About Nordic Swan Ecolabelled

Textiles, hides/skins and leather

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Nordic Ecolabelling

Content

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This document is a translation of an original in Danish. In case of dispute, the original document should be taken as authoritative.

Addresses

In 1989, the Nordic Council of Ministers decided to introduce a voluntary official ecolabel, the Nordic Swan Ecolabel. These organisations/companies operate the Nordic Ecolabelling system on behalf of their own country's government. For more information, see the websites:

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1 Summary

The Nordic Swan Ecolabelling of textiles is a highly topical issue. The textile industry is waking up and realising that something must be done about achieving more sustainable textile production and consumption. The focus areas for the industry are:

- Sustainable fibre
- Substitution of hazardous chemicals (e.g. Greenpeace's Detox List)
- Reduction in energy and water consumption
- Recycling and a circular economy
- Responsible production in terms of workers' rights
- Focus on quality and slow fashion rather than fast fashion

Brands vary in how many of these areas they tackle. Since the Nordic Swan Ecolabelling of textiles examines the entire life cycle of the textile, and all the relevant sustainability parameters, the criteria deal with all six areas listed above.

New fibre requirements

This 5th generation of Nordic Swan Ecolabelling for Textiles, hides/skins and leather includes newly developed requirements concerning textile fibres. The fibres in Nordic Swan Ecolabelled textiles must be either organic, recycled or produced with a reduced environmental footprint. This means, in part, that:

- Virgin cotton must be 100% organic, although textiles for professional use may, alternatively, be made from fibre 100% certified by either BCI, FairTrade or CmiA.
- Synthetic fibre must be based on either recycled or bio-based materials.
- Regenerated cellulose fibre must be recycled or certified as sustainable, and the actual fibre production must involve no discharge to wastewater.

Updated chemical requirements

The following three requirements are tightened and covers all the chemicals in the textile production:

- Chemicals with undesirable classifications such as toxic, carcinogenic and harmful to the aquatic environment are prohibited.
- Chemicals classified as CMR substances are prohibited.
- It must be clearly demonstrated that none of the 11 groups of substances from Greenpeace's Detox My Fashion campaign[1] have been used in the production of Nordic Swan Ecolabelled textiles.

As in the previous generation of the criteria, the chemical requirements in the new generation use a definition of ingoing substances that entails a ban on specific substances down to 0 ppm.

[1] Destination Zero: Seven Years of Detoxing the Clothing Industry, https://storage.googleapis.com/planet4-international-stateless/2018/07/destination_zero_report_july_2018.pdf accessed 07.08.2019.

As such, a safety data sheet alone is not enough to meet the documentation requirement. Further information about the chemicals will always be needed. Other certifications that do not require chemical documentation down to the same level will therefore not be permissible as documentation for these requirements.

Tighter requirements for energy and water consumption

The requirement concerning energy and water consumption has been expanded to include a requirement on implementation of a minimum of BAT practices to reduce energy and water consumption. This means that the textile production must be water- and energy-efficient and thus deliver reduced CO_2 emissions.

Textiles and a circular economy

In addition to recycled fibres, it is now also possible to use recycled textiles to make new textiles, thus with some limitations. There is also a requirement that unsold textiles must not be sent for incineration or to landfill and that the Brand Owner must be transparent about this.

In addition, the requirements relating to fibres and chemicals used, coupled with the quality requirements, support a circular economy.

Requirements for brand owner – new licence structure

The textile manufacturer and brand owner must each hold their own type of licence. The brand owner is now subject to requirements that ensure the traceability of the Nordic Swan Ecolabelled product on the market.

2 Motives for the Nordic Swan Ecolabelling of textiles, hides/skins and leather

The description of what characterizes Nordic Swan Ecolabelled textiles, skins and leather is divided into 2 product areas:

- Textiles
- Skins and leather

Nordic Swan Ecolabelled textiles

Nordic Ecolabelled textiles have reduced environmental impact throughout the lifecycle of the textile and the textile producer must ensure that production complies with UN human rights and relevant International Labour Conventions.

The different fibres in the fabric - depending on the type of fibres – must be either organic, recycled or bio-based. If the fibres are bio-based, they have to be produced with reduced environmental impact.

In order to protect the environment and the user of the textile, a long list of prohibited chemicals regulate the textile production. These are chemicals which are harmful to the environment and human health.

Textiles with the Nordic Swan Ecolabel give the opportunity for a long lifetime and the quality is therefore tested and documented.

Recycled textile materials can be used in the Nordic Swan Ecolabelled product with some limitations.

Several of the Nordic Swan Ecolabel requirements support that the textile can go into new resource loops after use. In this way, the requirements help to stimulate a circular economy, save resources and reduce the amount of waste. This is due to the requirements for either recycled or bio-based raw materials, strict control of the chemicals included in the textile, quality testing of the finished textile and requirements that prohibit the use of plastic and metal applications for decorating. Unsold Nordic Swan Ecolabelled textiles must not be burnt or sent to landfill.

The requirements include:

- Strict requirements for the cultivation and / or production of fibres reduce the environmental impact:
- Cotton fibres shall be 100% organic cotton or recycled.
- For selected types of professional textiles, it is also possible to use fibres certified according to BCI, FairTrade or Cotton Made in Africa (CMiA).
- Wool fibres must come from mulesing-free sheep farming.
- Synthetic fibres shall be either recycled material or biobased.
- Only viscose without effluent discharge can be used.
- Down and feathers are not plucked from live birds or from force-fed birds
- Meet strict environmental and health requirements for chemicals. Substances that can cause cancer, damage inheritance or reproductive capacity, and prohibition of endocrine disruptors, flame retardants and fluorine substances are all prohibited.
- All chemicals in the textile production are controlled for their environmental and health properties. This leads to cleaner wastewater.
- Metal parts - such as zippers and buttons - meet stringent requirements for heavy metals, and plastic parts must not contain phthalates.
- Textile production is water and energy efficient, which saves water and reduces CO_2 emissions.
- The quality of the fabrics has been tested for colour fastness and shrinking.
- The textile manufacturer must comply with UN human rights and relevant International Labour Conventions.

Nordic Swan Ecolabelled products of skins and leather

Nordic Swan Ecolabelled skins and leather have reduced environmental impact throughout the lifecycle and the manufacturer must ensure that production complies with UN human rights and relevant International Labour Conventions.

Only skins and leather which are residuals or by-products from meat, fish, milk or wool production can be Nordic Swan Ecolabelled.

In order to protect the environment and the user of the textile, a long list of prohibited chemicals regulate the textile production. These are chemicals which are harmful to the environment and human health.

Skins and leather with the Nordic Swan Ecolabel give the opportunity for a long lifetime and the quality is therefore tested and documented.

Recycled skins and leather materials can be used in the Nordic Swan Ecolabelled product with some limitations.

Several of the Nordic Swan Ecolabel requirements support that skins and leather can go into new resource loops after use. In this way, the requirements help to stimulate a circular economy, saving resources and reducing the amount of waste. This is due to, that only residuals or by-products can be used as raw materials for skins and leather, strict control of the chemicals included in the textile, quality testing of the finished leather, requirements that prohibit the use of plastic and metal applications for decorating. Unsold Nordic Swan Ecolabelled skins and leather products must not be burnt or sent to landfill.

Nordic Swan Ecolabelled products in hide/skin and leather

- Are produced by residuals or by-products from meat, fish, milk or wool production.
- Meet strict environmental and health requirements for chemicals. Substances that can cause cancer, damage inheritance or reproductive capacity, and prohibition of endocrine disruptors, flame retardants and fluorine substances are all prohibited.
- All chemicals in the production of skins and leather are controlled according to their environmental and health properties. In addition to the chemistry for the tanning process, chemicals such as dyes, coatings, solvents and biocides are also controlled.
- The finished skin and leather are tested free of chromium VI, which can be allergenic.
- To protect the aquatic environment, wastewater from tanneries shall have a chromium content of maximum 1 mg chromium (total) / l water.
- Metal parts - such as zippers and buttons - meet stringent requirements for heavy metals, and plastic parts must not contain phthalates.
- The quality of Nordic Swan Ecolabelled leather has been tested for tear resistance and abrasion resistance.
- The manufacturer shall comply with UN human rights and relevant International Labour Conventions.

2.1 UN's Sustainable Development Goals

The Nordic Swan Ecolabel actively contributes to fulfilment of Goal 12 to "Ensure sustainable consumption and production patterns".

Nordic Swan Ecolabelled textiles, hides/skins and leather have a reduced environmental footprint throughout the life cycle of the textile – from fibre production and textile production to requirements ensuring the high quality of textiles, so it can last a long lifetime. The Nordic Swan Ecolabel encourages reuse and recycling without the spread of harmful chemicals.

How Nordic Swan Ecolabelled textiles, hides/skins and leather contribute to Goal 12

Here, the focus is on sustainable and efficient utilization of resources by the fact that the fibres in the textile must be either organic, recycled or produced with a reduced environmental footprint. At the same time, the textile production must use water- and energy efficiency technologies or use self-produced solar energy.

A long list of chemicals that are harmful to health and the environment are prohibited in the production of the textile. All the chemicals in the textile production are checked regarding their environmental and health effects. For example, all the substances on Greenpeace's Detox List are prohibited. In addition, the detergents and softeners used in the wet processes must be biodegradable. This ensures responsible handling of the chemistry throughout the life cycle of the textile, with a positive impact on human health and the environment.

Nordic Swan Ecolabelled textiles shall contribute to more sustainable consumption patterns and therefore could be used for a long time. Hence the quality is tested for properties such as colour fastness and shrinkage.

Goal 8 on decent work for all is also relevant to this product group.

The global textile industry faces major social and ethical challenges. There is therefore a requirement that working conditions in the textile production must comply with relevant workers' rights as set out in the ILO Core Conventions. This includes a ban on child labour and forced labour.

3 Environmental impact of Nordic Swan Ecolabelled textiles, hides/skins and leather

The textile industry is one of the largest industries in the world, with as many as 100 million tonnes of textiles making their way onto the global market annually. At the same time, the fashion and textile industry are one of the most polluting and resource-heavy industries in the world and its scale alone says something about the environmental impact associated with the textile industry.

Increasing consumption

The Nordic region has a high consumption of textiles. The average annual consumption per inhabitant in the Nordic countries ranges from 13 to 16 kg of new textiles (clothing and household textiles)[2]. Fast fashion, whereby several trend-based collections are launched each year, is one of the things stimulating the increasing consumption of textiles. Slow fashion is now growing as a counterpoint to fast fashion, with more and more fashion brands and consumers focusing on the quality and long lifetime of the textile.

[2] NMR 2014, Towards a new Nordic textile commitment: Collection, sorting, reuse and recycling

Environmentally harmful production

The LCA study "Advancing life cycle assessment of textile products to include textile chemicals", in which Sandra Roos of Chalmers University of Technology includes the environmental impact of chemicals, states that the greatest environmental impact from textiles is associated with their actual production. The primary impacts come from the use and discharge of harmful chemicals and the use of water and energy in the textile production[3]. Energy consumption is significant for both resource consumption and emissions of greenhouse gases. The greatest impact on the climate change thus comes from the textile production, including all the wet processes. Next comes the contribution from transport of the textile from the retailer home to the consumer.

Cultivation of cotton is one of the most problematic processes in the production chain for textiles. The cultivation of conventional cotton requires intensive use of both water and chemicals. Similarly, wet processes (bleaching, dyeing and finishing) in textile production often have a significant impact on the environment. In addition to making intensive use of water and chemicals, the wet processes can also involve high levels of energy consumption. It is estimated that between 1.5 kg and 6.9 kg of chemicals are used to produce 1 kg of finished clothing. As such, the chemicals used in production will often weigh considerably more than the textile itself[4].

Not all LCA studies of textiles have the same focus on chemicals. When using LCA studies as a tool for assessing a textile's environmental impact across its life cycle, it is important to note that endocrine disruption, allergens and other harmful properties in the chemicals used are often poorly handled in the analysis. There is thus a risk that LCA tools do not give the best picture of where to most usefully target environmental improvements in the textile's life cycle[5]. In relation to ecolabelling, there is therefore a need to combine LCA studies with a more specific chemical analysis that examines both how problematic the chemistry is and the options for substitution.

The Swedish Chemicals Agency has identified 2,450 different chemicals that are used in textile production. 1,150 of these are identified as harmful and 368 are functional chemicals such as dyes, impregnation agents and anti-bacterial treatments. These chemicals are present in the finished textile and therefore may pose a potential risk to consumers and the environment in the use stage. Chemicals with no function in the end product may also be present in the textile, with a potential risk to health and the environment[6]. As an example, several studies indicate that allergic reactions to chemicals and textiles may be a problem[7].

[3] Advancing life cycle assessment of textile products to include textile chemicals, CHALMERS UNIVERSITY OF TECHNOLOGY 2016.
[4] Advancing life cycle assessment of textile products to include textile chemicals, CHALMERS UNIVERSITY OF TECHNOLOGY 2016.
[5] Advancing life cycle assessment of textile products to include textile chemicals, CHALMERS UNIVERSITY OF TECHNOLOGY 2016.
[6] Norden – velklædt i et rent miljø, Handlingsplan for bæredygtig mode og tekstil, Nordic Council of Ministers 2015.
[7] Kemi 2014, Chemicals in textiles – Risks to human health and the environment.

The Dirty Laundry report published by Greenpeace International[8] focuses on the discharge of harmful chemicals in wastewater from Chinese wet processing plants as part of textile production. A later study, also by Greenpeace, shows the presence of per- and polyfluorinated compounds (PFC) in all the analysed snow samples and many water samples taken in the mountain areas of 10 countries on three continents[9]. Greenpeace describes how even major textile brands with CSR programmes lack an effective strategy to ensure that the textiles they source from China do not lead to harmful substances polluting watercourses. The study also states that harmful chemicals with persistent or endocrine disrupting properties were found in wastewater samples from the factories. Even wastewater from factories with modern wastewater treatment systems was found to contain alkylphenols and polyfluorinated compounds such as PFOA and PFOS[10]. With its Detox Catwalk campaign in 2010, Greenpeace urged the global textile industry to phase out 11 harmful chemical groups by 2020 (see more in section 4.1).

3.1 Qualitative MECO analysis for textiles

A qualitative MECO analysis has been conducted for textiles in general. This describes the key areas that impact on health and the environment throughout the life cycle of the textiles – including consumption of materials/resources (M), energy (E), chemicals (C) and other impact areas (O) such as microplastics and biodiversity. The product group covers many different types of textile, hide/skin and leather products. These may include everything from clothing to home furnishings and professional textiles such as workwear to bags, gloves and upholstery fabrics. It is therefore not possible to perform a quantitative analysis that covers all these product types. The decision was thus taken to conduct a qualitative MECO analysis showing the key environmental and health impacts associated with the product group, without quantifying these impacts. The magnitude of the stated impacts depends on many factors, such as the choice of fibre type, fibre thickness and density, the choice of textile chemicals, finishing treatments, technology and production processes, design and the collection or waste systems in the respective countries.

The table shows that the choice of fibre type affects the kind of environmental impact that the raw material stage contributes. Here, resource consumption comes either in the form of crude oil for fossil synthetic fibre production or land use and the risk of biodiversity losses due to the use of renewable raw materials. Both the cultivation of raw materials and the production of synthetic fibres require energy, with harmful chemicals from pesticides and production chemicals another relevant factor for consideration. When it comes to animal fibres, it is also important to consider animal welfare, for example with regard to sheep.

[8] Greenpeace International (2011) Dirty Laundry: the toxic secret behind global textile brands.
[9] Greenpeace International (2015) Footprints in the snow.
[10] Greenpeace International (2011) Dirty Laundry: the toxic secret behind global textile brands.

Table 2: Qualitative MECO matrix for the life cycle of textiles

	Raw material phase	Production	Use phase	Waste and recycling phase
Raw materials/ inputs	Crude oil (synthetic fossil fibres) Wood raw material (cellulose-based fibres) Land use (vegetable fibres, silk and wool) Water (cotton and other vegetable fibres) Energy resources for extraction, cultivation and fertilisation	Energy resources for production Water for wet processes	Energy resources and water for washing and poss. energy resources for drying	Either landfill, incineration or recycling of textile fibres. A small proportion is reused
Energy	Energy for production of synthetic fibres and farming for vegetable fibres and wool	Energy for the processes, spinning, weaving/knitting, dyeing, finishing and manufacturing	Energy for washing and poss. drying	Loss of resources due to landfill and incineration. Energy recovery from incineration of textile fibres. Energy and resource savings through reuse of textile fibres
Chemicals	Cotton and wood raw material for cellulose and any other vegetable raw materials: Pesticides for cultivation Wool: Organophosphates and pyrethroids for treatment. COD emissions from wool scouring plants. Acrylic fibres: DMAc and acrylonitrile. Elastane fibres: Organotin compounds, emission of aromatic diisocyanates to air, DMAc Polyamide fibres: N2O emissions to air Polyester fibres: antimony, VOC Polypropylene: lead-based pigments Cellulose fibre: chlorine gas, sulphur emissions, zinc emissions to water, copper emissions to water Membranes coated with fluorinated substances.	Chlorine treatment of wool. Emissions of chemicals from the wet processes that are harmful to health and the environment. E.g. carcinogenic azo dyes (amines). PFAS for resistance to water, dirt and grease. Phthalates in print or plastic detailing. Pesticides, heavy meals or pH-changing chemicals.	Exposure to chemicals that are harmful to health: antibacterial biocides (silver ions, triclosan or triclocarban), PFAS, NPEO, allergenic dyes, CMR substances and endocrine disruptors. Detergents for washing the textiles.	Risk of passing undesirable chemicals onwards in the lifecycle through the use of textiles with no traceability. Potential to reduce chemical impact from raw material phase by reusing textile fibres.
Other	Animal welfare in farming (e.g. sheep). Also relevant for birds in the case of fillings (feathers). Sustainable cultivation of raw materials, not least to ensure biodiversity and protection of natural areas.	Temp. changes in aquatic environment (wet processes). Social and ethical challenges associated with working conditions for production outside the EU.	Microplastics from textile wear and washing.	

3.2 RPS analysis

Nordic Ecolabelling sets requirements concerning the topics and processes in the life cycle that have a high environmental impact – also called hotspots. An RPS tool is used to identify where ecolabelling can have the greatest effect. R represents the environmental relevance, P is the potential to reduce the environmental impact and S is the steerability on how compliance with a requirement can be documented and followed up.

Therefore, it makes sense for the criteria to contain requirements in areas in the life cycle that have been found to have a high overall RPS, since there is potential to achieve positive environmental gains. The table below provides an overview of the key areas where requirements are appropriate due to a high RPS.

Location of high RPS

Raw materials stage	
Fibre type	There is high relevance for the production/cultivation of textile fibres, but considerable variation in the type of environmental impact, depending on the type of fibre. It is difficult to pick out one fibre type as the best option on every environmental impact category. In terms of environmental impact from the textile fibres, the potential for greatest steerability lies in ensuring that the individual fibre type is either cultivated or produced in the least environmentally impactful way possible. **RPS for natural fibre requirements** - Here, a high RPS has been found for requiring 100% organic cotton for textiles for retail and professional fabrics – either 100% organic or IPM cotton. - For flax and other bast fibres, there is RPS for specific requirements concerning cultivation and processing. - Animal fibres such as wool and other keratin fibres demonstrate a high RPS for requirements on the level of residues of pesticides against parasites in the wool, as well as COD and detergent discharges in wastewater. **RPS for synthetic fibre requirements** - Synthetic fibres are subject to the requirement that either they must be bio-based or recycled materials are used in production. - For bio-based fibres, there are also requirements stipulating the types of raw materials that may be used and that they must not be cultivated using genetically modified raw materials. - Recycled fibres are required to have been tested for content of undesirable chemicals. - For regenerated cellulose fibre, the production process must be free from discharges and the wood fibre must be sourced from sustainable forestry.
Textile production	
Chemicals that are harmful to health and the environment	In this area, tackling harmful chemicals in textile production has high relevance, and there is also potential to set chemical requirements for textile production that exclude a wide range of chemical substances. In order to ensure that harmful chemicals are not discharged from wet processes, the greatest steerability as regards ecolabelling lies in ensuring that the harmful chemicals, such as organic fluorinated compounds and heavy metals, are not used in the processes. This ensures that these chemicals are not discharged into the aquatic environment and that they are not present in the finished textile that the consumer is in contact with. The Nordic Swan Ecolabel's chemical requirements, under which a ban means 0 ppm of the constituent chemical substances, provide high steerability. Testing for chemicals in wastewater is also an option but provides only a snapshot and would be a major undertaking if all the excluded substances had to be tested for. Here there is both potential and steerability in requiring that the detergents and softeners used in the textile production must be readily degradable in the wastewater treatment plant, so that they do not end up in the aquatic environment. Potential and steerability also exist for requirements concerning COD, temperature and pH in wastewater from wet processes.

Energy and water consumption	Overall, a high RPS has been found for requiring that the textile production uses a minimum of best available water and energy efficiency technologies or has measures in place for self-production of solar energy.
Use stage	
Exposure to chemicals that are harmful to health	Exposure to textile chemicals that are harmful to health is an area with high relevance [11]. There is also good potential to ensure the avoidance of, amongst other things, CMR substances such as carcinogenic dyes, allergenic dyes, endocrine disrupting dyes such as certain phthalates or to ensure that no harmful flame retardants have been used. These are just a few of the chemicals associated with textile production that are harmful to health. This can either be documented using information back along the production chain on exactly which chemicals have been used in production, or tests can be carried out on the finished textile. Collecting data from back along the production chain also ensures that there is no use of harmful chemicals that impact on the environment due to discharges from wet processes. Testing the finished product does not achieve this in the same way– particularly if the chemical is an auxiliary chemical, which is usually removed from the textile during its manufacture.
Harmful chemicals from recycled fibre or reuse of textiles	Relevance and potential are judged to be medium to high in this area. Testing of recycled fibre is considered the most steerable way of ensuring that specific harmful chemicals are not present. When reusing textiles in new Nordic Swan Ecolabelled products, steerability regarding exposure to harmful chemicals can be achieved by only using products with chemical traceability, when it comes to products with close skin contact.
Quality and lifetime	For the textile industry in general, there is considered to be high potential in confirming the high quality and long life of the textile. There is also steerability regarding the quality, since it is possible to set requirements in the criteria that specific quality parameters must be documented using standardised quality tests. The lifetime is more difficult to control, since the real-world lifetime (not just its technical life expectancy) is also affected by consumer behaviour and this is difficult to control through the ecolabelling of the textile. There is therefore no RPS for direct requirements, but the Nordic Swan Ecolabel requires third-party approval of all materials and chemicals – something that can be difficult to fit into the schedule for fast fashion products. The Nordic Swan Ecolabel is thus more suited to slow fashion products with a design that is likely to last longer.
Waste and recycling	
Textiles for recycling (Free from harmful chemicals)	The highest RPS in relation to how ecolabelling of a textile can promote recycling is to ensure that textiles are free from harmful chemicals, making their reuse desirable. Requiring all the chemicals used to be approved has relevance, potential and steerability.
Textiles for recycling (Design for disassembly)	Here, a high RPS has been found in reducing the use of metal and plastic details on the textile as much as possible – metal rivets, for example, are not permitted for purely decorative purposes. The combination of different fibre types is also of high relevance in terms of a textile's suitability for fibre-to-fibre recycling. However, there is currently no realisable potential for all types of textile products. In the area of professional textiles, for example, there is a need to use cotton/polyester blends to achieve the required performance and save energy in industrial laundering. There is considered to be a medium RPS for ensuring that jeans and other denim goods are suitable for fibre-to-fibre recycling.

