particularly high-risk occupation. Repetitive strain injuries can reduce an individual's ability to work and cause sick leave.

Subsequently, it required that the cleaning utensils are designed to facilitate ergonomic work that reduces the stress on muscles and joints. Ergonomics does not simply concern the design of the utensil but the interplay between the user and the utensil. It is vital that each utensil quickly and simply can be adapted to the optimum working posture for the task. Several important parameters are considered, such as constituent materials and weight, friction, adjustments and care of the utensil.

Friction is an important working parameter. Microfibre products must not create more friction than the other most common cleaning products. Friction is influenced by several factors, such as the constitution of fibres, fibre thickness, surface cleaned, and the intended cleaning method. This means that it is difficult to specify an exact coefficient of friction. Ecolabelled products must be ergonomically designed, for example to minimise friction without compromising cleaning performance.

Accordingly, the manufacturer shall specify how the cleaning products are developed to provide for ergonomic cleaning. The manufacturer shall be able to describe how, for example, the mop handle is designed to offer optimum cleaning performance while also reducing strain during cleaning. The use of a well-designed mop handle can increase the area that can be cleaned by raising cleaning efficiency by 20-40%. This can also reduce the number of mop changes. This is a new requirement in this version of the criteria.

### **Absorption (R33)**

It has been discussed whether it is possible to set requirements on the degree of splitting in this version of the criteria. Degree of splitting is a measure of the effectiveness of fibre splitting and is used by manufacturers for process control. According to information submitted to the project group, the degree of splitting should exceed 70%. The degree of splitting varies depending on the method of splitting.

During the revision, it has become apparent that there are several uncertainties that make it difficult to set direct requirements on the degree of splitting:

- Splitting is uneven across the surface of the product which may lead to an inaccurate assessment of the degree of splitting.
- There is no standard method to assess the degree of splitting.
- Measurement is at microscopic level, i.e. the fibre structure is evaluated using a microscope.
- The supplier may measure the degree of splitting only once or twice a year.
- Measurement is very costly.
- Splitting is a “living” process that continues after production, such as during washing.

The degree of splitting influences the properties of the final product, such as its cleaning performance and absorption. This means that splitting can be measured indirectly through absorption, which is an important functional parameter of the final product.

Absorption tests are performed during production, as a type of quality control. This means it is reasonable to set requirements of the absorption of the final product. The textile is knitted or woven and then set for splitting and dyeing. This means however that the requirement can only apply to the microfibre weave and not the final product, since this contains other materials.

## **3 General requirements**

### **3.1 Packaging (R34-35)**

The aim of this requirement is to make sorting and recycling of packaging simpler when the product is taken into use.

The second requirement concerns PVC and other halogenated plastics that must not be used for packaging or labels. This requirement prevents the use of plastic materials that can be problematic during manufacturing and incineration. When incinerated, PVC produces very toxic chlorinated hydrocarbons (due to the chlorine content of the plastic) which in turn form dioxins. The quantity of halogenated dioxins that forms also depends on the temperature of combustion. Further, stabilisers, plasticisers and flame retardants are also released during incineration. Many of these are dangerous to the environment and health.

## **3.2 Instructions and labelling (R36-R37)**

### **Instructions (R36)**

The instructions shall contain:

- Information on the surfaces for which the product is designed.
- Laundry instructions with directions regarding temperature and care.
- Information on the correct use without the cleaning chemicals.
- The optimum guaranteed service life with recommended usage.

Microfibre cloths and mops shall be used on the recommended surfaces to achieve the best cleaning results without causing permanent damage to the surface. Accordingly, it is vital that the supplier provides complete information about the surfaces for which the product is intended.

Ecolabelled microfibre cloths and mops shall provide clear washing and care instructions. This requirement is set to make it easier to use and care for the microfibre product in accordance with the manufacturer's recommendations. For example, no fabric softeners or bleaching agents shall be used when washing microfibre products since these can impair cleaning performance. The products must not be mixed with other types of laundry that can give off fluff and thereby impair the cleaning effectiveness of the microfibre product.

It must be possible to wash microfibre cloths and mops correctly to ensure that the product maintains its cleaning performance over a long period of time. The end user must be furnished with information that microfibre products shall be used without cleaning chemicals to guarantee the benefits of using an ecolabelled microfibre product.