3.3 Textiles and a circular economy

Textile consumption is high in the Nordic countries and the time during which the individual textile is actively used is often short. Over half of garments are neither reused or recycled and are instead discarded after use. At the same time, large amounts of clothing and textiles that have barely been used – and so could remain in use for a long time to come – are simply thrown away.[12]

[11] Chemical in textiles – Risk to human health and the environment, Swedish Chemicals Agency 2014.
[12] NMR 2014, Towards a Nordic textile strategy.

The Nordic Council of Ministers is one of the bodies focusing on reversing this trend, as described in the report "Well dressed in a clean environment: Nordic action plan for sustainable fashion and textiles" from 2015. This states that "the environmental and social footprint of the Nordic region's textile consumption shall be significantly reduced, while at the same time advancing the Nordic industry's position in sustainable fashion." This is further explained with a focus on making textiles part of a circular economy rather than ending up as waste. To make Nordic textile consumption more circular, it is important to place an emphasis on increasing the lifetime of products, and on ensuring that the textile fibres are free from specific problematic substances. This way, the textiles or their fibres can be held in a closed, toxin-free resource cycle that allows for their use repeatedly.

The recycled feedstock for textile fibre production often comes from materials other than textiles, such as PET bottles. Wool and cotton can also be recycled by shredding the textile and spinning the fibres again. The fibre-to-fibre recycling can be either mechanical, often resulting in the downcycling of the fibres to a lower quality product or chemical. The chemical recycling processes for fibre-to-fibre recycling are in development and may potentially bring greater benefits, such as improved quality. The recycling of textile fibres into new textile fibres remains limited globally due to technical barriers and low prices for virgin fibre, combined with high recycling costs and obstacles to trade in recovered textiles.

Over time, there is considerable potential for value creation in a circular economy, if the fashion industry is able to convert textile waste into raw material for textile production using advanced recycling techniques. However, this type of recycling technology is not yet available for a broad spectrum of fibres, and such a system has not proven economically viable on a large scale[13].

For specific fibre types, the industry is well advanced in its use of recycled materials for the production of new textiles. This is particularly for polyamide (nylon) and polyester, where the technology (mechanical or chemical), availability and quality make it possible to turn recycled materials into new fibres – not necessarily fibre-to-fibre, but instead using other recycled materials. An analysis conducted as part of a project for the Nordic Council of Ministers shows an environmental effect from the use of recycled materials for the fibre types studied. This generation of the criteria thus includes a requirement concerning the use of recycled materials based on fossil resources to make synthetic fibres[14].

Ecolabels such as the Nordic Swan can be used as a tool to stimulate a circular economy. They are a particularly good tool for ensuring that textiles are produced using the least harmful chemicals, making it more desirable to recycle the textile or its fibres after its final use.

Ecolabels are unable to control what actually happens to the textile in the use and waste stage.

[13] PULSE OF THE FASHION INDUSTRY, Global Fashion Agenda & The Boston Consulting Group 2017.
[14] Nordic Council of Ministers (2016). Gaining benefits from discarded textiles: LCA of different treatment Pathways.

This can, however, be influenced via specific measures in the textile production or requirements imposed on the textiles that can make resource efficient waste management possible, for example by prohibition of harmful chemicals makes it more desirable to recycle the textile.

The Nordic Swan Ecolabel sets quality requirement for textiles in the form of minimum permitted dimensional changes in the textile and a requirement for colour fastness during washing, use and exposure to light. Ensuring the high quality of the textile makes a long use stage more likely. The greatest potential for reducing the environmental impact of textiles is linked with extending their use stage so that clothing, for example, is worn many times over. This reduces the need to purchase and produce new textiles. However, several factors come into play in this context. The quality of the textile is one thing, but user behaviour and durable design are also key parameters. There is, however, little scope to influence these through ecolabelling.

3.4 Environmental impact from different types of fibre

There is often a focus on identifying the best fibres for textile production in environmental terms, and various reports have analysed how fibres impact on the environment. But in addition to different textile fibres having a different environmental impact, they also have different functionality in the use stage and at end-of-life[15]. This functionality can have a major impact on the textile's quality, area of use and lifetime, and is thus significant for the overall environmental impact throughout the life cycle of the textile.

One example of the variation among different fibre types can be found in cradle-to-grave analyses such as the one presented in the Global Fashion Agenda's Pulse report from 2017[16]. This provides a cradle-to-gate environmental impact index per kg of material using data from the Higg Material Sustainability Index (MSI). In the ranking of the various fibres, several of the synthetic fibres, such as polyester and polypropylene, do well environmentally, whereas the natural fibres such as cotton, wool and silk are down at the bottom end. In this case, however, there is no differentiation between conventional and organic fibre production, or between virgin and recycled fibres. The danger of using such an index lies in the underlying weighting of the different environmental impact categories. This is done in order to be able to add up all the environmental impact categories and give a total quantitative value for each fibre type. This weighting determines how much importance is attached to impacts such as harmful chemicals, water consumption, land use, biodiversity, use of fossil resources, energy consumption and climate impact. The Sustainable Apparel Coalition (SAC), which is responsible for the Higg Index, stresses in its own article "Materials Sustainability in the Higg Index"[17] that the MSI is not an LCA tool, and nor should it replace LCA studies. The MSI's reliance on weighting and its allocation of a simple total score are not in line with standardised LCA methods.

[15] Laitala, K. Does Use Matter? Comparison of Environmental Impacts of Clothing Based on Fiber Type, MDPI 2018 https://www.mdpi.com/2071-1050/10/7/2524
[16] http://globalfashionagenda.com/wp-content/uploads/2017/05/Pulse-of-the-Fashion-Industry_2017.pdf
[17] Materials Sustainability in the Higg Index, 2013 http://www.chinawaterrisk.org/interviews/materials-sustainability-in-the-higg-index/

Nordic Ecolabelling has chosen not to rank the individual fibre types against each other. The considerable difference in functionality in the use stage and end-of-life means that this product group contains countless functional units. Instead, the criteria focus on setting requirements that promote the environmentally best variant of the particular fibre type. Fibre types for which it has not been possible to set good requirements that can be documented have not been included, or a limit has been set on the use of the fibre type in the criteria. The criteria for the Nordic Swan Ecolabelling of textiles, hides/skins and leather do, however, set joint requirements for all fibres regarding the relevant processes and properties in the production of the finished textile, plus quality requirements that are relevant for the use stage.

3.5 Microplastics and other microfibres

Textiles from synthetic fibres such as polyester are a source of microplastics that can be harmful to health and the environment.[18] The Nordic Swan Ecolabel takes the concerns about microplastics seriously and wishes to limit the release of microplastics from textiles. Here it is important to wash textiles less often. Currently, standardised methods for examining microplastics from textiles are lacking. In addition, there is a lack of knowledge about which characteristics of textile production are important for the release of microplastics. Therefore, it is still difficult to set absolute requirements for the textile production itself.

Lack of knowledge
A major challenge that many researchers point out, is the lack of standardised methods for examining microplastics from textiles.[19,20] In addition, few studies have been conducted. Therefore, it becomes difficult to compare and generalize the results and thus decide what should be done. Both the fibre type, yarn properties, textile structure, brushing and cutting techniques can have a bearing on how much microplastics is released from the fabrics. At present, there is not enough knowledge for the Nordic Swan Ecolabel to set good requirements for the production regarding this. Microfibres, including microplastics, can also be collected during the production process, for example after washing or by removing loose microfibres from dry fabrics.[21]**Fejl! Bogmærke er ikke defineret.**,[22] Currently, there is a lack of knowledge about methods for this.

[18] Henry B, Laitala K, Klepp IG (2018) Microplastic pollution from textiles: A literature review. Project report No. 1-2018. Oslo and Akershus University College of Applied Sciences.
[19] Henry B, Laitala K, Klepp IG (2019) Microfibres from apparel and home textiles: Prospects for including microplastics in environmental sustainability assessment. Science of the Total Environment 652:483–94.
[20] Roos S, Arturin OL, Hanning AC (2017) Microplastics shedding from polyester fabrics. Mistra Future Fashion Report number 2017:1. Swerea.
[21] Henry B, Laitala K, Klepp IG (2019) Microfibres from apparel and home textiles: Prospects for including microplastics in environmental sustainability assessment. Science of the Total Environment 652:483–94.
[22] http://oceancleanwash.org/solutions/ (06.11.2019).

Some microplastics from production as well as from washing machines are, however, retained in wastewater treatment plants.[23,24,25]

Ecolabelling of both natural and synthetic fibres
Synthetic fibres constitute a large share of the market for textiles and have applications that natural fibres cannot fully cover. Completely excluding synthetic fibres from ecolabelled textiles will make the Nordic Swan Ecolabel not relevant to a large part of the market. The Nordic Swan Ecolabel believes that it will have greater environmental impact to set requirements that can contribute to reducing the environmental burden from both synthetic and natural fibres. Here, the overall requirements for chemicals, resource use, biodiversity and climate impact are important. When it comes to synthetic fibres, the Nordic Swan Ecolabel requires that recycled or bio-based fibres be used so that less new plastics from fossil sources are produced.

Fleece
Polyester is the most common synthetic fibre, and polyester fleece was early mentioned as a source of microplastics. However, all synthetic textiles shed microplastics. Very little research has been published on whether fleece is worse than other polyester fabrics, and the results are contradictory.[26,27] Currently, a lot of research is being done on how the production of fleece and other polyester fabrics can be improved.

Cotton, viscose and wool
Textiles made from cellulose fibres, such as cotton and viscose, also shed microfibres, and such microfibres have also been found in aquatic environments.[28,29,30] However, there is greater concern about plastic fibres because they more easily attract environmental toxins, which are then transported with the fibres.[31]

[23] Sun J, Dai X, Wang Q, van Loosdrecht MCM, Ni BJ (2019) Microplastics in wastewater treatment plants: Detection, occurrence and removal. Water Research 152:21–37.
[24] Cesa FS, Turra A, Baruque-Ramos J (2017) Synthetic fibers as microplastics in the marine environment: A review from textile perspective with a focus on domestic washings. Science of the Total Environment 598:1116–1129.
[25] Xu X, Hou Q, Xue Y, Jian Y, Wang LP (2018) Pollution characteristics and fate of microfibers in the wastewater from textile dyeing wastewater treatment plant. Water Science and Technology 78(10):2046–2054.
[26] Jönsson C, Arturin OL, Hanning AC, Landin R, Holmström E, Roos S (2018) Microplastics Shedding from Textiles – Developing Analytical Method for Measurement of Shed Material Representing Release during Domestic Washing. Sustainability 10(7):2457.
[27] Almroth BMC, Åström L, Roslund S, Petersson H, Johansson M, Persson NK (2018) Quantifying shedding of synthetic fibers from textiles; a source of microplastics released into the environment. Environmental Science and Pollution Research International 25(2):1191–9.
[28] Woodall LC, Sanchez-Vidal A, Canals M, Paterson GLJ, Coppock R, Sleight V, Calafat A, Rogers AD, Narayanaswamy BE, Thompson RC (2014) The Deep Sea Is a Major Sink for Microplastic Debris. Royal Society Open Science 1(140317).
[29] Stanton T, Johnson M, Nathanail P, MacNaughtan W, Gomes RL (2019) Freshwater and airborne textile fibre populations are dominated by 'natural', not microplastic, fibres. Science of the Total Environment 666:377–389.
[30] Savoca S, Capillo G, Mancuso M, Faggio C, Panarello G, Crupi R, Bonsignore M, D'Urso L, Compagnini G, Neri F, Fazio E, Romeo T, Bottari T, Spanò N (2019) Detection of Artificial Cellulose Microfibers in Boops Boops from the Northern Coasts of Sicily (Central Mediterranean). Science of the Total Environment 691:455–65.
[31] Jönsson C, Arturin OL, Hanning AC, Landin R, Holmström E, Roos S (2018) Microplastics Shedding from Textiles – Developing Analytical Method for Measurement of Shed Material Representing Release during Domestic Washing. Sustainability 10(7):2457.

In addition, cellulosic fibres degrade. Wool is a protein fibre that also degrades, but little has been investigated as to whether microfibres from woollen fabrics are present in the environment. Even natural fibres are today treated with wax or various types of plastics to make the fabrics softer or shrink less when washed. How this affects how the fibres degrade or shed microplastics is little known.[32] Therefore, The Nordic Swan Ecolabel requires that any coating on the wool must be degradable, see requirement O29.

Laundry requirements
The Nordic Swan Ecolabel also sets requirements for textile services (laundries) to reduce microplastics release. Ecolabelled laundries are rewarded if they have installed filters that collect microplastics. Scientists and industry are constantly working to develop better filters.

Consumer advise
Filters for washing machines for consumers have also been developed, but have not become standard yet.[33] Good advice is not to wash your clothes more often than necessary, use a front-feed washer and wash at a low temperature.[34,35,36] Washing bags that retain microplastics also exist, but research shows that they vary in how much they retain.[37,38]

Research is ongoing
Several major research projects on microplastics are currently underway, with researchers, organisations and the textile industry collaborating.[39] Efforts are being made both to identify the sources of release and how the environment is affected, and to develop better materials and production methods.

The Nordic Swan Ecolabel follows these projects and will continue to gather new knowledge. Next time the criteria for textiles are to be revised, we will consider if there are new methods that will reduce the release of microplastics. Then we will set new requirements for the producers.

[32] Hassan MM, Carr C (2019) A Review of the Sustainable Methods in Imparting Shrink Resistance to Wool Fabrics. Journal of Advanced Research 18:39–60.
[33] Brodin M, Norin H, Hanning AC, Persson C, Okcabol S. (2018) Microplastics from Industrial Laundries - A Study of Laundry Effluents. The Swedish Environmental Protection Agency.
[34] www.oceancleanwash.org/solutions/solutions-for-consumers (4.11.2019)
[35] Vassilenko K, Watkins M, Chastain S, Posacka A, Ross P (2019) Me, My Clothes and the Ocean: The Role of Textiles in Microfibre Pollution. Ocean Wise Conservation Association.
[36] Hartline NL, Bruce NJ, Karba SN, Ruff EO, Sonar SU, Holden PA (2016) Microfiber Masses Recovered from Conventional Machine Washing of New or Aged Garments. Environmental Science & Technology 50(21):11532–38.
[37] McIlwraith HK, Lin J, Erdle LM, Mallos N, Diamond ML, Rochman CM (2019) Capturing Microfibers – Marketed Technologies Reduce Microfiber Emissions from Washing Machines. Marine Pollution Bulletin 139:40–45.
[38] Sillanpä M (2019) Emissions and Mitigation of Synthetic Microfibres from Machine Washings and Tumble Dryings. In SETAC (ed.) (2019) SETAC Europe 29th Annual Meeting Abstract Book One Environment One Health Sustainable Societies.
[39] Examples are projects led by the Swedish research institute Swerea www.swerea.se/en/MinShed, the Norwegian research institute SINTEF www.sintef.no/en/projects/microfibre-evaluating-the-fate-effects-and-mitigat/, the German industry organisation Bundesverband der Deutschen Sportartikel-Industrie e.V. http://textilemission.bsi-sport.de/, and the American apparel producer Patagonia www.patagonia.com/blog/tag/microfibers/

4 Other labelling schemes and steering instruments

The global textile industry uses many different labels with a focus on health, the environment and working conditions. One explanation for the many types of labels may be the complex value chain, which makes it difficult for the manufacturer or Brand Owner to control every step back along the production chain. In this respect, labels that include third-party certification provide greater peace of mind regarding the product and the underlying production and pass credible information further up the value chain. However, with textile production known to be among the most environmentally impactful industries globally, there is strong demand to know that something is being done to reduce that environmental impact.

Some of the labels are type 1 ecolabels, such as the Nordic Swan Ecolabel, the EU Ecolabel and GOTS. These assess the entire life cycle of the product and target requirements at the stages in the life cycle that have relevance and potential. These labels are based on the ISO 14024 standard and set requirements regarding the relevant environmental parameters for textiles. Other labels are raw material labels, such as the organic label, plus there are labelling schemes for social and ethical conditions, such as the FairTrade label. There are also health labels that focus on the chemical content of the finished product, such as the OEKO-TEX standard 100 and the Asthma and Allergy label.

4.1 Important substance lists

The Detox Catwalk, Greenpeace

With its Detox Catwalk campaign in 2010, Greenpeace urged the global textile industry to phase out 11 harmful chemical groups by 2020. Greenpeace places an emphasis on four principles that underpin a company's undertaking to phase out chemicals by 2020: responsibility, the precautionary principle, a credible definition of "zero chemicals" and the public's right to know about the toxic chemicals used – including by suppliers.

Nordic Ecolabelling prohibits the use of all the 11 below listed substance groups in the production of the textile and defines "zero chemicals" as follows. When prohibiting ingoing substances, Nordic Ecolabelling's requirements mean all substances, whatever their concentration in a used chemical or chemical blend, including additives and known products released from ingoing substances. Impurities cannot, however, always be completely avoided. The only permitted impurities are residual products from production, including raw material production, that can be found in a used chemical in concentrations below 100 ppm. Such impurities may be reagents such as monomers, catalysts, by-products or carry-over from previous production lines.

The 11 prioritised chemical substance groups are:

1. Alkylphenols and their ethoxylates (APEOs & APs)
2. Phthalates
3. Brominated and chlorinated flame retardants (BFRs, CFRs)
4. Azo dyes that may release carcinogenic aromatic amines
5. Organotin compounds
6. Per- and polyfluorinated chemicals (PFCs)
7. Chlorobenzenes

8. Chlorinated solvents
9. Chlorophenols
10. Short-chain chlorinated paraffins
11. Heavy metals such as cadmium, lead, mercury and chromium (VI)

ZDHC – Zero Discharge of Hazardous Chemicals programme

The ZDHC Roadmap to Zero Programme is an international partnership between major textile brands and other actors in the textile industry, who are working to phase out harmful chemicals from the industry. The programme has its own Manufacturing Restricted Substances List, ZDHC Manufacturing Restricted Substances List (ZDHC MRSL) V1.1[40], published in 2014, which sets out which chemical substances are banned from intentional use in the production of textiles, leather and trim for textiles, clothing and footwear. The limit values for the substances are stated for two groups.

Group A, which covers raw materials, finished textile products and supplier guidance, has a total ban on all chemicals on the list.

Group B, which relates to chemical suppliers and the "commercial formulation limit", has specific limit values for the individual substances, ranging from 2 ppm to 1000 ppm.

Chemical suppliers can choose to register their chemicals that comply with the ZDHC MRSL in the ZDHC Gateway – Chemical module. Third-party certification may be used to confirm compliance with the requirements, but this is optional[41].

5 Justification of the requirements

This chapter presents proposals for new and revised requirements, as well as explaining the background to the requirements, the requirement levels and any changes since generation 4.

5.1 Product group definition

The criteria cover products made from textiles, hides/skins and leather, or a combination of the above. In this context, textiles, hides/skins and leather means:

- Products for both private and professional use may carry the Nordic Swan Ecolabel.
- Fibres*, yarn, fabric and finished textile products.
- Apparel and accessories, for example trousers, shirts, jackets, workwear, uniforms, underwear, handkerchiefs, scarves, purses, wallets and bags.
- Furnishing fabrics (for both private and professional use), such as towels, bedding, curtains, tablecloths, rugs, pillows, duvets and upholstery textiles, plus textiles for use in the furnishing of cars/trains/aircraft/boats.

[40] ZDHC Manufacturing Restricted Substances List (ZDHC MRSL), https://www.roadmaptozero.com/mrsl_online/ accessed 01.08.2019.
[41] Programme's Manufacturing Restricted Substances List (MRSL) Conformance Guidance https://www.roadmaptozero.com/fileadmin/pdf/Files_2017/MRSL_Conformance_Guidance_052017.pdf accessed 01.08.2019.

- Durable non-woven textiles that are to be used for apparel and accessories or in interior furnishings as described above. Durable non-woven products are those that can be used multiple times and washed.
- Hide and leather products, such as jackets, trousers or bags, and hides/skins and leather as raw materials for clothing or home furnishings (including for cars/trains/aircraft/boats), from the following species of animal: sheep, goat, cow, horse, pig, elk, deer and reindeer.

** Only the following fibre types can be certified with the Nordic Swan Ecolabel as a certified fibre and only if the relevant requirements of the criteria are met: Organic cotton fibres, wool and other creatine fibres (either sheep, camel, alpaca or goat), regenerated cellulose, flax (linen), silk, bamboo, sisal and other bast fibres*

The following products and materials cannot be ecolabelled in accordance with the criteria for textiles, hides/skins and leather:

- Mineral fibre, glass fibre, metal fibre, carbon fibre and other inorganic fibres.
- Products or materials that are treated with flame retardants. This also applies to flame retardants that are integrated in the product or material.
- Wall coverings, such as textile wallpapers.
- Disposable products. 'Disposable products' refers to products that cannot be washed/cleaned or reused.
- Products containing electronic components.
- Products containing perfume or other fragrances.

Products that can be ecolabelled in accordance with other Nordic Swan Ecolabelling criteria are not covered by the textile criteria.
Examples include:

- Disposable products made from non-woven material that cannot be washed or reused, for example paper towels (criteria for tissue paper).
- Microfibre cleaning cloths (criteria for supplies for microfibre based cleaning).
- Disposable products such as cotton pads for personal care (criteria for sanitary products).
- Wet wipes (criteria for cosmetic products).
- Baby products with textiles such as strollers and nursing pillows (criteria for baby products with textiles).
- Floor coverings, such as wall-to-wall carpets (criteria for floor coverings).
- Textile products that form part of a piece of furniture, e.g. sofa cushions, mattresses and floor cushions (beanbags) (criteria for furniture and fitments). Pillows that are part of a combined furniture licence, for example with beds or mattresses, and have the same type of filling, can be ecolabelled according to the criteria for furniture and fitments.
- Microfibre cloths (criteria for supplies for microfibre based cleaning).
- Textile banners and roll-ups with print on them (criteria for printing companies, printed matter, envelopes and other converted paper products).
- Toys/soft toys (criteria for toys).
- Shoes (covered by the EU Ecolabel's criteria for shoes).

5.2 Definitions

Terms	Definition
Brand owner licence	A mandatory license for companies that sells Nordic Swan Ecolabelled products under its own brand or in other ways want to bring Nordic Swan Ecolabelled products on the market. The product may be e.g. fibers, yarns, fabric or finished goods. A Brand owner license will always draw on one or more production licenses
Ingoing substances	All substances, whatever their concentration, in a used chemical (e.g. pigment or bleaching agent) or blend of chemicals (e.g. adhesive, surface treatment), including additives (e.g. preservatives and stabilisers). Known products released from ingoing substances (e.g. formaldehyde, arylamine and in-situ generated preservatives) are also considered to be constituent.
Impurities	Residual substances from production, including raw material production, that are present in a used chemical or blend of chemicals in concentrations of ≤ 100.0 ppm (≤ 0.01000 wt%, ≤ 100.0 mg/kg). Examples of impurities are residues of the following: reagents including monomers, catalysts, by-products, "scavengers" (i.e. chemicals used to eliminate/minimise undesirable substances), cleaning agents for production equipment, and carry-over from other/earlier production lines.
Laminate	A laminated fabric is a two (or more) layer construction with a polymer film bonded to a fabric. Laminated fabrics are used in rainwear, automotive, and other applications
Production licence	The license where all the environmental requirements are documented. A production license does not give the right to bring physical products with the Nordic Swan Ecolabel on the market. A production license typically be at the end manufacturer that delivers to the brand owner - and will be linked to documentation of a variety of processes and physical flows. A brand owner who also produces the textile, will always have both a brand owner and a production license, while a brand owner, who uses a third party for the production, will be able to choose either to use the manufacturers production license or to own the production license themselves.
Textile	Material made from weaving, knitting, crocheting, thread lacing, or made from felted fibres.
Textile element	"Textile element" is the designation of a unique textile element on the final product. "Textile element" describes the finished textile. Various textile elements have different supply chains or are produced differently, but may be of the same fibre type.

	Textiles which are only distinguished by dyeing or printing by the same supplier are considered to be the same textile element. For example, polyester from supplier 1 is one textile element, and polyester from supplier 2 will thus be another textile element. Two different types of polyester from the same supplier will also be separate textile elements.
Fibre type	Types of textile fibre such as cotton, wool, polyester and viscose.
Recycled material	Recycled material is defined in the requirement according to ISO 14021, which applies the following two categories: **"Pre-consumer/commercial"** is defined as material that is recovered from the waste stream during a manufacturing process. Materials that are reworked or reground, or waste that has been produced in a process, and can be recycled within the same manufacturing process that generated it, are not considered to be pre-consumer recovered material. Nordic Ecolabelling considers reworked, reground or scrap material that cannot be recycled directly in the same process, but requires reprocessing (e.g. in the form of sorting, remelting and granulating) before it can be recycled, to be pre-consumer/commercial material. This is irrespective of whether the processing is done in-house or externally. **"Post-consumer/commercial"** is defined as material generated by households or commercial, industrial or institutional facilities in their role as end-users of a product that can no longer be used for its intended purpose. This includes materials from the distribution chain.
Recycled fibres	This covers both mechanical and chemical recycling of fibres and materials.

5.3 Brand Owner licence

A Brand Owner that, sells Nordic Swan Ecolabelled products under its own brand, or in other ways places a Nordic Swan Ecolabelled product on the market, shall meet the following requirement in order to obtain their own Brand Owner licence.

O1 Traceability of the Nordic Swan Ecolabelled product

The Brand Owner is responsible for ensuring that a Nordic Swan Ecolabelled product can be traced back to a production licence (see section 5.2 Definitions).

The Brand Owner must provide the following information about the Nordic Swan Ecolabelled products:

- Whether the products are sold to consumers (B2C) and/or to professionals (B2B).
- Which textile production licence are being used for each Nordic Swan Ecolabelled products.

- The Brand Owner's trade names as it appears on the products.

The trade name must be identical to the trade names present on the Nordic Swan Ecolabelled products that are sold for retail or B2B. A Nordic Swan Ecolabelled product must not have the same trade name as a ***non-****Nordic Swan Ecolabelled product from the Brand Owner.*

✉ The Brand Owner must submit the information specified in the requirement.
✉ Submit a description of the procedure of the brand owner, which shows how it is ensure that the information held by Nordic Ecolabelling is kept updated for the entire period of the licence.

Background to the requirement

This new requirement has been added to establish a licence structure that ensures contact between Nordic Ecolabelling and the Brand Owner regarding the Nordic Swan Ecolabelled product. Nordic Ecolabelling will now have the correct information about trade names, which can then be used to inform consumers and professional purchasers about the availability of Nordic Swan Ecolabelled textile products.

O2 Unsold textiles

Unsold textiles and defect textile from productions must not be sent for incineration or dumped in landfill.

The brand owner must inform Nordic Ecolabelling and state on their website how they deal with unsold textiles.

✉ Description of how unsold textiles are dealt with.
✉ Link to page on brand owner's website that has information on how unsold textiles are dealt with.

Background to the requirement

The requirement has been set to ensure that unsold textiles and defect textile from productions are used in the redesign of new textiles, sent for recycling or donated to a charity. The aim of this is to achieve as great an environmental benefit as possible, despite the textiles not being sold for their intended purpose. The requirement also seeks to increase the focus on producing the "right" quantities and so avoiding overproduction.

O3 Information on reduced washing

For washable garments (except underwear, socks and stockings) the following text must be stated to the consumer: "Reduce number of washes - and help save energy and reduce climate impact".

Equivalent wording shall be approved by Nordic Ecolabelling.

✉ Submit photo of hang tag or care label on a product as well as routine for how this is done.

Background to the requirement

The use stage itself has a significant impact on energy consumption and thus climate change when it comes to clothing that is washed.

In particular, the washing temperature, the washing frequency and the use of the dryer are of great importance. As a consumer, it is possible to reduce the climate impact by washing only when necessary and washing at lower temperatures[42].

O4 Primary textile packaging

If the brand owner is responsible for the primary textile packaging* the following requirements shall be documented by the brand owner: O84, O85, O86 and O87.

** Primary packaging is defined here as packaging from the manufacturer that accompanies the product all the way to the consumer. Delivery packaging used by online retailers is not considered to be primary packaging.*

✉ Declaration from the brand owner describing who is responsible for the primary packaging of the product.

Background to the requirement

See background to requirement: O84, O85, O86 and O87.

5.4 Production licence

All the following requirements are included in the production licence.

5.4.1 Description of product and production methods

This section contains the general requirements for the products and is where the Nordic Swan Ecolabelled products and their production methods are to be described. Requirement limits concerning sewing thread, care labels, elastic and small textile elements are also outlined here.

O5 Product description

Describe the products included in the production licence by providing the following information:

- Describe whether the product type on the license is: fibre, yarn, fabric or finished textile product. For finished textile products specify the type (e.g. clothing for babies, children and adults, underwear, sportswear, swimwear, rainwear, home furnishings or professional textiles such as workwear, bed linen etc.).
- State the manufacturer's trade name on the products.

✉ Information requested in the requirement.

Background to the requirement

The requirement has been set to ensure that Nordic Ecolabelling has the correct information about the product, which can then be used to inform Brand Owners, consumers and professional purchasers about the availability of Nordic Swan Ecolabelled textile products.

O6 Material composition

The applicant must provide the information below for each product with a unique trade name.

[42] The life cycle of a pair of jeans, understanding the environmental impact of a pair of Levi's 501 jeans, Levi Strauss &Co, http://levistrauss.com/wp-content/uploads/2015/03/Full-LCA-Results-Deck-FINAL.pdf

An overview of all the materials present in the product (Bill of Materials), stating:

- All fabrics, specifying their designation/name and fibre composition as a percentage by weight (wt%).
- The materials in any membranes/coatings.
- Any details/accessories (e.g. zippers, buttons, Velcro strips, etc.), with a statement of the material type and weight.
- Any fillings and stuffing materials expressed as a percentage by weight.
- Information must be provided on whether textile fibres and plastic materials are recycled and/or biobased.
- If the fabric is recycled, this must be stated.

✉ Schematic overview containing the above information for all products covered by the production licence. The overview must clearly state which materials are present in the individual product.

Background to the requirement

It is important that this information is entered correctly, as it determines which requirements are relevant for the licence in question.

O7 Production chain

The following information about the production chain must be stated, in overview form, for each product*:

- Description of **all** the production methods/treatment techniques for the whole production of the product, including production by suppliers, as far back as the raw material suppliers**, preferably presented in a flow chart.
- Designation/name of the fibres, yarns and fabrics, which matches the designation/name stated in requirement O6. It must be clear which actors produce and process the various materials.
- Information on all the actors in the production chain, including suppliers and agents, is to be provided: company name, production location, contact person and the production processes used.

** Products with an identical production chain can be grouped together. It must however be made clear which trade names are gathered into groups.*

*** Raw material supplier means, for example, a supplier of textile fibres or a supplier of feathers for filling material.*

✉ Schematic overview (e.g. flow chart) presenting the above points.

Background to the requirement

The requirement has been set to ensure that the correct suppliers and processes are associated with the production licence. If any changes occur in the production chain, these changes must be reported to Nordic Ecolabelling.

5.5 Material limitations

O8 Material limits

The criteria contain the following material limitations and triviality limits:

- Sewing thread and embroidery thread are not covered by the requirements.

- Coatings, membranes and laminates must not totally exceed 20% by weight of the finished product. All the coatings, membranes and laminates used are covered by requirements in section 5.8.
- Zippers, buttons, reflectors, elastic bands, velcro and other details (plastic or metal) must not totally exceed 10% by weight of the finished product. For metal in belt buckles, up to 25% by weight of the belt can be allowed. Requirements concerning zippers, buttons, reflectors, elastic bands, velcro and other details are stated in requirement O12. Underwear and sportswear are not subject to a maximum limit for elastic bands and elastane as a fibre, see requirement O10.
- Fibre types, hides/skins and leather that are subject to requirements in the criteria and that jointly amount to no more than 5% by weight of the product are exempt from the fibre requirements in section 5.7 and the requirements concerning hides/skins and leather.

✉ Description showing compliance with the material limits in the requirement. The material overview from requirement O6 may be used as documentation.

Background to the requirement

The requirement has been set to control the types of textile products that can be Nordic Swan Ecolabelled with regard to the amount of materials other than textiles that are included. The aim of this is to ensure that the product fits in with the criteria and that the requirements are therefore relevant.

Materials other than textiles, skins and leather, which are included as details within the product, may be included to a maximum of 10% by weight. Separate limit values for belt buckles have been added, since metal buckles generally constitute a greater weight proportion than 10% by weight on a belt.

O9 Smaller textile elements

Smaller textile elements (e.g. pocket linings) that are individually present to a maximum of 5% by weight and in total to a maximum of 10% by weight in the finished product may be exempted from the requirements concerning fibre and textile production, if one of the following conditions is met:

- the textile element has an EU-Ecolabel certificate or
- the textile element has a GOTS transaction certificate or
- the textile element has an Oeko-Tex 100 class I certificate or can be documented as meeting the requirement level for Oeko-Tex 100 class I in test reports. In addition, fluorinated substances (fluorinated organic compounds) must not be used.

Alternatively, the requirements concerning fibre and textile production are to be fulfilled and documented.

✉ Certificate relating to the requirements for the textile elements that invoke this exemption.

✉ For Oeko-Tex 100 certified textiles: an additional statement regarding fluorinated organic compounds.

Background to the requirement

The requirement makes it possible for small textile elements that have either an EU-Ecolabel, a GOTS certificate or Oeko-Tex 100 class I certification (and have been declared free from fluorinated substances) to be exempt from documenting the requirements for fibre and textile production. Textile products may comprise many different fabrics with totally different production chains.

The requirements for the fabrics used are comprehensive in these criteria, going all the way back to the raw material supplier, and require documentation of all the chemicals used in every stage of the textile production. The choice has therefore been made to permit the use of the other stated certifications for smaller textile elements in order to make the application process easier.

The previous generation of the criteria included an exemption where fibre types that are **not** subject to requirements in the document may make up a total of 5% of the product by weight. This has been removed, since the criteria now cover more relevant fibre types, including silk.

O10 Elastane and elastic bands in underwear and sportswear

Elastane and elastic bands that are included in underwear or sportswear up a total maximum of 25% of the product's weight may be exempted from the requirements for fibre and textile production, if one of the following conditions is met:

- the elastic band has a GOTS certificate for accessories or Oeko-Tex 100 class I certification

  and

- the elastane fibre has Oeko-Tex 100 class I certification.

✉ Certificate showing that the requirement is fulfilled.

Background to the requirement

The assessment has been made that underwear and sportswear needs to be able to use a higher proportion by weight of elastane fibres and elastic bands as details in the textile product in order to achieve the desired function. Velcro bands are now included as details. These textile products come into close contact with the body and it is therefore important to ensure that they do not contain any of the most undesirable substances that are harmful to health. A chemical test of the elastic band is therefore required. Applicants are referred to recognised chemical tests of textile details/accessories.

O11 Info labels

Information printed directly on the textile product itself must meet requirements concerning printing chemicals and dyes in section 5.8.

There are no requirements relating to fabric info labels sewn into textiles (care label, brand name label and size label).

✉ State which labels are used on the product.

Background to the requirement

The requirements for the fabrics used are comprehensive in these criteria, going all the way back to the raw material supplier, and require documentation of all the chemicals used in every stage of the textile production. The decision has therefore been taken to set a triviality limit for info labels, which are such a tiny part of the finished textile product, in order to make the application process easier.

O12 Zippers, buttons, velcro, reflectors and other details

Details/accessories* with no practical function such as sequins, rivets, glitter and so on are not permitted.

Rivets may, however, be used on denim to attach pockets, as they have a reinforcing function in this situation, if the material meets the requirements below.

Metal or plastic details/accessories that have a function may be used (e.g. buttons, press studs, zippers, buckles and reflectors), if the material meets the requirements below.

Metal details

The following limit values apply for metal details:

- Lead (Pb) <90 mg/kg (Digested sample, Detection GC-ICP-MS)
- Cadmium (Cd): <40 mg/kg (Digested sample, Detection GC-ICP-MS)
- Nickel (Ni): Migration limit <0.5 micrograms/cm2/week (Test methods EN 12472 and EN 1811 or EN 16128:2001).

Plast- and rubber details:

Plastic and polymer elements such as tape for seams must not be made from PVC or PVDC or contain phthalates.

* All parts of the product that are not fabric, sewing thread, stuffing or skin and leather are details.

✉ Metal: Test report for the metal material in question (e.g. buttons) showing fulfilment of the metal requirement. Alternatively, a GOTS or Oeko-Tex 100 class I certificate may be used as documentation for metal details.

✉ Plastic: Declaration from the manufacturer of the plastic material (e.g. button manufacturer) that the plastic meets the requirement.

Background to the requirement

Details without any function such as sequins and rivets only for decoration are not allowed as they will interfere with future recycling of the fabric. The requirement for metals has been set to ensure that people are not exposed to the effects of heavy metals and phthalates that are harmful to health. The lead requirement has been changed to harmonise with the equivalent requirements of Oeko-Tex 100 class I, GOTS and the EU Ecolabel. It is thus now possible to use a certificate from GOTS or Oeko-Tex 100 class I for metal details. The EU Ecolabel cannot be used as documentation for the cadmium requirement, since the EU Ecolabel accepts 50 mg/kg. The limit values for cadmium and nickel are the same as in generation 4 of the criteria. The plastic requirement also remains unchanged since generation 4.

By details is meant, for example, buttons, pushbuttons, zippers, sequins, rivets. In case of doubt contact Nordic Ecolabelling.

5.6 Re-design of recycled textiles, hides/skins and leather

Nordic Ecolabelling wishes to promote the recycling of textiles, hides/skins and leather. However, to prevent the spread of substances that are harmful to health and the environment, the recycled textile, hide/skin and leather elements used must meet the requirements below. Other newly produced elements of the product and details such as buttons and zippers must meet the relevant requirements in the criteria.

If the recycled material or the finished product is subject to additional processing with chemical products (e.g. dyes, printing, finishing, etc.), the requirements in sections 5.8.1 and 5.8.2 regarding the relevant chemicals must be fulfilled and documented. Recycled textiles, hides/skins or leather that are not further processed using chemicals do not need to meet the requirements concerning chemicals used in textile, hide/skin and leather production.

The requirements regarding recycled fibres are described in the section on fibre production, since this section only addresses textile recycling.

O13 Recycled textiles, hides/skins, leather

Recycled textile, hide/skin and leather materials* may be used for the whole or part of the product. Due to the risk of contamination with harmful substances from the original use of the textile, recycled material from professional workwear for industry or materials previously used for cleaning may not be used.

Recycled materials must not contain plastisol print (e.g. PVC), for example in print, coatings or details.

The material must either

- originally be ecolabelled with the Nordic Swan Ecolabel, the EU-Ecolabel, GOTS or Bra Miljöval, or have Oeko-Tex 100 certification.

  or

- only used for
  - furnishing fabrics such as rugs, tablecloths, blankets (not bed linen) and curtains
  - adult clothing for consumers, but not underwear
  - bags, purses, wallets and other adult accessories.

** Recycled textiles, hides/skins, leather and filler materials are defined here as post-consumer materials or pre-consumer, where it can be documented that the material is a residual material or waste from another business. Fabrics (not fabricated) are only counted as recycled textiles, if it can be documented that more than five years have elapsed since the fabric was originally produced. For a further definition, see ISO 14021.*

✉ **Originally labelled:** Documentation that the textile, hide/skin or leather was originally labelled with the ecolabels stated in the requirement or labelled with Oeko-Tex 100. This may be an original invoice or a label on the textile.

✉ **No labelling:** Documentation showing that the textile, hide/skin or leather being used is recycled. Also, description of the type of product in which the recycled textile, hide/skin leather will be used.

✉ Declaration that recycled material from professional workwear for industry has not been used, and that the material does not contain PVC, for example in print, coatings or details.

Background to the requirement

The aim of the requirement is to promote the recycling of used textile, hide/skin and leather products. There is also an environmental gain associated with the use of textile, hide-skin and leather residues/waste which cannot otherwise be used in the production system that generated it. Increased material recycling is important in stimulating a circular economy for textiles.

This maintains the value of the material at a high level, as it saves on resources, energy and chemical load by not having to produce new textiles[43].

There is generally no traceability for recycled textiles, hides/skins and leather with regard to the chemicals used in the original production, and so the recycled material may contain harmful chemicals. The Swedish Chemicals Agency has identified 2,400 substances that are used in textile production. Of these, 10% are considered to pose a potential health risk for humans by being carcinogenic, allergenic, endocrine disruptors and so on [44]. Even post-consumer textiles that have been washed several times have been found to contain harmful chemicals [45]. The requirement concerning textiles not previously ecolabelled or Oeko-Tex certified therefore contains a limitation on the product types for which recycled material may be used. These limitations have been set, based on how the product is normally used and thus how the user is exposed to any harmful chemicals.

5.7 Fibre production

Nordic Ecolabelling sets requirements concerning the production of both natural fibres and synthetic fibres. Natural and synthetic fibres all impact on the environment in one way or another. Synthetic fibres, for example, uses fossil resources, while conventional cultivation of cotton involves high consumption of water and pesticides. The criteria cover the most common fibre types in the textile industry, with the intention of promoting the variants of each individual fibre type with the best environmental profile. Nordic Ecolabelling also wishes to encourage the textile industry to work towards more sustainable textile production along the whole value chain. The approach here is therefore to focus on the fibre types that are most widely used and thus make a major contribution to the textile industry's environmental impact – in order to nudge them in a less environmentally harmful direction – and to promote new, less environmentally harmful, fibres. This makes it possible to steer even more textile production in a sustainable direction.

The fibres are usually spun. However, if the if fabric is non-woven, for example as a substrate (e.g. for laminates, coatings and membranes), the fibre raw materials must also meet the requirements associated with the relevant fibre in this section.

Fibers must comply with relevant requirements for the type of fiber in the criteria, regardless of whether they apply for Nordic Ecolabelling of fiber, yarn, fabric or finished textile product. The following fiber types can be Nordic Ecolabelled at fiber level: Organic cotton fibers, wool and other creatine fibers (either sheep, camel, alpaca or goat), regenerated cellulose, flax (flax), silk, bamboo, sisal and other bast fibers.

[43] Ellen MacArthur Foundation, A new textiles economy: Redesigning fashion's future, (2017, http://www.ellenmacarthurfoundation.org/publications).
[44] Swedish Chemicals Agency (2014). Chemicals in Textiles – risks to human health and the environment. Report from a government assignment. Report 6/14.
[45] Nordic Council of Ministers (2016). Gaining benefits from discarded textiles: LCA of different treatment pathways.

Natural fibre

Vegetable fibres are subject to specific requirements concerning the cultivation of cotton and other cellulose seed fibres, as well as flax and other bast fibres. For animal fibres such as wool and other keratin fibres, requirements are set for the level of residues of pesticides against parasites in wool, as well as COD discharges in wastewater.