The criteria revision has shown that it is imperative to ensure high product performance and eliminate inferior products by setting requirements on cleaning performance following washing. The project group has chosen to reformulate the requirement on durability in these criteria. According to the requirement, the manufacturer and supplier of the microfibre product must notify the customer of the optimum guaranteed service life of the product under the recommended conditions of use.

Durability is one of the most important environmental and quality parameters for ecolabelled microfibre cloths and mops. The service life the product must be recommended by the manufacturer.

### **Labelling (R37)**

Microfibre cloths and mops shall be labelled so that they are easily identifiable and distinguishable from other cleaning cloths and mops. This requirement is set to make it easier for the use to distinguish microfibre cloths and mops from other cleaning products, which in turn makes it easier to use and care for the product as recommended by the manufacturer and thus maintain its cleaning performance. No changes have been made from version 1.4.

## 4 Quality and regulatory requirements (R38-R47)

These requirements ensure that the holder of an ecolabelling licence is responsible for following safety, working environment, labour, and terms and concessions at the production facility during the production of the ecolabelled product.

These requirements are included to ensure that the requirements of the ecolabelling criteria are upheld during the period of the licence. This section is standard to all Nordic Ecolabelling criteria.

These requirements ensure that the ecolabelled product is marketed in compliance with "Regulations for Nordic Ecolabelling of Products". This describes the design of the Nordic Ecolabel and specifies how it is to be placed on the product. The regulations also describe how the licensee may use the Nordic Ecolabel in other Nordic countries and the documentation necessary for registration.

Customers must be informed that they are using a Nordic Ecolabelled microfibre cloth/mop and what this means.

The requirements on customer information are new to the criteria and regulate how the licensee shall communicate the advantages of using an ecolabelled microfibre product.

## Appendices

### Appendix 1 Analysis and inspection

This section describes how tests and analyses are performed. Inspection includes both inspections at the time of application and follow-up inspections. The tests contain requirements on the analysis laboratories, which must fulfil the general requirements of standard: General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005) or have official GLP\* status.

*\*Good Laboratory Practice (GLP) embodies a set of principles that provides a framework within which laboratory studies are planned, performed, monitored, recorded, reported and archived. These studies are undertaken to generate data by which the hazards and risks to users, consumers and third parties can be assessed. GLP helps assure regulatory authorities that the data submitted are a true reflection of the results obtained during the study and can therefore be relied upon when making risk/safety assessments. GLP ensures the quality, integrity and reliability of safety data.*

GLP principles includes:

- Organization and Personnel
- Quality Assurance Program
- Test system facilities and facilities for test and reference items
- Equipments, reagents and Materials
- Test systems
- Test & reference items
- Standard operating procedures
- Performance of Study
- Reporting of results
- Storage of Records and Reports

## **Appendix 2 Function**

Recommendations that apply to tests for dust and dirt removal and the reduction of bacteria are found in this appendix.

## **Appendix 3 Declarations**

The declarations in this appendix shall be used when applying for a Nordic Ecolabel licence for microfibre cloths and mops, version 2.0.

## **Appendix 4 Information on classifications**

Information on classification for the transition to the Globally Harmonised System (GHS) is presented in this appendix.

## **Appendix 5 User test**

Use this appendix when applying for a Nordic Ecolabel licence for microfibre cloths and mops, version 2.0.

## **Appendix 6 Marketing**

This appendix shall be used when applying for a Nordic Ecolabel licence for microfibre cloths and mops, version 2.0.

# **5 Changes from the previous version**

The most important changes since version 1.4:

- Change to product group definition.
- Introduction of requirements on textiles.
- Harmonisation with GHS/CLP classification.
- Introduction of requirements on metals.
- Introduction of requirements on plastics.
- Tightening/adjustment of functional requirements.
- New layout.

# **6 New criteria**

In the next version of the criteria, the following items will be reviewed:

- Fibres that are not permitted for use in ecolabelled microfibre cloths and mops.
- Production requirements, including the splitting process (splitting process with the least environmental impact regarding rest products and energy consumption).
- Washing temperature and how this influences the cleaning properties of the microfibre cloth or mop.
- Minimising packaging.

## 7 References

EU (2008a): CLP regulation 1272/2008/EC with subsequent amendments and adaptations. Official Journal of the European Union.