Synthetic fibre

Synthetic fibres are subject to the requirement that either they must be bio-based or recycled materials are used in production. For bio-based fibres, there are also requirements stipulating the types of raw materials that may be used and that they must not be cultivated using genetically modified raw materials. Recycled fibres are required to have been tested for content of harmful chemicals. For regenerated cellulose fibre, requirements are set regarding the production processes. Here, the fibre production must involve no discharge to wastewater, and sourcing of a high share of fibres from sustainable forestry or as recycled.

Fibre from recycled material

Fibre from recycled material/fibres* is exempted from the requirement for virgin fibre but, instead of meeting the requirements for the type of fibre concerned, the applicant must document that the material or fibre is purchased as recycled, and document requirement O28 on testing for content of undesirable substances. There are no requirements concerning chemicals used in the actual recycling processes. However, as with other chemicals added, for example during dyeing or spinning, there are requirements concerning the chemicals used in the treatment of the fibres in requirement O29 and the requirements for chemicals used in all the processes in the textile production, as set out in section 5.8.

* See definition of recycled material and fibre in section 5.2 Definitions.

Fibre not covered by the criteria

Textile fibres that are not subject to any fibre requirements in these criteria may account for no more than 5% by weight of the individual fabric.

5.7.1 Cotton and other natural seed fibres of cellulose

O14 Cotton fibres

Cotton and other natural seed fibres of cellulose (including kapok) must be organically cultivated* or recycled**.

The following product types for professional use can be exempted from the requirement of 100% organic cotton:

- Clothing (uniforms and workwear) and
- Bed linen, towels, bathrobes, tablecloths, tea towels, cloths and napkins for e.g. hotels, hospitals and other institutions.

If using the exception, the cotton fibres shall not come from GMO (genetically modified organisms)*** and shall be cultivated with IPM (Integrated Pest Management) according to one of the following standards:

- BCI (Better Cotton Initiative)
- CmiA (Cotton made in Africa)
- FairTrade for cotton

The proportions of the different types of certified cotton must add up to 100% and all documentation shall reference the Control Body or certifier of the different forms of cotton.

Documentation that BCI cotton does not contain material from GMO shall be documented in accordance with test method IWA 32:2019 or equivalent for each batch of BCI cotton that is purchased.

Cotton certified via CmiA and FairTrade does not need to be tested, as long as these schemes exclude the use of genetically modified cotton.

Cotton fibre, cotton yarn and cotton fabrics cannot be Nordic Swan Ecolabelled if using the exception. Other relevant products beyond those stated above may be included on request, following assessment by Nordic Ecolabelling.

** **Organic cotton** means cotton fibre that is certified as organic or transitioning to organic according to a standard approved in the IFOAM Family of Standards, such as Regulation (EU) 2018/848, USDA National Organic Program (NOP), APEDA's National Programme for Organic Production (NPOP), China Organic Standard GB/T19630. Also approved are GOTS and DEMETER and certification as "transitioning to organic cultivation". The certification body must have the accreditation required for the standard, such as ISO 17065, NOP or IFOAM.*

*** **Recycled fibres or materials**: Pre-consumer or post-consumer recycled raw materials, see the definition in the ISO 14021 standard. Both mechanically and chemically recycled fibres are included. See the definitions in section 5.2 for more details.*

**** Genetically modified organisms are defined in EU Directive 2001/18*

✉ **Organic cotton:** Valid certificate showing that the cotton in the Nordic Swan Ecolabelled product was organically cultivated in line with the standards in the requirement. If the supplier is the holder of GOTS certification, the requirement must be documented with a transaction certificate showing that the goods supplied are GOT certified. For BCI, there must be documentation that the purchased cotton can be traced back to BCI farmers.

✉ **Recycled fibres:** Fulfilment of the requirement is documented for recycled fibre with either a and/or b below:

a) Certificate showing that the raw material is 100% recycled (post and / or pre-consumer) with Global Recycled Standard certificate 4.0 (or later versions), or other equivalent certification approved by Nordic Ecolabelling.

b) Present documentation demonstrating that the recycled fibre was purchased as 100% recycled (post and / or pre-consumer) and state the supplier.

✉ **Cotton fibres covered by the exception:** Documentation showing that the cotton is grown within one of the three IPM standards BCI, CmiA or FairTrade Cotton. All documentation shall reference the Control Body or certifier of the different forms of cotton. and be documented

- on an annual basis for purchased cotton with transaction records and / or invoices
- or, on a final product basis (by weight) measured at spinning and / or fabrication.

✉ Test report showing that the BCI cotton does not contain material from commonly known varieties of genetically modified cotton and procedure demonstrating that all purchased batches are tested.

Background to the requirement

The growing and harvesting of cotton is associated with serious environmental and health problems. This is due largely to the use of chemicals such as pesticides and fertilisers in the cultivation, but other factors such as water use (irrigation or rainwater), monoculture and land use contribute to the overall environmental impact[46]. There are several ways to reduce the environmental and health impact of cotton production.

Use of protective equipment and training of farmers in pesticide use, plus better control over which pesticides are used, are important measures in the cultivation of IPM (Integrated Pest Management) cotton. In such cultivation systems there are additional requirement to reduce the use of artificial fertilisers and energy.

The environmental impact can also be reduced through organic cultivation, which does not use synthetic pesticides and fertilisers, and also does not permit genetically modified cotton. One of the environmental problems that organic production does not resolve is the issue of irrigation. Much of today's organic cultivation takes place in areas where rainwater is the main water source, something that reduces the problems associated with water consumption.[47] Although organic production does not necessarily deliver reduced water consumption, the quality of run-off water is significantly better for both people and the natural environment. It is difficult to say whether there is any difference in yield when comparing conventional and organic cotton production. One of the reasons for this is that there are already major yield variances within the individual systems. Various studies suggest that IPM has the highest yield of the three production methods, and that around 20% of global cotton production is IPM[48].

In this revision, Nordic Ecolabelling has chosen to require organic cotton for most of the products that carry the Nordic Swan Ecolabel. This is in line with Nordic Ecolabelling's view of organic farming as a means of sustainably protecting soil, water resources and biodiversity. Although organic cotton production is low on a global basis, there is a strong interest in organic products in the Nordic market. This requirement sees us return to the requirement in version 3 of the criteria for Nordic Swan Ecolabelled textiles, and increase the level from version 4, which requires 10% organic cotton with the addition that the remaining 90% should document a low pesticide content. Although this is a major tightening of the requirement, experience tells us that many of the licences for generation 4 already used 100% organic cotton.

Exemptions from the requirement for 100% organic cotton

However, the cost of organic cotton can be a barrier in relation to competitiveness, particularly for professional textiles.

[46] Revision of the European Ecolabel and Green Public Procurement (GPP) Criteria for Textile Products – Technical report and criteria proposal, Working document, European Commission, Joint Research Centre Institute for Prospective Technological Studies (IPTS) 2013.
[47] "The sustainability of cotton – consequences for man and the environment", Kooistra K., Termorshuizen A and Pyburn R., Wageningen University & Research, report no. 223, April 2006.
[48] Revision of the European Ecolabel and Green Public Procurement (GPP) Criteria for Textile Products – Technical report and criteria proposal, Working document, European Commission, Joint Research Centre Institute for Prospective Technological Studies (IPTS) 2013.

An exception has therefore been made for these to ensure that these are still relevant for e.g. public procurement. Since professional textiles are not a clearly defined product group, this review narrows it down to clothing (uniforms and workwear) and textiles such as towels, bathrobes, bed linen, duvets, pillows, curtains and rugs for hotels, hospitals and other institutions. Products not listed may be judged to be professional textiles by Nordic Ecolabelling or through a Nordic assessment.

Textiles where exemptions from the requirement for 100% organic cotton can be used shall meet the requirement for IPM cotton that follows the standards of FairTrade, CmiA (Cotton made in Africa) or BCI (Better Cotton Initiative). A certificate from one of the standards is required as documentation. Genetically modified cotton is also prohibited. This must be documented for BCI cotton that permits its use. A genetic test of the cotton for every batch purchased is required as documentation. The test must be performed to standard IWA 32:2019, a relatively new test that can identify the presence of genetically modified cotton in cotton fibres, yarn and textiles.

Recycled cotton fibre

It is also possible to Nordic Swan Ecolabel textiles that contain recycled cotton fibre. This is cotton fibre that is recovered from used clothing and textiles from consumers or industrial waste (post- or pre-consumer textile waste). Industrial textile waste may be surplus material from the production of yarns, textiles and textile products, for example selvedge from weaving and fabric remnants from factory cutting rooms. The textiles are stripped and pulled into fibres, which are then carded and spun into new yarn. Recycled cotton may also be blended with virgin fibres to improve yarn strength.[49]

GMO

GMO is a highly debated topic, and several countries have banned cultivation of GMOs. Topics discussed are food security, land use, lack of scientific knowledge about effects under local agricultural/forest conditions and risk of adverse effects on health and the environment.

Nordic Ecolabelling emphasises the precautionary principle and bases its position on regulations that have a holistic approach to GMOs. This means that sustainability, ethics and benefit to society must be emphasised together with health and the environment. We are not in principle against genetic engineering and GMOs per se but are concerned about the consequences when genetically modified plants, animals and microorganisms are propagated in nature. Nordic Ecolabelling believes that GMOs should be assessed on a case-by-case basis.

Research has not clearly shown that today's GMOs contribute towards sustainable agriculture with less use of pesticides, and there is a lack of research into long-term consequences of GMOs, both environmental, social and economic consequences. There are potential adverse effects of GMOs along the entire value chain from crop research and development, through cultivation, storage, use and waste management.[50]

[49] Wikipedia - Cotton recycling, https://en.wikipedia.org/wiki/Cotton_recycling (accessed 26.08.2019).
[50] Catacora-Vargas G (2011): "Genetically Modified Organisms – A Summary of Potential Adverse Effects Relevant to Sustainable Development. Biosafety Report 2011/02, GenØk – Centre for Biosafety.

In several of these stages, there is a lack of scientific studies, and there is a lack of holistic assessment.[51,52,53,54] Today's GMOs are also adapted to industrial agriculture with companies that have obtained a monopoly-like position, and Nordic Ecolabelling wishes to contribute to limiting the negative consequences of this.

Genetically modified cotton is grown primarily in India, the United States, China and Australia. Most common is Bt cotton, which produces a substance that is toxic to certain insects' pests. Despite years of use there is still uncertainty about the long-term ecological consequences.[55,56] In several countries and regions, insects have become resistant to the toxins produced by the cotton plants, but it varies how long it has taken. [57,58] In India, Bt cotton was first used in 2002. Up to 2006, less insecticide was used overall (amount of active ingredient per hectare) because Bt cotton fought the most common insect pest. [59] However, due to spraying against other insect pests, the use of insecticides increased overall again until 2013, and after 2015 resistant insects have also become a problem.[60] In Australia, integrated pest management was used from the 1990s, which probably contributed to delaying resistance. The use of insecticides in Australia has decreased, first in Bt cotton and then in conventional cotton, but the use of herbicides has not been reduced.[61]

5.7.2 Silk, flax (linen) and other bast fibres (hemp, jute and ramie)

O15 Silk

Silk fibre that makes up more than 30% by weight of the fabric must either be certified as "organic" * or be recycled**.

[51] Catacora-Vargas G (2011): Genetically Modified Organisms – A Summary of Potential Adverse Effects Relevant to Sustainable Development. Biosafety Report 2011/02, GenØk – Centre for Biosafety.
[52] Kolseth et al (2015) Influence of genetically modified organisms on agro-ecosystem processes. Agriculture, Ecosystems and Environment. 214 (2015) 96–106.
[53] Fischer et al. (2015) Fischer et al. (2015): Social impacts of GM crops in agriculture: a systematic literature review. Sustainability 7:7.
[54] Catacora-Vargas G et al. (2018): Socio-economic research on genetically modified crops: a study of the literature. Agriculture and Human Values 35:2.
[55] Venter HJ, Bøhn T (2016) Interactions between Bt crops and aquatic ecosystems: A review. Environ Toxicol Chem 35(12):2891–2902.
[56] Kolseth et al (2015) Influence of genetically modified organisms on agro-ecosystem processes. Agriculture, Ecosystems and Environment. 214 (2015) 96–106.
[57] Blanco CA et al. (2016) Current situation of pests targeted by Bt crops in Latin America. Curr Opin Insect Sci 15:131–8.
[58] Tabashnik BE, Brévault T, Carrière Y (2013) Insect resistance to Bt crops: lessons learned from the first billion acres. Nature Biotechnology 31:6.
[59] Pesticide Action Network UK UK (2017) Is cotton conquering its chemical addiction. A review of pesticide use in global cotton production. http://issuu.com/pan-uk/docs/cottons_chemical_addiction_-_final_?e=28041656/54138689
[60] Pesticide Action Network UK UK (2017) Is cotton conquering its chemical addiction. A review of pesticide use in global cotton production. http://issuu.com/pan-uk/docs/cottons_chemical_addiction_-_final_?e=28041656/54138689
[61] Pesticide Action Network UK UK (2017) Is cotton conquering its chemical addiction. A review of pesticide use in global cotton production. http://issuu.com/pan-uk/docs/cottons_chemical_addiction_-_final_?e=28041656/54138689

** **Organic silk: silk** that is certified as organic or transitioning to organic according to a standard approved in the IFOAM Family of Standards, such as Regulation (EU) 2018/848, USDA National Organic Program (NOP), APEDA's National Programme for Organic Production (NPOP), China Organic Standard GB/T19630. Also approved are GOTS and DEMETER and certification as "transitioning to organic cultivation". The certification body must have the accreditation required for the standard, such as ISO 17065, NOP or IFOAM.*

*** **Recycled fibres**: Pre-consumer or post-consumer recycled raw materials, see the definition in the ISO 14021 standard. Both mechanically and chemically recycled fibres are included. See the definitions in section 5.2 for more details.*

✉ Valid certificate showing that the silk in the Nordic Swan Ecolabelled product was organically cultivated in line with the standards in the requirement. If the supplier is the holder of GOTS certification, the requirement must be documented with a transaction certificate showing that the goods supplied are GOT certified.

✉ Fulfilment of the requirement is documented for recycled fibre with either a or b below:

a) Global Recycled Standard certificate showing that the raw material is recycled, or other equivalent certification approved by Nordic Ecolabelling.

b) Present documentation demonstrating that the recycled fibre was purchased as recycled and state the supplier.

Background to the requirement

This requirement is new, since the previous generation of the criteria did not include silk. The use of silk in Nordic Swan Ecolabelled textiles has been assessed to be relevant. Silk is often used in the textile products of brands that mainly use timeless basic designs in their collections – also known as slow fashion[62]. Natural fibres such as silk and wool are generally considered to be an obvious choice for textiles that last. These fibres provide good breathability and are slow to take on odours[63]. There is no specific standard for organic silk, but as with other organic natural fibres, silk fibre can be certified as organic according to an approved standard within the Organic IFOAM Family that is relevant to the production type in question[64]. Organic cultivation means no use of artificial fertilisers or pesticides when growing mulberry trees or other plants for silkworms.

O16 Flax (linen) and other bast fibres

Flax (linen) and other bast fibres (e.g. hemp, jute and ramie) may only be cultivated using pesticides permitted in Regulation (EC) No 1107/2009.

✉ Declaration that only pesticides approved in Regulation (EC) No 1107/2009 have been used.

Background to the requirement

The use of natural fibres in textiles has the advantage that it does not draw directly on fossil resources.

[62] Slow fashion https://en.wikipedia.org/wiki/Slow_fashion
[63] Design for Longevity Guidance on increasing the active life of clothing, 2013, http://www.wrap.org.uk/sites/files/wrap/Design%20for%20Longevity%20Report_0.pdf
[64] Organic IFOAM Family of Standards https://www.ifoam.bio/en/ifoam-family-standards-0

It remains relevant, however, to consider whether these natural fibres are sustainably cultivated with minimum damage to the environment. It is, for example, important to ensure that there has been no use of harmful pesticides that could lead to a loss of biodiversity. Pesticides may only be used for the cultivation of flax (linen) and other bast fibres if those pesticides are permitted in Regulation (EC) No 1107/2009.

O17 Water retting of flax (linen) and other bast fibres

Production of flax (linen) and other bast fibres (e.g. hemp, jute and ramie) using water retting is only allowed if the wastewater from the retting ponds is treated so as to reduce the chemical oxygen demand (COD) or the total organic carbon (TOC) by at least:

- 75% for hemp fibres
- 95% for flax (linen) and other bast fibres

Test method: Test in accordance with ISO 6060.

Measurement of BOD, PCOD or TOC may also be used if a correlation to COD is evident.

✉ Test report from the producer of the flax (linen)/bast fibre, showing that the requirement is fulfilled or

✉ Proof of a valid EU Ecolabel licence in line with the Commission Decision of July 2014.

Background to the requirement

Water retting is prohibited unless the wastewater is cleaned to reduce the content of organic material and so comply with the requirement levels. Either biological or chemical retting is necessary to separate the fibres from the inner stem and the outer shell. This is done by exposing the stem or other bast fibre to moisture and heat. Water retting is the most effective method, but there are other methods such as placing the fibres in a tank and adding enzymes. Emissions of retting wastewater with a high content of organic material to the aquatic environment can result in a lack of oxygen during degradation, which can damage the aquatic animal and plant life. Water retting is used not only for bast fibres but also for sisal fibres[65]. The requirement is unchanged, since the current level remains relevant. The EU Ecolabel for textile products has an equivalent requirement concerning COD emissions from water retting. It also includes a requirement that flax and other bast fibres shall be retted under ambient conditions and without thermal energy inputs. Nordic Ecolabelling has chosen not to set this requirement, but instead to focus on pesticide use during fibre cultivation.

5.7.3 Wool and other keratin fibres

O18 Wool and other keratin fibres

Any wool and other keratin fibres used must originate from sheep, camels, alpaca or goats, and must be one of the following:

1. certified organic wool*
2. recycled wool**

or

[65] Buch, Lignocellulosic Composite Materials, Springer International Publishing 2018.

3. conventional wool with documentation that the requirement below concerning pesticide content in the raw wool is fulfilled.

Pesticide content in conventional wool:

- The total content of the following substances may not exceed 0.5 ppm: γ-hexachlorocyclohexane (lindane), α-hexachlorocyclohexane, ß-hexachlorocyclohexane, δ-hexachlorocyclohexane, aldrin, dieldrin, endrin, p,p'-DDT and p,p'-DDD, cypermethrin, deltamethrin, fenvalerate, cyhalothrin and flumethrin.
- The total content of the following substances may not exceed 2 ppm: diazinon, propetamphos, chlorfenvinphos, dichlorfenthion, chlorpyriphos, fenchlorphos, dicyclanil, diflubenzuron and triflumuron.
- The requirement to test for pesticide residues does not apply if documentation can show which farmers produced at least 75% by weight of the wool or keratin fibres, and those farmers can confirm that the substances named in the requirement have not been used in the areas or on the animals in question.

Test method: The tests must be performed in accordance with IWTO Draft Test Method 59: Method for the Determination of Chemical Residues on Greasy Wool or equivalent.

The analysis must be performed on raw wool before wet processing and the test report must be submitted with the application. Thereafter, the applicant must have a procedure in place for annual testing in line with the requirement and for ensuring compliance with the requirement. Nordic Ecolabelling must be informed if the requirement is not fulfilled.

* ***Definition of organic wool:*** *wool fibre that is certified as organic or transitioning to organic according to a standard approved in the IFOAM Family of Standards, such as Regulation (EU) 2018/848, USDA National Organic Program (NOP), APEDA's National Programme for Organic Production (NPOP), China Organic Standard GB/T19630. Also approved are GOTS and DEMETER and certification as "transitioning to organic cultivation". The certification body must have the accreditation required for the standard, such as ISO 17065, NOP or IFOAM.*

** ***Definition of recycled wool:*** *Pre-consumer or post-consumer recycled raw materials, see the definition in the ISO 14021 standard. Both mechanically and chemically recycled fibres are included. See the definitions in section 5.2 for more details.*

✉ **Organic wool:** Valid certificate showing that the wool in the Nordic Swan Ecolabelled product was organically cultivated in line with the standards in the requirement. If the supplier is the holder of GOTS certification, the requirement must be documented with a transaction certificate showing that the goods supplied are GOT certified.

✉ **Recycled fibre:** Fulfilment of the requirement is documented for **recycled fibre** with either a or b below:

a) Global Recycled Standard certificate showing that the raw material is recycled, or other equivalent certification approved by Nordic Ecolabelling.

b) Present documentation demonstrating that the recycled fibre was purchased as recycled and state the supplier.

✉ **Conventional wool:** Declaration from the wool supplier that no mulesing has been used.

✉ **Conventional wool:** In addition, a test report showing that the pesticide requirement has been fulfilled, plus a written procedure showing how an annual test is performed in line with the pesticide requirement, along with annual in-house checks of compliance with the requirement. Test results are to be archived and kept available for inspection by Nordic Ecolabelling. An alternative to the pesticide test is a confirmation from the farmers that the stated substances are not used, plus an overview of the proportion of wool concerned.

Background to the requirement

The requirement only accepts wool fibre from sheep and other keratin fibres from camels, alpaca and goats. Angora wool from rabbits is not accepted, for example.

Wastewater from washing wool (scouring) often contains large quantities of pesticides that are used to treat sheep. Pesticide residues can have a significant environmental impact if discharged into the aquatic environment. At the same time, pesticides such as organochlorine compounds, which are known to be toxic, non-readily degradable and bioaccumulative, may also harm the environment while active in the wool. Despite a ban, this type of pesticide is still used[66]. Wool scouring firms and exporters of wool have the greatest scope to control the use of pesticides for ectoparasites by issuing absolute requirements to the wool producers (farmers). This requirement can therefore be documented by at least 75% of the wool farmers declaring that they do not use the above-mentioned pesticides. Organic wool automatically meets the requirement. According to the International Wool Textile Organization (IWTO), in 2015 less than 1% of global sheep farming was organic[67]. Since wool at the same time accounted for only 1% of the total fibre production (figures from 2017), the total amount of organic wool is not that extensive. The judgement has therefore been made that only accepting organic wool would be too tough a requirement.

Test method IWTO DTM-59: 2009; Method for the Determination of Chemical Residues on Greasy Wool[68]. This method tests for the presence of four groups of pesticide residues: organochlorine compounds, organophosphates, synthetic pyrethroids and insect growth regulators.

O19 Scouring agents

Scouring agents that are used in the washing of raw wool must be either readily aerobically biodegradable or inherently aerobically biodegradable in accordance with test method: OECD 301 A-F (60% degradability), OECD 310 (60% degradability), OECD 302 A-C (70% degradability) or equivalent test methods.

✉ Declaration from the chemical supplier and safety data sheet for the scouring agents used and/or OECD or ISO test results showing compliance with the requirement.

[66] Ravidnran, J. et al., Organochlorine pesticides, their toxic effects on living organisms and their fate in the environment, Interdiscip Toxicol. 2016 Dec; 9(3-4): 90-100.
[67] International Wool Textile Organization (IWTO), "Wool Production." Accessed 07.09.2017: http://www.iwto.org/wool-production
[68] https://www.iwto.org/sites/default/files/images/iwto_news/image/INDEX-Red%20Book%202015.pdf accessed 13.05.2019.

Background to the requirement

The requirement is set to minimize the environmental impact of washing of wool. Here wool detergents are used, which are discharged with the wastewater and thus can affect the aquatic environment. Therefore, these are required to be biodegradable. Raw wool is washed (scoured) to remove dirt, grease and suint. This is typically performed using water, detergent and an alkali, but a solvent may also be added to remove oils that are not water soluble.

O20 COD emissions from wool scouring plants

Emissions of COD from wool scouring plants must not exceed (expressed as a 6 month average):

- 45 g/kg for fine wool (merino wool or wool fibre that is 25 microns or thinner)
- 25 g/kg for coarse wool

Wastewater that is sent to municipal or other regional treatment works is exempted.

Measurement of PCOD, TOC or BOD may also be used, if a correlation to COD is evident.

Test method: Test according to ISO 6060.

✉ Test report from the wool scouring plant showing that the requirement is fulfilled. Alternatively, a valid GOTS or EU Ecolabel certificate may be used as documentation.

Background to the requirement

The COD requirement remains unchanged from the previous generation of the criteria. The requirement has now been harmonised with requirements set by both the EU Ecolabel and GOTS. The requirement is now split into differentiated requirement levels for fine and coarse wool. The requirement was formerly 20 g/kg for all wool, whether fine or coarse, which did not work optimally. The decision has therefore been made to set the same requirement levels as both the EU Ecolabel and GOTS. This will make it possible to use these wool certifications as documentation for the COD requirement. The EU Ecolabel does not have a pH or temperature requirement, and therefore cannot be used as documentation for that part of the requirement.

Dirt, grease and suint that are washed out before the wool can be further processed can pollute wastewater discharged into the environment. COD indicates the amount of oxygen consumed through complete oxidation of the organic material under aerobic conditions. The higher the COD emissions, the more oxygen consumption the discharge will cause and the greater the risk of oxygen deficiency in the aquatic environment. This potential environmental impact can be significantly reduced by removing dirt, grease and suint from the wool, with the resource-efficient bonus of maximising their value as by-products. Removing dirt and grease from the wool also helps to minimise energy consumption and the need for detergents in the wool scouring plant[69].

[69] Revision of the EU Green Public Procurement (GPP) Criteria for Textile Products and Services, Technical report with final criteria, JRC 2017.

O21 pH value and temperature of wastewater from wool scouring

The pH value of the wastewater released to the surface water must be 6-9 (unless the pH value in the recipient lies outside this interval), and the temperature must be lower than 40°C (unless the temperature in the recipient is higher).

✉ Test reports from the wool scouring plant showing measurements of the wastewater's pH and temperature. Alternatively, a valid GOTS certificate may be used as documentation.

Background to the requirement

The requirement has been set so that the discharge of wastewater into surface water does not interfere with the aquatic environment by changing the pH or temperature to a large extent locally, thereby disturbing the natural balance of the aquatic environment. If national legislation sets requirements in this area, this must also be complied with. However, the requirement in these criteria must still be documented. The requirement remains unchanged from the previous generation of the criteria.

O22 Ban on mulesing

Surgical mulesing and mulesing performed using liquid nitrogen are not permitted on merino sheep.

✉ Declaration from the merino wool producer, stating that no mulesing has taken place.

Background to the requirement

Mulesing remains a problem associated with merino wool. Merino sheep are specially bred to have wrinkled skin, so that they produce more wool. This causes urine and faeces to collect around the hind quarters, which attracts flies, who then lay eggs in the folds of skin. Surgical mulesing involves removing wool and skin on the rear end of the sheep to avoid parasites from egg-laying flies. This method is primarily used in Australia. The requirement prohibits this type of treatment and must be documented with a declaration from the wool producer stating that mulesing is not performed.

In 2018, the New Zealand government imposed a ban on surgical mulesing. In Australia, the majority of the country's wool producers still use surgical mulesing [70]. There is, however, a move to find alternatives and Australia's newest non-surgical alternative to the surgical method will be available to sheep farmers in 2019. The process involves the use of liquid nitrogen on the rear of the sheep[71]. Existing alternatives to surgical mulesing include breeding programmes, which involve selective breeding of sheep with low sensitivity to fly strike. Other measures focus on the actual farming practices, such as adjusting the time of shearing the sheep and the time of lambing, as this also helps to minimise the problem of blowfly strike. Work is also under way on various forms of blowfly control. The combination of these measures is considered to be sufficiently effective, compared to surgical mulesing[72].

[70] New Zealand Bans Mulesing, article Sept. 2018 at https://www.peta.org.au/news/new-zealand-bans-mulesing/
[71] Non-surgical mulesing alternative for Australasia, article Sept. 2018 at https://www.ecotextile.com/20180911123719/materials-production-news/non-surgical-mulesing-alternative-for-australasia.html
[72] Mulesing & Welfare at http://blogs.ubc.ca/mulesing/take-home-message/

5.7.4 Regenerated cellulose fibre

O23 Regenerated cellulose fibre (viscose), raw material

Regenerated cellulose fibre shall be based on:

- wood, bamboo fibre, cotton linters or
- recycled cotton or viscose fibre

Wood fibre and bamboo shall meet the following requirements:

- Virgin fibres: Species of trees on the Nordic Ecolabel list of protected tree species (www.nordicecolabel.org/wood/) may not be used in regenerated cellulose fibre/pulp. The requirement only applies to virgin wood fibre and therefore does not apply to fibre defined as recycled material*.
- Virgin fibres: The producer of the regenerated fibre or the producer of the dissolving pulp must state the name (species) of the wood and bamboo raw material used in production.
- The producer of the regenerated fibre or the producer of the dissolving pulp must hold chain of custody certification from either FSC or PEFC.
- **On an annual basis:**

  50% of the fibre raw material used as cellulose fibre/in the dissolving pulp shall be certified as sustainably forested under the FSC or PEFC schemes. The remaining percentage of fibre raw material shall be covered by the FSC/PEFC compliance schemes (FSC Controlled Wood/PEFC Controlled Sources)

  or

  At least 75% of the regenerated fibre in the dissolving pulp must be recycled material*

  or

  be a combination of certified fibre raw material and recycled material, calculated using the following formula:

  Required share of fibre raw material from certified forestry in the pulp (Y):

  $Y\ (\%) \geq 50 - 0.67\ x$

  where x = proportion of recycled material.

  The requirement shall be documented as raw material purchased on an annual basis (volume or weight) by the producer of the regenerated fibre or the producer of the dissolving pulp.

  If several pulps are mixed, the certification percentage must be met for the final pulp that is used.

** Recycled material is defined here as pre-consumer and post-consumer, see definition in ISO 14021. Pre-consumer material: Material redirected from the waste flow during a manufacturing process. This excludes the reuse of materials such as reprocessed materials (rework), reground materials or scrap produced in a process, and that can be recovered within the same process as it was generated in.*

Post-consumer material: Material from households or from commercial, industrial and institutional facilities in their role as end users of the product, and that can no longer be used for the intended purpose. This includes material discarded from the distribution chain.

Nordic Ecolabelling includes, for example, by-products from primary wood processing industries (sawdust, wood chips, shavings, bark, etc.) or residues from forestry operations (bark, branches, roots, etc.) in its definition of recycled material.

✉ **Recycled fibres:** Fulfilment of the requirement is documented for recycled fibre with either a and/or b below:

a) Certificate showing that the raw material is 100% recycled (post and / or pre-consumer) with Global Recycled Standard certificate 4.0 (or later versions), or other equivalent certification approved by Nordic Ecolabelling.

b) Present documentation demonstrating that the recycled fibre was purchased as 100% recycled (post and / or pre-consumer) and state the supplier.

Wood fibres and bamboo:

✉ Declaration from the producer of the fibre raw material in the case of regenerated fibre, or the producer of the dissolving pulp, that the requirement concerning wood species that must not be used has been fulfilled.

✉ Name (in Latin and one Nordic language) of the raw materials used.

✉ The producer of the fibre raw material in the case of regenerated fibre, or the producer of the dissolving pulp, must present a valid chain of custody certificate issued by FSC or PEFC that covers the virgin fibres and recycled material used in the pulp.

✉ Documentation from the producer of the pulp, showing the quantity of certified fibre raw material purchased. The amounts purchased must be supported by an invoice or delivery note (paper or e-invoice). The proportion of certified fibre must be updated and reported annually throughout the validity period of the licence.

Background to the requirement

The requirement concerns the use of raw materials, which must be legally harvested and not come from protected areas of land. The raw material for regenerated cellulose fibre is usually wood fibre or bamboo. Recycled cotton or viscose fibre may also be used. This revision retains the requirements for the use of certified wood and the certification share has been increased from 30 to 50%. In addition, bamboo is required to be grown in forest areas that are certified according to one of the FSC or PEFC standards. More information about Nordic Ecolabelling's forestry requirements can be found on the Nordic website[73]. Nordic Ecolabelling also wants to stimulate the use of recycled fibre and sees that in Sweden re:newcell is produced as a cellulose pulp of old cotton and viscose fibres, which can be used in new fibre production.

O24 Regenerated cellulose fibre (viscose), process

The fibre production must be based on emission-free* processes such as lyocell, direct cellulose spinning (Spinnova process) or an equivalent.

** Emission-free processes are defined here as processes with a high degree of recycling of chemicals (> 98%) or processes without chemicals.*

✉ A description of the process showing that the regenerated cellulose fibre is produced using emission-free processes.

Background to the requirement

The requirements regarding the production of regenerated cellulose have been tightened in this generation of the criteria.

[73] Nordic Ecolabelling, Forestry requirements. https://www.nordic-ecolabel.org/certification/paper-pulp-printing/pulp--paper-producers/forestry-requirements/

The requirement now only accepts “emission-free” processes. I.e. processes with more than 98% recycling rate for chemicals used or processes without the use of chemicals. This limits emissions of harmful chemicals to air and water. Examples of such processes are the lyocell process (> 99% recovery of biodegradable solvent) and the Spinnova process (mechanical spinning without chemicals). Other newly developed processes can be approved as "emission-free" after the assessment of Nordic Ecolabelling. There are also requirements concerning the use of raw materials, which must be legally harvested and not come from protected areas of land.

5.7.5 Synthetic fibre

Synthetic fibre is subject to the requirement that the fibre must either comprise recycled material, if it is of fossil origin, or be bio-based (see further definition of these in the requirements below). The requirement sets out which types of recycled and bio-based raw materials are acceptable.

O25 Synthetic fibre – fossil origin

Synthetic fibre of fossil origin must comprise 100% recycled material*.

The requirement is to be documented with either a or b below:

a) Global Recycled Standard certificate showing that the raw material is recycled, or other equivalent certification approved by Nordic Ecolabelling.

b) By stating the producer of the recycled raw material and documenting that the feedstock used in the raw material is 100% recycled material, see definition in requirement.

This must not include recycled food safe plastic originated from plants that are EFSA** or FDA*** approved or marketed as compatible with these.

An exception is given in requirement O10 for elastane with up to 25% in selected product types.

** Recycled material is defined here in line with ISO 14021 using the following two categories as specified, and covers both mechanical and chemical recycling:*

“Pre-consumer/commercial” *is defined as material that is recovered from the waste stream during a manufacturing process. Materials that are reworked or reground, or waste that has been produced in a process, and can be recycled within the same manufacturing process that generated it, are not considered to be pre-consumer recovered material.*

Nordic Ecolabelling considers reworked, reground or scrap material that cannot be recycled directly in the same process, but requires reprocessing (e.g. in the form of sorting, re-melting and granulating) before it can be recycled, to be pre-consumer/commercial material. This is irrespective of whether the processing is done in-house or externally.

“Post-consumer/commercial” *is defined as material generated by households or commercial, industrial or institutional facilities in their role as end-users of a product that can no longer be used for its intended purpose. This includes materials from the distribution chain.*

*** In line with Commission Regulation (EC) No 282/2008 of 27 March 2008 on recycled plastic materials and articles intended to come into contact with foods.*

**** In line with the Code of Federal Regulations Title 21: Food and Drugs, PART 177 – INDIRECT FOOD ADDITIVES: POLYMERS.*

- ✉ Declaration from the producer of the recycled raw material that the raw material is not EFSA or FDA approved, see requirement.
- ✉ a) Certificate from an independent certifier of the supply chain (e.g. Global Recycled Standard).
- ✉ b) Documentation from the producer, showing that the feedstock used in the raw material is 100% recycled material, see definition in requirement.

Background to the requirement

Nordic Ecolabelling wishes to support a circular economy by encouraging the use of recycled materials over virgin raw material – in this case crude oil. The requirements for the various synthetic fibres have therefore been changed in this generation of the criteria. The criteria now only accept recycled materials as the input for synthetic fossil textile fibres that account for more than 5% by weight of the individual textile element. In the case of elastane, up to 25% by weight of virgin elastane or elastane band may be included in socks, leggings and sportswear. This exemption is stated in requirement O10.

Substantial environmental potential is expected in the future with regard to reduce resource consumption and CO_2 emissions[74], if the textile industry is able to covert textile waste into new raw materials. However, today fibre-to-fibre recycling remains limited for textiles[75], and recycled polymers from other synthetic materials such as plastics are often used today. The requirement therefore accepts both fibre-to-fibre recycling and polymer-to-fibre recycling. Nordic Ecolabelling wishes to stimulate increased use of recycled materials in textile production, thus avoiding the use of virgin fossil materials. It is currently reasonably possible to use recycled material for fibre types such as polyester and polyamide, but the same options are not as widely available for other fibre types as yet (August 2019). The review "Environmental impact of textile reuse and recycling - A review"[76] describes that there is strong support for claims that textile reuse and recycling in general reduce environmental impact compared to incineration and landfilling, and that reuse is more beneficial than recycling. Benefits mainly arise because of the assumed avoidance of production of new products. The is also scenarios under which recycling may not be beneficial, for example in cases where the avoided production processes are relatively clean.

The requirement therefore seeks to encourage fibre types, that are able to make use of recycled feedstock. Advancements are being made in this area all the time and the possibility of using recycled feedstock may therefore change over time.

Prohibition on the use of re-granulate resulting from reprocessing processes that have obtained an EFSA approval pursuant to Commission Regulation (EC) No 282/2008 on recycled plastics materials and articles intended for food contact or FDA approval pursuant to Regulation (EC) No 282/2008 to the Code of Federal Regulations Title 21: Food and Drugs, PART 177 — INDIRECT FOOD ADDITIVES: POLYMERS. These are both approvals for the material to be used for food contact.

[74] Sandin, G, Environmental impact of textile reuse and recycling – A review, Journal of Cleaner Production Volume 184, 20 May 2018, Pages 353-365.
[75] PULSE OF THE FASHION INDUSTRY, Global Fashion Agenda & The Boston Consulting Group 2017.
[76] Sandin, G, Environmental impact of textile reuse and recycling – A review, Journal of Cleaner Production Volume 184, 20 May 2018, Pages 353-365.

It is not desirable for textile production to use processed, recycled raw materials approved for food packaging production. Plastic materials approved for food packaging require the highest traceability and purity of the plastic raw material and it will therefore be down cycling to use this plastic for anything other than food contact products.

The requirement states that the feedstock used in the recycled raw material must be traceable. Without traceability, it is difficult to ensure that the material really is recycled. Traceability can be documented with a certificate from a third-party certifier of the supply chain, such as the Global Recycled Standard, for example. The Global Recycled Standard (GRS) is an international, voluntary standard that sets requirements for third-party certification of recycled content and chain of custody in the supply chain. This standard restricts the use of undesirable chemicals in the manufacture of new products, but the standard does not cover chemicals that may enter via the recycled materials, and thus gives no guarantee about what may be present in the finished GRS product[77] (see more on undesirable chemicals in recycled materials in requirement O28). Alternatively, traceability may be documented by the producer of the recycled raw material declaring that 100% recycled feedstock has been used.

Recycled polyester

The main source of recycled feedstock for polyester fibre is currently rPET from used water bottles. PET may be recycled both mechanically and chemically[78]. An LCA conducted for the Nordic Council of Ministers[79] describes the environmental effects of chemical recycling of PET. The analysis shows that chemical recycling is better than incineration of PET, in terms of the following impact categories: climate change, water consumption and total energy consumption, but is worse than incineration when it comes to eutrophication and photochemical ozone creation potential. Several other studies confirm this result. A point is also made about uncertainty linked to data sets originating from the Teijin factory in Japan – one of the only commercial plants in operation today, where waste polyester products are chemically processed into new polyester filament fibres under the brand name ECO CIRCLE™ FIBERS. Teijin also produces rPET from PET bottles for polyester staple fibre and textiles under the brand name EcoPET[80].

Recycled polyamide

Polyamide (PA, nylon) can be recycled via the mechanical or chemical processing of nylon waste, as happens, for example, in the carpet industry. A comparative LCA study of virgin nylon and recycled nylon for carpet manufacturing, conducted for Shaw Carpets (2010) and reviewed by LBP-GaBi University of Stuttgart, highlights significant environmental benefits from the use of recycled nylon.

[77] Global Recycled Standard http://textileexchange.org/wp-content/uploads/2017/06/Global-Recycled-Standard-v4.0.pdf
[78] Ragaert, K. Mechanical and Chemical Recycling of Solid Plastic Waste, 2017 Waste Management publication.
[79] Nordic Council of Ministers (2016). Gaining benefits from discarded textiles: LCA of different treatment pathways.
[80] Nordic Council of Ministers (2016). Gaining benefits from discarded textiles: LCA of different treatment pathways.

There are, however, still only a limited number of recycled nylon suppliers. Econyl is one of the leading suppliers, with its nylon 6 for textile production, which uses a chemical process with 100% pre- and post-consumer recycled content[81]. The split is around 50% pre- and 50% post-consumer[82]. There are several examples of textile brands that use Econyl in their polyamide products. An EPD for Econyl declares that ECONYL® polymer is free from substances that are harmful to health and the environment due to being carcinogenic, mutagenic or reprotoxic, allergenic, PBT or vPvB[83].

Recycled polyurethane

Sheico Group, a Taiwanese sportswear manufacturer that also produces spandex, is able to produce 100% spandex with Global Recycled Standard (GRS) certification. Their Sheiflex spandex yarn is made from 100% recycled industrial waste spandex from its own and competitors' production lines. Sheico has managed to recycle spandex following the development of new technology. To ensure that the polymer from the waste yarn is dissolved homogeneously, so the recycled spandex can offer the same stability and quality as virgin spandex, an analysis of the recycled fibre is required in order to adjust the purity and viscosity before spinning[84].

O26 Synthetic fibre – bio-based origin

Biomass from agricultural raw materials used for bio-based* polymer fibre (e.g. polyester and polyamide) must meet the following requirements. Secondary raw materials** are exempt from the requirement:

- The name (Latin and English) and geographical origin (country/state) must be stated for all agricultural materials.
- Palm oil and soya oil must not be used for bio-based polymer fibre in the textile.

Specific conditions for sugar cane

- Where bio-based polymer fibre is based on sugar cane, the raw material must be Bonsucro certified.

The producer of the bio-based polymer must hold Bonsucro's chain of custody (CoC) certification. The chain of custody must be ensured through mass balance, with book and claim systems not accepted. The producer of the bio-based polymer must document its purchase of certified raw materials for polymer production, for example in the form of specifications on an invoice or delivery note.

Nordic Ecolabelling may, if appropriate, consider other certification systems for the raw materials mentioned above.

** Bio-based polymer fibre is defined here as polymer fibre where at least 90% by weight of the material is bio-based.*

*** Secondary raw materials are defined here as waste products from other production, including by-products such as straw from grain production and by-products from maize. PFAD (Palm Fatty Acid Distillate) from palm oil is not considered to be a residual/waste product.*

[81] http://www.econyl.com/textile-yarn/
[82] https://www.bipiz.org/en/advanced-search/aquafil-econyl-or-how-to-produce-nylon-6-from-100-regenerated-materials.html
[83] ENVIRONMENTAL PRODUCT DECLARATION for ECONYL® POLYMER, Aquafil 2013 and updated 2017.
[84] Spandex gets recycled certification, https://www.ecotextile.com/2017110723070/labels-legislation-news/spandex-gets-recycled-certification.html (accessed 26.02.2019)

- ✉ Name (in Latin and English) and geographical origin (country/state) of the agricultural raw materials used.
- ✉ For certified raw materials, a copy of a valid CoC certificate or a certificate number. Documentation such as an invoice or delivery note from the producer of the bio-based polymer, showing the purchase of bio-based polymer from certified raw material in at least the same annual quantity as is used in the production of the bio-based polymer.
- ✉ For secondary raw materials, documentation from the supplier of the raw material, showing compliance with the requirement's definition of secondary raw material.

Background to the requirement

The requirement is new to these criteria and makes it possible to use bio-based polymer fibre. The requirement has been set to ensure that the renewable raw materials used do not originate from agricultural land created from the destruction of rainforest or the clearance of other valuable ecosystems. In terms of resources, the requirement promotes the use of renewable raw materials over virgin fossil materials. It is, however, important that the bio-based raw materials are grown sustainably. Even renewable raw materials may be associated with environmental and social problems.

There are several examples of bio-based polyester on the market, including Virent's BioFormPX paraxylene[85] and Ecodear® PET[86]. However, not all of the mentioned bio-based polyester products meet the requirement here for at least 90% biomass in the polymer. It is not clear which biomass is used for these particular fibres, but starch and sugar from sugar cane, sugar beet and maize are often used for the production of bio-based polymers. Starch currently accounts for 80% of the feedstock for biopolymers[87]. Castor oil, or oils such as soya or palm oil tend to be used to produce bio-based polyamide.