EU (1967): Dangerous substances directive, 67/548/EEC with subsequent amendments and adaptations

<http://www.kemi.se/>

Nordic environmental declaration for sheet metal, metal strapping, foil and aluminium profiles. Skanaluminium: *Nordic environmental declaration, edition 1, 2000*

<http://www.sis.se/>

[http://www.oecd.org/department/0,3355,en\\_2649\\_34381\\_1\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/department/0,3355,en_2649_34381_1_1_1_1_1,00.html)

[http://www.unece.org/trans/danger/publi/ghs/ghs\\_welcome\\_e.html](http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html)

RAPPORT Triclosan, DEHP och klordan - samlad utvärdering av svenska miljöövervakningsdata, Swedish Environmental Protection Agency, 2007

Nordic Ecolabelling (2009b): Nanoteknologi. Note to NMN 17. March 2009

Nordic Ecolabelling (2008): Utvärdering av kriteriedokument Svanenmärkning av mikrofiberdukar och -moppar

REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

PFOS-relaterade ämnen, Strategi för utfasning, Swedish Chemicals Inspectorate, 2004

Perfluorerade ämnen - användningen i Sverige, Swedish Chemicals Inspectorate, 2006

Nordic Ecolabelling (2003): The ecolabelling of micro-fibre cloths and mops, Background memo for draft proposal 1.0

[http://www.oeko-tex.com/OekoTex100\\_PUBLIC/index.asp](http://www.oeko-tex.com/OekoTex100_PUBLIC/index.asp)

Nanoteknik – stora risker med små partiklar? En kunskapssammanställning om risker med nanoteknik för hälsa och miljö, samt förslag till hur identifierade kunskapsluckor bör åtgärdas, Swedish Chemicals Inspectorate, 2007

MetVikan ErgoClean, Economics has always been the backbone in Vikans concept for effective, professional cleaning, 2009

Report, Case Study 2 – Whipps Cross Summary, Microbiology, JohnsonDiversey, 2009

Report, Case Study 2 – Marks & Spencer, Productivity, JohnsonDiversey, 2009

Whipps Cross letter to JohnsonDiversey From Lone Sarosi, Deputy Director of Infection Prevention and Control, JohnsonDiversey, 2009

Field Evaluation of dust levels at Marks and Spencer stores during the trial of the Jonmaster Microfibre System and a range of JohnsonDiversey chemicals, Linda Loader and Karen Sleator, Technical Team UK, 2003

Test report Cert No 67106. Cleaning efficiency of different mopp products and comparison with current standard reference products. Weber & Leucht GmbH, 2008

Temadag Gulv2006. Teknologisk Institut Kompetanse

"Tørt er fortsatt best". Article in the journal "Renholdsnytt" no. 6, 2007

Tekomo Byggnadskvalitet AB, 2003

Cleaning and floor care project, S:t Eriks upper secondary school, 1999

Cleaning methods with low chemical use- a comparison of cleaning methods at University Hospital in Lund, Sjukvården i Landskrona- Lund-Orup, Ann-Kristin Ekholm, 1998

ACT - Advanced Cleaning Technics Field test concerning the capacity of ACT-mop to reduce the number of bacteria. Comparison between the mops and swabfabrics, as well photo documentation of the analyse results

Tekomo Byggnadskvalitet AB, 1998

Actuelle tricot in Borås AV, Sweden. Laboratory test of ACT- multiuse mop with microfibres. The importance of disinfection compound for the efficiency of cleaning. Tekomo Byggnadskvalitet AB, 1997

ACT - Advanced Cleaning Technics. Laboratory test to evaluate the capacity of ACT cloths to reduce the bacterial contamination. Comparison between unused (unwashed) and used (washed several times) ACT cloths for cleaning fixtures and sanitary surface. Tekomo Byggnadskvalitet AB, 1997

Test report for ACT mops, SP Technical Research Institute of Sweden, SP Report 1997

<http://www.sustainablehospitals.org/PDF/tenreasonsmop.pdf>

<http://ec.europa.eu/environment/ecolabel/>

[http://circa.europa.eu/Public/irc/env/ipcc\\_brefs/library?l=/translation\\_executive\\_2/textile\\_svdoc/\\_EN\\_1.0\\_&a=d](http://circa.europa.eu/Public/irc/env/ipcc_brefs/library?l=/translation_executive_2/textile_svdoc/_EN_1.0_&a=d)

<http://www.kemi.se/templates/PRIOfames.aspx?id=4045&gotopage=4088>

Alexandersson, P. (2006) Miljöaspekter på golvvård, Swedish Society for Nature Conservation, ISBN: 915587891-1