The establishment of palm oil plantations is one of the main causes of rainforest destruction, which threatens the existence of indigenous peoples, plants and animals. Rainforests are particularly important for biodiversity, as they are the most species-rich ecosystems on the planet[88]. Soya beans are grown on land that is often established in the place of rainforest and savannah in South America. Soya production is one of the greatest threats to the rainforest on the American continent, particularly in the southern Amazon[89].

O27 Synthetic fibre (bio-based), genetically modified raw materials

Agricultural raw materials from genetically modified organisms * shall not be used in the production of bio-based polymer fibre.

Secondary** raw materials are exempt from the requirement.

** Genetically modified organisms are defined in EU Directive 2001/18. Process chemicals and raw materials produced using genetically modified microorganisms in closed systems are not defined as GMOs.*

[85] http://www.virent.com/news/virent-bioformpx-paraxylene-used-to-produce-worlds-first-100-plant-based-polyester-shirts/ accessed 20.02.2019.
[86] https://www.toray.com/products/fibers/fib_0131.html accessed 20.02.2019.
[87] https://aboutbiosynthetics.org/feedstock-to-fashion/ accessed 20.02.2019.
[88] OLSEN LJ, FENGER NA & GRAVERSEN J 2011. Palm oil – Denmark's role in the global production of palm oil. WWF Report DK. WWF World Wide Fund for Nature, Denmark.
[89] http://www.worldwildlife.org/industries/soy, (27.01.2016).

*** Secondary raw materials are defined here as waste products from other production, including by-products such as straw from grain production and by-products from maize. PFAD (Palm Fatty Acid Distillate) from palm oil is not considered to be a residual/waste product.*

✉ Declaration from the producer of the bio-based polymer, showing that genetically modified raw materials have not been used in the production of the polymer.

Background to the requirement

The requirement is new, as bio-based polymer fibre was not previously covered by the criteria. The requirement prohibits the use of genetically modified agricultural raw materials in bio-based polymer fibre. Process chemicals and raw materials, e.g. proteins, which are produced by the use of genetically modified microorganisms in closed systems, are not themselves GMOs or genetically modified, and Nordic Swan Ecolabeling do not consider such production as problematic.

GMO (genetically modified organisms) is a highly debated topic, and several countries have banned GMO cultivation. Topics discussed are food safety, land use, lack of knowledge of impacts under local agriculture / forest conditions and risk of adverse environmental and health impacts. Nordic Ecolabelling emphasizes the precautionary principle and is based on regulations that have a holistic approach to GMO, where sustainability, ethics and social benefits must be emphasized together with health and the environment. It is important to stress that Nordic Ecolabelling is not opposed to the technology itself but is concerned about the consequences of GM plants spreading in nature.

Research results have not clearly shown that today's GMO crops contributes to development towards sustainable agriculture with less use of pesticides. At the same time research on long-term effects of genetically modified plants, both environmental and socio-economic consequences, is lacking. There are potential adverse effects of GMOs along the entire value chain from research and development of plants, through cultivation, to storage, use and waste management [90], [91],[92]. In several of these stages, there is a lack of scientific studies, and a lack of assessment of the overall picture[93]. Today's GMOs are also adapted to industrial agriculture with companies that have obtained a monopoly-like position, and Nordic Ecolabelling wants to help limit the negative consequences of this.

[90] Catacora-Vargas G (2011): "Genetically Modified Organisms – A Summary of Potential Adverse Effects Relevant to Sustainable Development. Biosafety Report 2011/02, GenØk – Centre for Biosafety.
[91] Fischer et al. (2015) Fischer et al. (2015): Social impacts of GM crops in agriculture: a systematic literature review. Sustainability 7:7.
[92] Catacora-Vargas G et al. (2018): Socio-economic research on genetically modified crops: a study of the literature. Agriculture and Human Values 35:2.
[93] Kolseth et al (2015) Influence of genetically modified organisms on agro-ecosystem processes. Agriculture, Ecosystems and Environment. 214 (2015) 96–106.

5.7.6 Recycled fibres

O28 Recycled fibres, test for environmentally harmful substances

This requirement applies to all recycled fibres – both synthetic and natural. Recycled fibres/raw materials for fibre production shall not contain the following substances above the limits stated in the table below.

PET bottles that are used in the production of polyester as well as chemically recycled polymers that perform chemical purification are exempt from the documentation requirement.

The requirement must be documented on application, with subsequent annual checks via self-assessment.

Substance/substance group	**Max. limit**
Metals	
Chromium total	1.0 mg/kg
Lead	0.1 mg/kg
Mercury	0.02 mg/kg
Cadmium	0.1 mg/kg
Antimony	30.0 mg/kg
Organic tin compounds	
TBT and TPhT	0.5 mg/kg
Total of DBT, DMT, DOT, DPhT, DPT, MOT, MMT, MPhT, TeBT, TeET, TCyHT, TMT, TOT, TPT	1.0 mg/kg
Chlorophenols	
Pentachlorophenol	0.05 mg/kg
Tetrachlorophenol	0.05 mg/kg
Trichlorophenol	0.2 mg/kg
Dichlorophenpol	0.5 mg/kg
Monochlorophenol	0.5 mg/kg
Per- and polyfluorinated compounds	
PFOS, PFOSA, PFOSF, N-Me-FOSA, N-Me-FOSE, N-Et-FOSE	Total < 1.0 µg/m2
PFOA	< 1.0 µg/m2
PFHpA, PFNA, PFDA, PFUdA, PFDoA, PFTrDA, PFTeDA	0.05 mg/kg for each
Other stated per- and polyfluorinated compounds as set out in Oeko-Tex 100 Annex 5.	0.05 or 0.5 mg/kg for each as stated in Oeko-Tex 100
Phthalates	
BBP, DBP, DEP, DMP, DEHP, DMEP, DIHP, DHNUP, DCHP, DHxP, DIBP, DIHxP, DIOP, DINP, DIDP, DPrP, DHP, DNOP, DNP, DPP	Total 0.1 wt%
Flame retardants	
Flame retardants, with the exception of flame retardants approved by Oeko-Tex	< 100 mg/kg for each

Formaldehyde	16 mg/kg
Arylamines with carcinogenic properties stated in Oeko-Tex 100 Annex 5	Total 20 mg/kg
Surfactant, wetting agent residues	
Nonylphenol, octylphenol, heptylphenol, pentylphenol	Total 10 mg/kg
Nonylphenol, octylphenol, heptylphenol, pentylphenol, nonylphenol ethoxylate and octylphenol ethoxylate	Total 100 mg/kg
Dyes	
Cleavable, classified as carcinogenic in Oeko-Tex Annex 5	Total 20 mg/kg
Cleavable aniline as listed in Oeko-Tex Annex 5	Total 100 mg/kg
Classified as carcinogenic in Oeko-Tex Annex 5	50 mg/kg
Dyes classified as allergenic in Oeko-Tex Annex 5	50 mg/kg
Other dyes listed in Oeko-Tex Annex 5	50 mg/kg
Pesticides (for recycled natural fibre)	
Pesticides listed in Oeko-Tex 100 Annex 5	Total 0.5 mg/kg

Test methods: as stated in Testing Methods Standard 100 by Oeko-Tex

✉ Test reports or Oeko-Tex 100 class I certificate showing fulfilment of the requirement.

✉ A written procedure showing how an annual test is performed in line with the requirement, along with annual in-house checks of compliance with the requirement. Test results are to be archived and kept available for inspection by Nordic Ecolabelling.

Background to the requirement

The requirement is new in this generation of the criteria, which now contains a requirement, for example, that synthetic fibre must use recycled material as the constituent raw material. It is important to consider the potential exposure of the user and the environment to undesirable chemicals from recycled material. The requirement covers the chemical substances and substance groups that are at greatest risk of being present in recycled fibre for textile production. Recycled fibre may contain residues of additives from previously used dyes, pesticides from cultivation, biocides used during transport, and so on[94]. This applies to both fiber recovered from used textiles and fibre recovered from products other than textiles. Even if the textile is washed several times, unwanted chemicals may still be present in the recycled fibre. In mechanical recycling processes, all the chemical substances remain in the fibre and may be transferred to the new textile fibre. In the chemical recycling process, some chemical substances remain in the material, and both unproblematic and problematic substances can cause technical interference with the process[95].

[94] IKEA and H&M analyze the content of recycled fabrics, article 29-10-2019 on Treehugger.com https://www.treehugger.com/sustainable-fashion/ikea-and-hm-analyze-content-recycled-fabrics.html?utm_source=TreeHugger+Newsletters&utm_campaign=9cd1c025b2-EMAIL_CAMPAIGN_11_16_2018_COPY_01&utm_medium=email&utm_term=0_32de41485d-9cd1c025b2-243762625

[95] Nordic Council of Ministers (2016). Gaining benefits from discarded textiles: LCA of different treatment pathways.

It is possible to conduct a spot test for the most relevant substances over a set interval, but since the recycled feedstock may come from multiple sources and can therefore vary a great deal, it is not possible to implement the testing required to identify all the potential "old additives".

Recycled fibre from PET bottles may also contain small amounts of undesirable substances such as antimony and heavy metals, which are derived from labels, adhesives, printing inks and waste from the transport and sorting of the plastic. However, measurements have established that the levels fall well below the limits set for heavy metals in packaging materials in California's Toxics in Packaging Prevention Act of 2006[96].

5.7.7 Additives and fibre treatment

The requirement relates to any additives and coatings applied to the fibre. The requirement concerns all fibre types.

O29 Treatment and coating of fibre and yarn

- Any fibre treatment or coating must meet the following requirements: O31 Classification of chemical products, O32 Prohibition of CMR substances, O33 Prohibited substances* and O39 Chemicals that contains silicone.
- Treatment or coating of wool to prevent felting:
    - Chlorine and fluorine compounds are prohibited.
    - Wool fibres shall only be coated with biodegradable** coating

** An exception is made for added nano titanium dioxide in the production of regenerated cellulose.*

*** Coating must be aerobically degradable according to OECD 301 A-F or OECD 310 (readily biodegradable) or 302 A-C (inherently biodegradable).*

✉ Declaration from the fibre producer/supplier that requirement is fulfilled, and description of and safety data sheet for additives and coatings applied to the fibre.

✉ For coating of the wool fibre: Documentation showing that the coating is degradable in accordance with the requirement.

Background to the requirement

This generation of the criteria contains a separate requirement concerning treatment and coatings of the fibre. This to make it clear that these chemicals are subject to certain requirements. The requirement has been set to avoid the addition of harmful substances to the fibre or to be used in the treatment of the fibre. This applies to chemicals used in treating the fibre, such as chlorine treatment of wool fibre or softeners, and to substances that are present in chemicals used to coat the fibre.

Coating of wool fibers

The requirement only accepts wool fiber coating, if it is documented that the coating is biodegradable according to OECD 301 A-F or OECD 310 (readily biodegradable) or 302 A-C (inherently biodegradable).

[96] M. Whitt, Survey of heavy metal contamination in recycled polyethylene terephthalate used for food packaging, Journal of Plastic Film & Sheeting 2012.

Wool fibers may have a polymer coating to reduce shrinkage during washing. The purpose of this requirement is to avoid coating natural fiber such as the wool fiber with a polymer which may interfere with the possibility of the wool fiber being degraded and thus give rise to microplastics contamination if released either by use or washing of the woolen fabric[97]. There is no clear evidence of how coating with a polymer impact the overall biodegradability of the wool fiber. However, when there are alternative solutions on the market today, which the Nordic Swan Ecollabelling of textiles wants to promote. Here, you can choose either an anti-shrinkage treatment of the wool fiber (e.g., selected plasma or enzyme treatments) that does not include coating the fiber or using a coating that is biodegradable according to OECD 301 AF or OECD 310 (readily biodegradable) or 302 AC (inherently biodegradable).

Silicone

Many of the chemicals used as softeners or fibre and yarn coatings are based on silicone. The production of these chemicals makes use of the cyclic siloxanes D4, D5 and D6. These cyclic siloxanes are included in the EU's Candidate List, as they are persistent, bioaccumulative and toxic (PBT/vPvB substances). Nordic Ecolabelling sets a requirement in O37 that residual levels of D4, D5 or D6 in the silicone mix must not exceed 0.1 wt% (1000 ppm) of each. This limit value has been chosen to correspond with the threshold for mandatory inclusion of information on the substances on a safety data sheet.

Treatment of wool

A large proportion of the wool used for clothing today is treated to withstand machine washing without shrinkage and not to scratch when used. The Nordic Swan Ecolabel criteria do not allow the use of chlorinated wool, such as the anti-shrink treatment, chlorine-Hercosett process. When wool is chlorinated, absorbable organic halogens (AOXs) are formed which are discharged together with the wastewater. The chlorinated organic compounds are undesirable in the environment. Carbon filters can be used to reduce the emission of AOX compounds, but not completely eliminate the emission to wastewater. At the same time, there will be a risk of discharging AOX compounds in subsequent dying processes. There are alternative treatments for wool fibers, such as plasma treatment and enzyme treatment, that do not lead to the release of environmentally harmful chlorine compounds. In addition, the two alternative treatment methods mentioned may provide the desired effect without coating with non-biodegradable polymer.

[97] Hassan MM, Carr C (2019) A Review of the Sustainable Methods in Imparting Shrink Resistance to Wool Fabrics. Journal of Advanced Research 18:39–60.

5.8 Chemicals used in textile production

General background to the new chemical requirements in generation 5

The structure of the chemical requirements has been changed in this generation of the criteria, and the requirements have been tightened. There is now a requirement that excludes certain classifications of both chemicals and ingoing substances, irrespective of the type of chemical concerned. There is also a requirement concerning prohibited substances that similarly covers all production chemicals. The requirements in the previous generation of the criteria focused more on specific processes and chemical types, such as classification requirements for dyes, colourants and pigments, chemicals for finishing and softeners and solvents. The advantage of these requirements now being set for all production chemicals is that it facilitates clearer communication of what Nordic Swan Ecolabelling of textiles means, and also makes sure there are no loopholes that allow problematic textile chemicals to fall outside the remit of the set requirements. The various treatments and processes may take place at different stages of textile production and it is therefore important that the requirement is clear no matter where in the production process the chemical is used.

It is also now clarified, that the 11 groups of substances from Greenpeace's Detox My Fashion campaign[98] are prohibited in the production of Nordic Swan Ecolabelled textiles (see requirement O33 Prohibited substances). In addition, Nordic Ecolabelling has a stricter limit value than many other ecolabelling schemes that require these substance groups not to be present in the products. This is because, within its process, Nordic Ecolabelling besides checking all the safety data sheets for chemicals used also has a further dialogue with the chemical manufacturers. The chemical manufacturers are required, for example, to declare the absence of the prohibited substances. This means that they are not added to or present (0 ppm) in the chemicals. Nordic Ecolabelling's definition of an ingoing substance can be found in chapter 5.2, which also defines examples of impurities (in amounts below 100 ppm). These include residues of monomers, catalysts, by-products, cleaning agents for production equipment and carry-over from other/previous production lines.

There are still additional requirements concerning specific process chemicals, such as the requirement addressing biodegradable detergents and sizing preparations, where it is necessary to have requirements that are relevant only to these processes.

The requirements in this section apply to all chemicals used in the production of textiles, unless otherwise is specified in the requirement. Examples of chemicals include softeners, bleaching agents, pigments and dyes, stabilisers, dispersants, sizing agents, enzymes and other auxiliary chemicals. The chemicals are used in a variety processes in textile production, including carding, spinning, weaving, knitting, washing, bleaching, dyeing, printing and finishing, e.g. coating, lamination or bonding. The requirements apply irrespective of whether the textile producer or their supplier uses the chemicals.

[98] Destination Zero: Seven Years of Detoxing the Clothing Industry, https://storage.googleapis.com/planet4-international-stateless/2018/07/destination_zero_report_july_2018.pdf accessed 07.08.2019.

Chemicals used in water treatment plants or for the maintenance of production equipment are exempted from the requirements.

5.8.1 General chemical requirements

O30 Overview of chemicals

All chemical products shall be stated and documented with a safety data sheet. A collective list or separate lists shall be drawn up for each production process and/or supplier, including for printing on textiles and products.

The following information shall be submitted for each chemical product:

- trade name
- the function of the chemical
- the process step in which the chemical product is used
- the supplier/producer using the chemical product

☒ List of chemicals for every production process and/or supplier.
☒ Safety data sheet for every chemical product, in line with Annex II of REACH 1907/2006.

Background to the requirement

To gain an overview of which chemicals are used in the various processes in the textile production after fibre production, the criteria require the submission of a list of all the chemicals used.

O31 Classification of chemical products

Chemical products shall not be classified as any of the hazard categories set out in the table below.

CLP Regulation 1272/2008		
Hazard class	**Hazard category**	**Hazard code**
Toxic to aquatic life	Aquatic Acute 1 Aquatic Chronic 1 Aquatic Chronic 2	H400 H410 H411
Hazardous to the ozone layer	Ozone	H420
Carcinogenicity*	Carc 1A or 1B Carc 2	H350 H351
Germ cell mutagenicity*	Muta. 1A or 1B Muta. 2	H340 H341
Reproductive toxicity*	Repr. 1A or 1B Repr. 2 Lact.	H360 H361 H362
Acute toxicity	Acute Tox 1 or 2 Acute Tox 3	H300, H310, H330 H301, 311, 331
Specific target organ toxicity with single or repeated exposure	STOT SE 1 STOT RE 1	H370 H372
Sensitising on inhalation or skin contact	Resp. Sens. 1, 1A or 1B Skin Sens. 1, 1A or 1B	H334** H317**

Note that responsibility for correct classification lies with the manufacturer.

** Including all combinations of stated exposure route and stated specific effect. For example, H350 also covers the classification H350i.*

*** Non-disperse dyes are exempt from the prohibition of H334 and H317, provided that non-dusting formulations are used or that automatic dosing is used.*

✉ Declaration from the chemical manufacturer that the requirement is fulfilled.
✉ For exempted non-disperse dyes: Declaration that non-dusting formulations of these are used or that automatic dosing is used.

Background to the requirement

The requirement has been significantly tightened since the previous generation of the criteria, since it now covers all chemical products used in the textile production, where the requirement previously covered chemicals for specific functions such as dyes and pigments, finishing products and softeners and solvents in coatings. In addition, the requirement has been expanded to also exclude classification as H370 (Causes damage to organs) and H372 (Causes damage to organs through prolonged or repeated exposure). There is an additional requirement that excludes disperse dyes and other chemicals that are classified as H334 (May cause allergy or asthma symptoms or breathing difficulties if inhaled) and H317 (May cause an allergic skin reaction). Similar prohibitions existed in the previous generation of criteria. Since disperse dyes are not covalently bonded to the textile fibre, their colour fastness will often be lower. There is therefore assesed to be a greater risk of exposure to disperse dyes. As a consequence, stricter requirements are set for disperse dyes that are classified as allergenic[99].

In generation 4 of the criteria, requirement O31 (Dyes, colourants and pigments) excluded 30 specific dyes. These dyes are either CMR or potentially allergenic. Seven dyes have a harmonised classification in ECHA as CMR substances and a further two have a CMR self-classification. These nine dyes will thus now be excluded under the CMR ban in this requirement. The remaining are disperse dyes, the majority of which are classified as H317 (self-classification). These are therefore also excluded in this requirement. It should also be noted that several of these dyes are no longer in use.

O32 Prohibition of CMR substances

Chemical products shall not contain any ingoing substances* that have any of the classifications in the table below.

* See the definition of ingoing substances and impurities in section 5.2.

CLP Regulation 1272/2008		
Hazard class	**Hazard category**	**Hazard code**
Carcinogenicity*	Carc. 1A or 1B Carc. 2	H350 H351
Germ cell mutagenicity*	Muta. 1A or 1B Muta. 2	H340 H341
Reproductive toxicity*	Repr. 1A or 1B Repr. 2 Lact.	H360 H361 H362

** Including all combinations of stated exposure route and stated specific effect. For example, H350 also covers the classification H350i.*

✉ Declaration from the chemical producer, that the requirement is fulfilled.

[99] JRC Technical Reports, Revision of the European Ecolabel and Green Public Procurement (GPP) Criteria for Textile Products, Nov 2013, page 304: http://ec.europa.eu/environment/ecolabel/documents/140124%20Ecolabel%20Textiles_Technical%20report%20final.pdf

Background to the requirement

The requirement excludes all constituent CMR substances to an absolute level of 0 ppm. There is thus no triviality limit for ingoing substances. Ingoing substances are defined as all substances, whatever their concentration, in a used chemical (e.g. pigment or bleaching agent) or blend of chemicals (e.g. printing paste, coating), including additives (e.g. preservatives and stabilisers). Known products released from ingoing substances (e.g. formaldehyde, arylamine and in-situ generated preservatives) are also considered to be constituent. Impurities are defined as residual substances from production, including raw material production, that are present in a used chemical or blend of chemicals in concentrations of ≤ 100.0 ppm (≤ 0.01000 wt%, ≤ 100.0 mg/kg).

The requirement has been changed since the previous generation of the criteria. The prohibition of all ingoing CMR substances in categories 1A, 1B and 2 now has its own separate requirement. Nordic Ecolabelling strives to ensure that the health and environmental impacts of the products are as low as possible. Therefore, there is a requirement prohibiting specific CMR classification, which thereby excludes some of the, in health terms, most problematic classifications of substances. The requirement covers all chemicals used in the textile production, to ensure a focus on this in all processes that make use of chemicals.

O33 Prohibited substances

The following substances shall not be an ingoing substance* in chemical products:

* See the definition of ingoing substances and impurities in section 5.2.

- Substances on the Candidate List (https://echa.europa.eu/candidate-list-table) Siloxanes D4, D5 and D6 have their own documentation requirement, see requirement O39
- Substances that are PBT (Persistent, Bioaccumulative and Toxic) or vPvB (very Persistent and very Bioaccumulative) as set out in the criteria of REACH Annex XIII
- Substances that are considered potential endocrine disruptors in category one or two on the EU's Priority List of substances for further evaluation of their role in endocrine disruption, plus endocrine disruptive substances identified in the Biocidal Products Regulation (EU 528/2012) and/or the Plant Protection Products Regulation (EC 1107/2009). The full specification of substances on the EU's list can be found at http://ec.europa.eu/environment/chemicals/endocrine/pdf/final_report_2007.pdf (Annex L, page 238 onwards)
- Flame retardants (e.g. short-chain chlorinated paraffins)
- Per- and polyfluorinated compounds, e.g. PTFE, PFOA and PFOS
- Chlorinated polymers such as PVC and PVDC
- Nanoparticles from nanomaterial*
- Heavy metals**
- Azo dyes that may release carcinogenic aromatic amines (see Appendix 2)
- Phthalates
- Chlorinated solvents and carriers, including chlorophenols and chlorobenzenes
- Alkylphenols and alkylphenol ethoxylates (APEO)
- Organotin compounds

- Linear alkylbenzene sulphonates (LAS)
- Quaternary ammonium compounds such as DTDMAC, DSDMAC and DHTDMAC
- EDTA (ethylene diamine tetraacetic acid) and DTPA (diethylene triamine pentaacetate)

** The definition of nanomaterial follows the European Commission's definition of nanomaterial of 18 October 2011 (2011/696/EU). Natural pigments are exempted from the requirement.*

*** Heavy metals are the metals listed in point 2 below. Exemptions from the requirement are granted for:*

1. Copper in metal complex dyes, see requirement O35.
2. Metal impurities in dyes and pigments up to the amounts set out in ETAD, Annex 2 "Heavy metal limits for dyes": antimony (50 ppm), arsenic (50 ppm), cadmium (20 ppm), chromium (100 ppm), lead (100 ppm), mercury (4 ppm), zinc (1500 ppm), copper (250 ppm), nickel (200 ppm), tin (250 ppm), barium (100 ppm), cobalt (500 ppm), iron (2500 ppm), manganese (1000 ppm), selenium (20 ppm) and silver (100 ppm)
3. Exception for iron used for colour depigmenting before printing.

✉ Declaration from the chemical manufacturer or chemical supplier that the requirement is fulfilled.

Background to the requirement

The list of prohibited substances has been expanded in comparison with the previous generation of the criteria, with the requirement now covering the 11 substance groups that the textile industry widely agrees are relevant for phasing out. The list of the 11 substance groups derives from the "Detox My Fashion" initiative that Greenpeace launched in 2011. Other initiatives such as Detox to Zero by Oeko-Tex and ZDHC also refer to this list of substances. The previous generation of the criteria included most of these substance groups in separate requirements. The decision has now been taken to gather them all together here, with the prohibition list covering all chemicals used in the textile production.

Under this requirement, Nordic Swan Ecolabelled textiles are subject to a prohibition list that covers, with third-party audits, all 11 substance groups on Greenpeace's Detox List in the production of textiles. Nordic Ecolabelling defines "prohibition" as follows: The prohibition of specific ingoing substances encompasses all substances, whatever their concentration in a used chemical or chemical blend, including additives and known products released from ingoing substances. Impurities cannot, however, always be completely avoided. The only permitted impurities are residual products from production, including raw material production, that can be found in a used chemical in concentrations below 100 ppm. Such impurities may be reagents such as monomers, catalysts, by-products or carry-over from previous production lines. See the precise definition of ingoing substances and impurities in section 5.2.

Some of the substance groups and substances in the requirement may already have their use restricted in the EU. It is however still considered relevant to exclude these and require documentation confirming their absence, not least because many textiles are produced outside the EU.

In comparison with the earlier generation of the criteria, this requirement has been expanded to include flame retardants and azo dyes, amongst other things. Both groups were previously prohibited, but the requirement was worded differently.

Candidate List and Substances of Very High Concern (SVHC)

Substances of Very High Concern (SVHC) is a term describing substances that fulfil the criteria in Article 57 of the REACH regulation, which are defined as: substances that are CMR (category 1A and 1B under the CLP Regulation), PBT substances, vPvB substances (see section below) and substances that have endocrine disruptive properties or are environmentally harmful without meeting the criteria for PBT or vPvB. SVHC may be included on the Candidate List with a view to later inclusion on the Authorisation List. This means that the substance becomes regulated (ban, phasing out or some other form of restriction). Due to these undesirable properties, substances on the Candidate List cannot be Nordic Swan Ecolabelled. Other SVHC substances are dealt with through a ban on PBT and vPvB substances and through requirements concerning classification and a ban on endocrine disruptive substances.

PBT and vPvB

PBT (Persistent, Bioaccumulative and Toxic) and vPvB (very Persistent and very Bioaccumulative) are organic compounds defined in Annex XIII of REACH (Regulation (EC) No 1907/2006). Nordic Ecolabelling generally does not want such substances to be included in the products.

Potential endocrine disruptors

Potential endocrine disruptors are substances that may affect the hormone balance in humans and animals. Hormones control a number of vital processes in the body and are particularly important for development and growth in humans, animals and plants. Changes in the hormone balance can have unwanted effects and here there is an extra focus on hormones that affect sexual development and reproduction. Several studies have shown effects on animals that have been traced to changes in hormone balance. Emissions to the aquatic environment are one of the greatest sources for the spread of endocrine disruptors[100]. Nordic Ecolabelling bans the use of substances that are considered to be potential endocrine disruptors, category 1 (there is evidence of a change in endocrine activity in at least one animal species) or category 2 (there is evidence of biological activity related to changes in hormone balance), in line with the EU's original report on "Endocrine disruptors"[101] or later studies[102].

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[100] Miljøstatus i Norge (2008): Hormonforstyrrende Stoffer. http://www.miljostatus.no/Tema/Kjemikalier/Noen-farlige-kjemikalier/Hormonforstyrrende-stoffer/#D (dated 26.02.2009).

[101] DG Environment (2002): Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption. FINAL REPORT. European Commission DG ENV / BKH Consulting Engineers with TNO Nutrition and Food Research. 21 June 2000.

[102] DG Environment. (2002): Endocrine disruptors: Study on gathering information on 435 substances with insufficient data. http://ec.europa.eu/environment/endocrine/documents/bkh_report.pdf#page=1, European Commission / DG ENV / WRc-NSF. (2002): Study on the scientific evaluation of 12 substances in the context of endocrine disruptor priority list of actions, http://ec.europa.eu/environment/chemicals/endocrine/pdf/wrc_report.pdf#page=29
DHI water and environment. (2007): Study on enhancing the Endocrine Disruptor priority list with a focus on low production volume chemicals. DG Environment. http://ec.europa.eu/environment/chemicals/endocrine/pdf/final_report_2007.pdf

The European Commission is currently working on developing criteria for endocrine disruptors.[103] Nordic Ecolabelling is following this development and will make any necessary changes to the requirement once the EU criteria for identifying these substances have been published.

Flame retardants

Flame retardants come in several different types. For example, brominated flame retardants, chlorinated or phosphorous flame retardants. Flame retardants are suspected of contributing to a number of unwanted health effects. Several of the substances are suspected of causing birth defects, cancer and endocrine disrupting effects. The flame retardants HBCDD, short chain chloro-paraffins, TCEP, boric acid (and certain salts thereof), boron oxide and certain borax compounds (sodium tetraborate decahydrate and sodium tetraborate pentahydrate) are on the EU candidate list under REACH.

Many brominated flame retardants (BFR) are persistent and bioaccumulative chemicals that can now be found dispersed in nature. Polybrominated diphenylethers (PBDE) are one of the most common groups of BFR and they have been used as flame retardants on a wide range of materials, including textiles. There are, for instance, examples of hexabromocyclododecane (HBCDD) and tetrabromobisphenol A (TBBPA) being used on fabrics for cars. Other relevant textiles that may have been treated with flame retardants include bed linen in the healthcare sector (hospitals, care homes and nursing homes) and workwear[104]. The focus on phasing out brominated flame retardants has led to the use of alternatives such as phosphorus and nitrogen-based flame retardants.

Per- and polyfluorinated compounds, e.g. PTFE, PFOA and PFOS

Fluorosurfactants and other per- and polyfluorinated compounds (PFCs) constitute a group of substances that have harmful properties. Certain per- and polyfluorinated compounds can be broken down into the very stable PFOS (perfluorooctane sulphonate) and PFOA (perfluorooctanoic acid) and similar substances. These substances are extremely persistent and are easily absorbed by the body[105]. The substances are found all over the globe, from the large oceans to the Arctic. PFOS have also been found in birds and fish and in their eggs. The substances in this group impact on the biological processes of the body and are suspected to be endocrine disruptors, carcinogenic and to have a negative impact on the human immune system[106].

[103] Chemical watch, News, Andriukaitis promises EDC criteria 'before the summer', 04.02.2016, https://chemicalwatch.com/44841/andriukaitis-promises-edc-criteria-before-the-summer
[104] Survey, health and environmental assessment of flame retardants in textiles, Danish Environmental Protection Agency, 2014.
[105] Borg, D., Tissue Distribution Studies And Risk Assessment Of Perfluoroalkylated And Polyfluoroalkylated Substances (PFASS), Doctoral Thesis, Institute Of Environmental Medicine (IMM) Karolinska Institute, Stockholm, Sweden 2013 http://publications.ki.se/xmlui/bitstream/handle/10616/41507/Thesis_Daniel_Borg.pdf?sequence=1
[106] E.g. Heilmann, C. et al, Persistente fluorbindelser reducerer immunfunktionen, Ugeskr Læger 177/7, 30.3.2015 OSPAR 2005: Hazardous Substances Series, Perfluorooctane Sulphonate (PFOS), OSPAR Commission, 2005 (2006 Update), MST, 2005b: Miljøprojekt nr. 1013, 2005, More Environmentally Friendly Alternatives to PFOS-compounds and PFOA, Danish Environmental Protection Agency, 2005.

PFOA, APFO (ammonium pentadecene fluoro octanoate) and certain fluoride acids are on the Candidate List due to their reprotoxicity, as well as PBT. There are new research results showing that shorter chains (2-6 carbon atoms) have been discovered in nature[107].

Chlorinated compounds such as PVC

PVC may contain hazardous phthalates and since they are not chemically bonded to the plastic, they can leak out of the products[108]. In addition, soft PVC coating on the textile is not desirable in the waste stage, where it can be problematic either in incineration facilities or when the textile fibre is recycled.

Nanoparticles

Nanoparticles are not desirable in ecolabelled products. These include nanometals such as nanosilver, nanogold and nanocopper. Nanometals such as nanosilver and nanocopper are a particular problem as they are present in many products for their antibacterial effect. See more information in the background text to the requirement “Biocides and antibacterial substances”.

The criteria specify that polymer emulsions are not considered to be nanomaterial and set out exemptions from the requirement. A nanomaterial is a natural, incidental or purposely manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for at least 50% of the particles in the number size distribution, one or more external dimensions is in the size range 1-100 nm*.

It should be noted that Nordic Ecolabelling does not require a test for all raw materials in terms of nanoparticles. The requirement needs a declaration from the raw material supplier for raw materials that are not covered by the exemption. The declaration must state that the raw material does not contain nanomaterial, as defined in the requirement.

Heavy metals

The requirement covers all chemicals in the textile production and prohibits the use of the following heavy metals: antimony, arsenic, cadmium, chromium, lead, mercury, zinc, copper, nickel, tin, barium, cobalt, iron, manganese, selenium and silver.

Heavy metals such as cadmium, lead and mercury may be found as impurities in certain dyes and pigments used for textiles. These metals can accumulate in the body over time and are highly toxic with irreversible effects, including damage to the nervous system (lead and mercury) or kidneys (cadmium). Cadmium is also known to cause cancer. Cadmium is classified as carcinogenic, mutagenic, reprotoxic, toxic and toxic for aquatic organisms. Chromium is allergenic, carcinogenic and toxic for aquatic organisms.

[107] Perkola, Noora, Fate of artificial sweeteners and perfluoroalkyl acids in aquatic environment, Doctoral dissertation Department of Environmental Sciences, Faculty of Biological and Environmental Sciences, University of Helsinki, Finland 12.12.2014, https://helda.helsinki.fi/bitstream/handle/10138/136494/fateofar.pdf?sequence=1

[108] Miljøstatus i Norge: http://www.miljostatus.no/no/Tema/Kjemikalier/Noen-farlige- kjemikalier/Ftalater/ (accessed 04.12. 2011).

The use of cadmium, mercury and lead has become very limited in textiles, but controlling for them remains relevant[109].

Azo dyes

The requirement has been moved to this requirement containing the prohibition list in this generation of the criteria. Aromatic amines released by azo dyes may be carcinogenic, allergenic, irritating and toxic.

In relation to the previous version of the criteria, the requirement has been extended to include 12 substances described in the report "Toxics in Carpets in the European Union". These 12 aromatic amines have been identified as degradation products from azo dyes used in carpets and are also considered to be relevant for textiles. All the carcinogenic aromatic amines covered by the Nordic Ecolabel requirement are listed in Appendix 2. The 12 new substances in this criteria version are listed at the bottom.

Note that Nordic Ecolabelling's requirements go further than REACH, by entirely prohibiting the use of azo dyes that may release any of the carcinogenic aromatic amines.

Some of the substances in Annex 2 are excluded through REACH (Regulation No. 1907/2006) Annex XVII No 43 if they are included in quantities exceeding 30 mg / kg (see Appendix 8 of the REACH Regulation).

Phthalates

The requirement excludes the presence of phthalates on the Candidate List and other phthalates. A number of phthalates, including the phthalates on the Candidate List in REACH, are considered problematic. The phthalates on the Candidate List, for example, interfere with reproduction and are classified as reprotoxic. When the phthalates are used as softeners in plastic products, the phthalates are not bound in the material, and so will slowly be released during use of the product[110]. Phthalates are often used as a softener in polyvinyl chloride (PVC). In the textile industry, they are used in the print on textiles, waterproof fabrics, artificial leather, rubber, as a softener in PVC, and in some dyes.

Chlorinated solvents, including chlorophenols and chlorobenzenes

Chlorinated solvents – such as trichloroethane (TCE) – are used by textile producers to dissolve other substances during manufacture and to clean textiles. TCE is an ozone depleting substance that is persistent in the environment. It is also known to affect the central nervous system, liver and kidneys. Since 2008, the EU has severely restricted the use of TCE. Chlorinated carriers may be used for the colouring of synthetic fibre and fabric or blends of polyester and wool.

Chlorobenzenes are persistent and bioaccumulative chemicals that have been used as solvents and biocides in the production of dyes and as auxiliary chemicals. The effect of exposure depends on the type of chlorobenzene; however, they tend to affect the liver, thyroid and central nervous system.

[109] Investigation of chemical substances in consumer products, Danish Environmental Protection Agency 2011.
[110] Guidance to businesses on phthalates, Danish Environmental Protection Agency 2013.

Hexachlorobenzene (HCB) is the most toxic and persistent chemical in this group, as well as being an endocrine disruptor.

Chlorophenols

Chlorophenols are a group of substances that are often used as biocides in a wide range of products. Pentachlorophenol (PCP) and its derivatives are, for example, used as biocides in the textile industry. PCP is highly toxic to humans and can affect the body's organs. It is also highly toxic for aquatic organisms. The EU prohibited the manufacture of products that contained PCP in 1991 and now also severely restricts the sale and use of all goods that contain the chemical. Imported products containing PCP are the most significant remaining sources of potential PCP emissions and exposure. It may, for example, be present in leather and textiles to protect against mould. Chlorophenols may also be present as impurities from the raw materials used in the production of dyes. Furthermore, PCP and tetrachlorophenol (TeCP) may be used as preservatives in printing paste for textiles[111].

Alkylphenols and their ethoxylates

Alkylphenol ethoxylates (APEO) and/or alkylphenol derivatives (APD) are a group of non-readily degradable surfactants that are proven endocrine disruptors. The alkylphenol compounds most often used in textiles are nonylphenols (NP) and octylphenols and their ethoxylates, particularly nonylphenol ethoxylates. The textile industry uses NPs in its washing and dyeing processes. They are toxic for aquatic organisms, persistent in the environment and can accumulate in body tissue and be biomagnified (increase in concentration through the food chain). Their similarity to natural oestrogen hormones can disrupt the sexual development of some organisms[112].

Organotin compounds

Organotin compounds are used in biocides and as fungicides in a wide range of consumer products. In the textile industry, they can be found in products such as socks, shoes and sportswear to prevent odours caused by the breakdown of perspiration. One of the most common organotin compounds is tributyltin (TBT). Several of the tin-organic compounds are banned for selected areas of use through Reach Annex XVII entry 20 and the following three; TBTO, DBTC and DOTE are on the EU Candidate List[113].

Linear alkylbenzene sulphonates (LAS)

LAS is an active ingredient in detergents and cleaning agents that may be used in washing processes during textile production. LAS is, as a tenside, highly toxic and can be absolutely lethal to aquatic organisms such as fish, crustaceans and algae. The toxic effect is due to surfactants dissolving fat and proteins and thus also the living organism's cells and their cell membranes.

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[111] Roadmap to zero https://www.roadmaptozero.com/fileadmin/layout/media/downloads/en/Chlorophenols.pdf accessed 02.08.2019.

[112] Eleven hazardous chemicals which should be eliminated, https://www.greenpeace.org/archive-international/en/campaigns/detox/fashion/about/eleven-flagship-hazardous-chemicals/ accessed 02.08.2019.

[113] https://miljostatus.miljodirektoratet.no/tema/miljogifter/prioriterte-miljogifter/tbt-og-andre-organiske-tinnforbindelser/) besøgt 8 august 2019.

In addition, LAS is not degraded anaerobically and will thus end up in the sludge in treatment plants where the substance is potentially harmful due to its toxicity to aquatic organisms. Therefore, LAS is excluded.

Quaternary ammonium compounds such as DTDMAC, DSDMAC and DHTDMAC

The cationic detergents distearyl dimethyl ammonium chloride (DSDMAC), dihydrogenated tallow alkyl dimethyl ammonium chloride (DTDMAC) and dihydrogenated tallow dimethyl ammonium chloride (DHTDMAC) are substances with toxic and persistent properties. Their emissions to water have been significantly reduced in recent times. Concern remains, however, over their use in softeners, through which they can reach surface water via direct discharges, sewerage systems or wastewater treatment plants. These three surfactants have been phased out in many countries, in line with the PARCOM Recommendation 93/4 on the Phasing Out of Cationic Detergents DTDMAC, DSDMAC and DHTDMAC in Fabric Softeners. Since they might possibly still be used in some countries, their exclusion remains relevant[114].

EDTA

EDTA (ethylenediaminetetraacetic acid) and its salts are not readily degradable and the EU's risk assessment states that under the conditions at municipal water treatment plants EDTA is either not broken down or only breaks down to a slight degree (CEFIC, 2009). Today there are more environmentally aware alternatives that are degradable and able to replace EDTA in chemical products. These include MGDA (methylglycinediacetic acid). EU is also actively working to limit EDTA in the paper industry (Official Journal of the European Union, 2006/C 90/04). EDTA is used as a complexing agent in the production of many chemical products for technical use.

5.8.2 Specific chemical requirements

O34 Biocides and antibacterial substances

The following substances, which may have a biocidal and/or antibacterial effect in fibre, fabric or the finished textile, are not permitted:

- Antibacterial substances (incl. silver ions, nanosilver and nanocopper) and/or
- Biocides in the form of pure active ingredients or as biocidal products.

Naturally occurring antibacterial effects in materials are not subject to the prohibition.

✉ Declaration from the chemical manufacturer/supplier that the requirement has been fulfilled.

Background to the requirement

Biocidal products and antibacterial products are not desirable in Nordic Swan Ecolabelled products. Frequent use of antibacterial substances in ordinary consumer products may contribute to increased resistance in bacteria and the eradication of necessary bacteria, and Nordic Ecolabelling does not wish to contribute to this.

[114] JRC Technical Reports: Revision of the European Ecolabel and Green Public Procurement (GPP) Criteria for Textile Products 2013.

Tests carried out by Swedish water company Svensk Vatten on sportswear treated with nanosilver show that, after 10 machine washes, 31-90% of the nanosilver had been washed out of the textile. Nanosilver is harmful for the aquatic environment[115]. Nordic Ecolabelling has therefore introduced a requirement prohibiting the addition of biocides and antibacterial substances. These substances are increasingly being added to consumer products – everything from textiles to kitchen equipment. One of the substances often being added is nanosilver. Particular attention is being paid to nanometals such as nanosilver and nanocopper, since they occur in many products. These nanomaterials are added to achieve an antibacterial effect. There has been particular concern that emissions of nanosilver into wastewater and other dispersal could eliminate desirable bacteria and cause resistance in bacteria. Another example of antibacterial substances that must not be used are organotin compounds and chlorophenols, which are used, for example, during the transport and storage of textiles.

Preservatives used in chemical raw materials ("in can" preservatives), for example in adhesives or surface treatments, are not subject to this prohibition. Here, the purpose of the biocide is to preserve the chemical product during storage. Naturally occurring antibacterial effects in materials are also not subject to the prohibition. Bamboo, for example, has such effects.

The requirement is a combination of requirements O27 and O67 from the previous generation of the criteria. For communication purposes, requirement O33 also specifies that organotin compounds are not permitted, since they are one of the 11 substance groups highlighted by Greenpeace in its "Detox My Fashion" campaign from 2011.

O35 Metal complex dyes and pigments

Only metal complex dyes and pigments based on copper that make up a maximum of 5% by weight may be used, and only for the following fibres and processes:

- when dyeing wool fibre
- when dyeing polyamide fibre
- when dyeing a blend of wool and/or polyamide with regenerated cellulose fibre

✉ Technical datasheets or test reports showing fulfilments of the requirement.

Background to the requirement

The requirement has been tightened since the previous generation of the criteria, as it is possible to substitute metal complex dyes when dyeing cotton. Metal complex dyes are used in connection with the dyeing of wool, silk, cotton and polyamide, for example. The dyes have hydroxyl, carboxyl or amino groups that are complexing agents for metal ions (Cr, Co, Ni, Cu). Metal complex dyes are problematic because they contain undesirable heavy metals. The requirement prohibits the use of metal complex dyes and pigments containing, for example, chromium, cobalt and nickel. It also restricts the scope to use copper, which occurs widely in metal complex dyes.

[115] Silverläckan, En rapport om silver i sportkläder 2018, Svenskt Vatten
file:///C:/Users/hbb/Downloads/Silverrapport%20Svenskt%20Vatten%2020181022C.pdf

Copper should be avoided in the aquatic environment, but it is not harmful to health unless ingested. Because of its high fixation ratio and colour fastness copper in metal complex dyes, is therefore acceptable in small quantities (max. 5 wt% in the dye) for certain fibre types.

In general terms, metal complex dyes have a high fixation ratio (85-98%) and good fade resistance. The good fade resistance may help to give the textile a long life[116]. With wool/polyamide blends, it can be difficult to achieve the desired clarity and colour fastness for certain colours without the use of metal complex dyes. Parts of the industry state that it is possible to phase out metal complex dyes even for the dark colours and still produce textiles of good quality that the market wants. Other businesses believe that the restrictions being introduced make it more difficult for them to produce all the types of goods that the market demands. It is, however, worth considering whether customers would demand these colours, if they knew that there were less environmentally harmful alternatives.

O36 Degradability of detergents, softeners and complexing agents

Chemical products that are used as detergents, softeners and complexing agents shall be either readily aerobically biodegradable or inherently aerobically biodegradable, in accordance with test methods OECD 301 A-F (60% degradability), OECD 310 (60% degradability), OECD 302 A-C (70% degradability) or equivalent test methods.

Silicone softeners and complexing agents referred to as binders "chelating agents" and "sequestering agents" are also covered by the requirement.

✉ The chemical manufacturer must submit safety data sheets or test reports showing fulfilment of the requirement.

Background to the requirement

Detergents, softeners and complexing agents are used in large quantities in the wet processes of textile production. It is therefore relevant to set a requirement that these chemicals must be readily degradable or inherently degradable, in order to reduce the environmental impact of these chemicals. The requirement has been reworded and tightened since the previous generation of the criteria. The wording now specifically states that the requirement applies to all chemicals used for their function as a detergent, softener or complexing agent. Chelating agents and sequestering agents are synonymous with complexing agents and are therefore also covered by the requirement.

The requirement has been tightened such that the chemicals can no longer be "eliminable in the wastewater treatment plant", as this could lead to sludge used for soil improvement containing undesirable chemicals. The requirement is no longer identical to the corresponding requirement for the EU-Ecolabel.

O37 Sizing agents

This requirement only applies to weaving processes.

[116] Brancheorientering for tekstilfarvning og –tryk, Orientering fra Miljøstyrelsen Nr. 7 2010.

At least one of the alternatives below shall be fulfilled and documented:

1. Sizing agents must be either readily aerobically biodegradable or inherently aerobically biodegradable, in accordance with test methods OECD 301 A-F (60% degradability), OECD 310 (60% degradability), OECD 302 A-C (70% degradability) or equivalent test methods

or

2. Over 80 wt% of the sizing agents used must be recovered from the wastewater.

✉ Alternative 1: Safety data sheet for sizing agents used, showing fulfilment of the requirement.

✉ Alternative 2: Declaration from the weaving factory that the requirement is fulfilled, plus brief description of the recovery process from the weaving factory.

Background to the requirement

This requirement only applies to weaving factories. Sizing agents are added to protect the yarn during the weaving process. This results in greater abrasion resistance and prevents wear of the yarn during weaving. The requirement is a reworking of the requirement from the previous generation of the criteria. It is now clear that the requirement also permits recovery of sizing agents as an alternative. Recovering chemicals can save on resources and energy, and thus make a positive contribution to a circular economy.

O38 Bleaching agents

Chlorinated substances shall not be used as bleaching agents. The requirement applies to all types of textile processes, including bleaching of yarn, fabric or the finished textile.

✉ Declaration from the producer of the yarn, fabric or finished textile that the requirement is fulfilled.

Background to the requirement

The requirement is identical to the requirement from the previous generation of the criteria. However, in this generation of the criteria, the requirement has been split up, so that the prohibition of chlorine treatment of the wool fibre is found in requirement O29.

Chlorinated bleaching agents are environmentally hazardous and are therefore not permitted. The use of chlorinated bleaching agents has been reduced in the industry and alternatives are available, such as hydrogen peroxide (H2O2)[117]. Requirement O23 sets out provisions concerning bleaching agents for regenerated cellulose fibre.

O39 Chemicals that contain silicone

D4 (CAS no. 556-67-2), D5 (CAS no. 541-02-6) and D6 (CAS no. 540-97-6) shall only be present in the form of residues from the raw material production, and each shall only be present in amounts up to 1000 ppm in the silicone raw material (the chemical).

✉ Test from the chemical manufacturer showing that the requirement is met.

[117] The EU Ecolabel's background document, 2007.

Background to the requirement

Siloxanes D4, D5 and D6 are included on the Candidate List of Substances of Very High Concern in REACH, and so these substances are prohibited through requirement O33. However, a specific requirement has been included for these siloxanes to make it clear that documentation is required to confirm that the content is below the stated limit value in any silicone used. This is considered relevant because much of the textile production takes place in countries that are not covered by REACH.

It is possible to find chemicals containing silicone in use throughout the production chain, for example as softeners. The requirement has thus been reworded since the previous generation of the criteria, because it used to only cover finishing, membranes and laminates.

O40 VOC in printing paste

Printing paste may not contain more than 5% volatile organic compounds (VOC)*.

** Volatile organic compounds are defined here as organic compounds with a steam pressure exceeding 0.01kPa at 20°C.*

✉ Declaration from the producer or supplier of the printing paste that the requirement is fulfilled.

Background to the requirement

Volatile organic compounds are undesirable, because they tend to be harmful to health, poorly degradable in an aquatic environment and have a negative impact on the ozone layer. Printing paste often contains volatile organic compounds, which is why there are requirements limiting the use of such substances.

The requirement remains unchanged from the previous generation of the criteria. The documentation requirement has been updated, to make it clear that the supplier or producer of the printing paste must declare fulfilment of the requirement.

5.9 Coatings, laminates and membranes

O41 Textiles as substrate (e.g. in laminates)

Textiles used as substrate/carrier material in the production of textiles with coatings, laminates and membranes shall fulfil the requirements for the respective fibres in section 5.7.

See the definition of coatings, laminates and membranes in section 5.2 Definitions.

✉ Documentation as described in the relevant fibre requirement.

Background to the requirement

Textiles (fabrics) used as carrier materials/substrates for lamination or onto which a coating or membrane is applied must meet the same requirements as other fabrics that are used in Nordic Swan Ecolabelled textiles. The requirement is new and has been inserted to show that both fibre requirements and chemical requirements (if relevant) apply to fabrics used in conjunction with coatings, laminates and membranes for textiles.

O42 Coatings, laminates and membranes

Additives (e.g. added in master batch) in polymers used in coatings, laminates and membranes must meet and document following requirements:

- O31 Classification of chemical products,
- O32 Classification of ingoing substances,
- O33 Prohibited substances
- O35 Metal complex dyes and pigments.

✉ Documentation as described in the relevant fibre requirement.

Background to the requirement

The requirement remains unchanged from generation 4 of the criteria. Here, this requirement refers to the general chemical requirements for additives (in master batch) in the polymer, to make it clear that these chemicals are also considered to be chemicals used in the textile production. Coatings, laminates and membranes coated with or based on per- and polyfluorinated compounds, for example, are not permitted. These substances are excluded from use in requirement O33 Prohibited substances.

Fluorinated polymers are widely used as coatings, laminates and in membranes, to achieve a product with breathable properties, while also being water resistant, for example in outdoor wear.

Fluorinated polymers such as perfluoroalkyl substances are highly persistent (stable) and slow to degrade. The compounds are very slowly soluble in water and fat, and accumulation takes place as they are bound to surfaces of particles or tissue. They are bound to proteins and can be found with a high content in top predators. In a Nordic screening survey, PFAS compounds were shown in all of the sample types investigated, and the highest level was found in marine mammals. The report concluded that PFAS are found in significant concentrations in the Nordic environment. The greatest focus is on the PFAS compound perfluorooctane sulphonate (PFOS), which is toxic for aquatic organisms, birds and bees.[118]

The greatest emissions of organic fluorinated substances occur during production of the clothing, but the substances are also dispersed into nature through use, washing and finally disposal of the clothing. There are alternatives to organic fluorinated substances, for both membranes and surface treatment. The 2015 report "Alternatives to perfluoroalkyl and polyfluororalkyl substances (PFAS) in textiles" from the Danish Environmental Protection Agency names paraffin oils and wax, silicone, polyurethane and dendrimer-based substances as non-fluorinated alternatives for the surface treatment of textiles. Fluorinated membranes may be made from either polyester (see e.g. https://www.klattermusen.com/en/fabrics/190_cutan/), a blend of polyester and polyethylene (see e.g. https://en.wikipedia.org/wiki/SympaTex) or from polyurethane (see e.g. https://www.hellyhansen.com/about-us/manufacturing/).

[118] Norwegian Pollution Control Authority (2005) Monitoring of air and precipitation transported over long distances.

In its report "Chemistry for any weather" from 2012, Greenpeace concludes that it is possible to produce wind- and waterproof outdoor clothing without using organic fluorinated substances. They refer to a study conducted by the Berlin University of Applied Science (HTW)[119], where three fluorine-free coatings and a fluorine-free membrane were tested in the laboratory and compared with the properties of conventional fluorinated products. The tests examined properties such as water repellency, oil repellency, waterproofing, windproofing, breathability and abrasion resistance. The results showed that the properties of the fluorine-free alternatives matched those of the fluorinated products in the areas that are of most importance to the ordinary consumer, namely wind- and waterproofing, breathability and abrasion resistance. Oil repellency was the only property for which the fluorinated products achieved better results than the fluorine-free alternatives.

5.10 Specific chemical requirement for adhesives

O43 Adhesives

The requirement covers adhesives used to glue textiles, coatings, membranes, laminates or other materials.

Adhesive used for small info labels such as care labels is not covered by the requirement.

The adhesive

- must not have any added colophony resin

and

- must meet requirements O31 Classification of chemical products, O32 Prohibition of CMR substances and O33 Prohibited substances.

✉ Safety data sheet and declaration from the chemical manufacturer that the requirement is fulfilled.

Background to the requirement

The requirement has been tightened compared with generation 4. The area of use is clarified and there is a specification that requirements O31 Classification of chemical products, O32 Prohibition of CMR substances and O33 Prohibited substances apply to all adhesives, with the exception of adhesive used for small info labels.

5.11 Discharges from wet processes

O44 COD, temperature and pH in wastewater from wet processes

- Discharges of COD in wastewater from wet processes shall not exceed 20 g per kg of textile produced. Wastewater that is sent to municipal or other regional treatment works is exempted.

  Test method: COD content shall be tested in accordance with ISO 6060 or equivalent.

- The pH value of the wastewater released to the surface water shall be between 6 and 9 (unless the pH value in the recipient lies outside this interval).

[119] Marijke Schöttmer, Master's thesis: Investigation of Alternatives to Fluorocarbon Finishes for Textiles.

- The temperature of the wastewater released to the surface water shall be lower than 40°C (unless the temperature in the recipient is higher).
- A test report shall be submitted with the application. Thereafter, the applicant must have a procedure in place for annual testing in line with the requirement and for ensuring compliance with the requirement. Nordic Ecolabelling must be informed if the requirement is not fulfilled.

✉ Report submitted with application, showing average monthly calculations of COD, pH and temperature for at least three of the past 12 months. (For COD, measurement of PCOD, TOC or BOD may be used if a correlation to COD is evident).

✉ Description of how the wastewater from the wet process is treated and if the wastewater is sent to municipal or other regional treatment.

✉ A written procedure showing how an annual test is performed in line with the requirement, along with in-house checks of compliance with the requirement.

Background to the requirement

The requirement remains unchanged from generation 4 of the criteria, but with the addition of requiring a procedure for annual in-house checks of compliance with the requirement. It is also specified that the calculations must be carried out in at least three of the past 12 months. In addition, material to help with calculating COD has been drawn up.

High levels of COD in the wastewater can lead to oxygen depletion of the aquatic environment and thereby harmful effects on flora and fauna. There is also a requirement that the temperature of the wastewater shall be lower than 40°C (unless the recipient's temperature is higher) and that the pH shall be between 6 and 9 (unless the recipient's value lies outside this interval). Measurement of PCOD, TOC or BOD may also be used, if a correlation to COD is evident.

5.12 Energy and water consumption

O45 Implementation of BAT for energy efficiency and water savings

The applicant shall demonstrate that the energy used for washing, drying and curing associated with dyeing, printing and finishing the textile is measured and compared with BAT levels or own figures from before implementing efficiency techniques.

This shall be done as a part of an energy management system or a system for the management of CO_2 emissions. The requirement may be documented per process.

The applicant shall demonstrate that the water consumption associated with wet processes such as dyeing, printing and finishing the textile is measured

There shall also be documentation for that the production facilities have implemented a minimum of BAT water and energy efficiency techniques or measures for in-house production of solar energy, see the table and the extra information about BAT themes below. This applies to the total production volume for the individual production facility.

BAT themes	Production volume	
	<10 tonnes per day	>10 tonnes per day
1. General energy management	Two techniques	Three techniques
2. Washing and rinsing	One technique	Two techniques
3. Drying and curing using stretchers	One technique	Two techniques

BAT themes:

General techniques:

- Measuring how much is consumed and where
- Process monitoring and automatic control systems for power regulation, filling volumes, temperatures and timings
- Insulating pipes, valves and flanges
- Frequency-controlled electric motors and pumps
- Closed design of machines to reduce evaporation losses
- Reuse of water and liquids in batch processes
- Combining multiple wet treatments into one process
- Heat recovery, e.g. from washing, steam condensate, exhaust air from processes, exhaust gases from combustion
- Solar thermal panels, solar photovoltaic panels or a heat recovery system for used hot water, installed within the operation and generating energy amounting to 30% of what the process requires

Washing and rinsing:

- Using cooling water as process water
- Replacing overflow tanks with drainage/inlet tanks
- Using "intelligent" rinsing technologies with water flow control and counter flow
- Installing a heat exchanger

Drying and curing using stretchers:

- Optimising air circulation
- Insulating the premises
- Installing effective burner systems
- Installing heat recovery systems

☒ The applicant must compile and submit reports from energy management systems for the individual dyeing, printing and finishing facilities. ISO 50001 or equivalent systems for energy management or management of CO_2 emissions are accepted as documentation of the energy management system.

☒ The applicant must compile and submit measurements of water consumption for the individual dyeing, printing and finishing facilities.

☒ The applicant must submit an overview of the dyeing, printing and finishing facilities, stating the production volume per day for each process.

☒ For each implementation of a BAT technique or process using solar energy produced in-house, the applicant must submit images of the facility, technical descriptions of the individual technologies and assessments of the energy savings achieved, along with a statement of the process and operation in which the technology has been implemented.

Background to the requirement

The requirement concerning energy and water consumption has been expanded to include a requirement on implementation of a minimum of BAT techniques to reduce energy and water consumption. It is assessed not possible to set an absolute requirement limit for energy and water consumption, since production of the individual fabrics can vary a great deal, depending on the function of the finished fabric.

There is a requirement, instead, that the individual production facility must implement a minimum of BAT techniques for water and energy efficiency. BAT techniques are taken from the Reference Document on Best Available Techniques for the Textiles Industry, European Commission July 2003[120] and compared with the requirements for BAT techniques in the EU Ecolabel criteria for textile products from 2014.

Here we have been looking into whether it would be possible to use a PEF (product environmental footprint) analysis or EPD (environmental product declaration) as a basis for a specific CO_2 or energy requirement. However, it is considered very difficult to impose an absolute quantitative requirement for either energy consumption or CO_2 impact, which is relevant for all textiles in this product group. This product group includes many different textiles products with different functions. An overall requirement (or differentiated for a few different subcategories) with a maximum benchmark value for either energy consumption or climate impact in the form of CO_2 equivalents would be directed towards specific fibre types and specific textile types. An overall requirement would not be relevant for all textile products in the product group.

5.13 Fillings, stuffing materials and padding

The following requirements concern fillings, stuffing materials and padding that individually account for more than 1 wt% of the total filling, stuffing material or padding in the final product.

O46 Fibres in filling and stuffing materials

Fillings, stuffing materials and padding made from fibre must meet the following fibre requirements:

- Cotton fibre: requirement O14
- Flax (linen), ramie, sisal, hemp, jute and other bast fibres: requirement O16
- Wool fibre: requirements O18, O19 and O22
- Regenerated cellulose fibre: requirement O23
- Synthetic fibre: requirements O25
- Recycled fibres: O28
- All fibres: requirement O29

✉ Here the same documentation is required as stated in the requirements referred to.

Background to the requirement

The requirement has been set to ensure that the environmental impact from raw material production is also addressed for products where filling and stuffing materials are of great relative importance compared to the other materials in the product. Reference is made to the background texts for the individual fibre requirements. Any finishing or coating of the fibres must meet requirement O29.

O47 Feathers and down – ethical requirements

Use of feathers and down plucked from live birds is prohibited.

Forced feeding of birds is prohibited.

[120] Reference Document on Best Available Techniques for the Textiles Industry, European Commission July 2003.

Recycled* down and feathers are exempt from the requirement, but documentation for traceability shall be provided to confirm that the down and feathers are recycled.

** Recycled down and feathers are defined here as post-consumer recycled down and feathers in line with standard ISO 14021.*

☒ Responsible Down standard or a certificate from another standard that fulfils the requirement.

☒ Recycled down and feathers: Recycled Global Standard certificate. Alternatively, documentation from the supplier, confirming that the down/feathers are post-consumer recycled down or feathers.

Background to the requirement

Geese are the main target of feather and down plucking from live birds, but the method may also be applied to other duck species. Plucking feathers from live geese for down production is prohibited within the EU, although down and feathers may be "harvested" during the moulting period. The European Food Safety Authority (EFSA) has investigated the issue and concluded that it is possible to pluck down and feathers from live geese without causing pain, as long as it takes place during the moulting period[121]. The problem is that this is not taken into consideration in commercial operations and there are cases where the law is not complied with in all EU member states. The recommendation from EFSA is that goose down and feathers should only be plucked during the moulting period, and that control systems should be created for this. No such control system is in place yet, however, and Nordic Ecolabelling has therefore set a requirement prohibiting the use of down and feathers plucked from live birds. Forced feeding is also not permitted.

Textile Exchange has published a certifiable standard for down and feathers – **the Responsible Down Standard (RDS**). RDS ensures an independent third-party assessment of the key aspects of breeding and handling the animals and ensures traceability all the way back along the supplier chain. The purpose of the standard is to improve the welfare of the birds, and also to provide greater reassurance to retailers and consumers with regard to the purchase of sustainable materials. The aim of the Responsible Down Standard is to ensure that down and feathers do not come from birds that have suffered unnecessary harm. The standard can be applied to both mixed and 100% certified products. However, the end-product can only be labelled as RDS-certified if the down or feathers in the product are 100% certified. The certification ensures, for example, that forced feeding is prohibited and that down and feathers are not plucked from live birds. It also ensures that the birds are not kept in cages and have space to express their natural behaviours. This includes the requirement that there must be nesting areas for female birds[122]. There is a long list of certified down and feather suppliers, which can be found here: http://responsibledown.org/for-business/find-certified-companies/all-companies-certified-to-the-responsible-down-standard/. These feathers and down are used in various products on the market, such as clothing, duvets and other textile products with fillings.

[121] EFSA Scientific Opinion on the practice of harvesting (collecting) feathers from live geese for down production, 25 November 2010.
[122] http://responsibledown.org/wp-content/uploads/2015/07/TE-Responsible-Down-Standard-2.0-opt.pdf accessed 07.06.2016.

O48 Feathers and down – microbial cleanliness

Feathers and down must comply with the following to document microbial cleanliness:

- oxygen index number of max. 10
- fat content must lie within the range 0.5% to 2.0%

Determined in accordance with the standards:

- EN 12935 Feather and down – Hygiene and cleanliness requirements,
- EN 1162 "Feathers and down. Test methods – Determination of the oxygen index number"
- And EN 1163 Feather and down – Test methods – Determination of the oil and fat content.

✉ Microbial cleanliness: Test report showing compliance with the requirement.

Background to the requirement

The standard EN 12935 "Feather and down – Hygiene and cleanliness requirements" sets requirements for the microbial cleanliness of feathers and down as a filling material. It gives the oxygen index number as an indicator of the material's cleanliness. The standard states that an oxygen index number of less than 20 for the filling material is considered hygienically acceptable and so no further analysis of microbial activity in the material is necessary. The Nordic Swan Ecolabel criteria require an oxygen index number of max. 10, representing high microbial cleanliness. EN 12935 refers to EN 1162 "Feathers and down. Test methods – Determination of the oxygen index number" and EN 1163 Feather and down – Test methods – Determination of the oil and fat content.

O49 Feather and down - Labelling of filling materials

Feather and down filling materials in duvets and pillows must be labelled in accordance with standard EN 12934 "Feather and down – Composition labelling of processed feathers and down for use as sole filling material".

✉ Declaration that the labelling of the filling material complies with EN 12934.

Background to the requirement

This requirement is new. Standard EN 12934 contains provisions on information about the composition of feather and down filling materials and sets out guidelines on the label on the finished goods.

O50 Additives and treatments

Fillings, stuffing materials and padding (except for fibres which have their own requirement O46) must not be added or treated* with:

- Substances on the REACH Candidate List. Link to the REACH Candidate List: http://echa.europa.eu/web/guest/candidate-list-table
- PVC
- Organic chlorinated compounds
- Flame retardants (e.g. short chained chlorinated paraffins)
- Halogenated bleaching chemicals
- Aziridines and polyaziridines
- Carcinogenic, mutagenic and reprotoxic compounds (categories 1A, 1B and 2 in accordance with CLP Regulation 1272/2008)
- Phthalates

- Fluorinated organic compounds such as PFOA** (perfluorooctanoic acid and its salts/esters), PFOS (perfluorooctane sulphonate and its compounds), and PTFE (polytetrafluoroethylene), etc.
- Organotin compounds
- Biocides or biocidal products intended to add a disinfecting or antibacterial effect in the product.

** See the definition of impurities and ingoing substances in section 5.2 Definitions.*

*** "Be aware of national legislation concerning PFOA, if the product is to be sold/marketed in Norway. In Norway, PFOA is governed by the "Regulation on restrictions to the use of health- and environmentally hazardous chemicals and other products (Product Regulations)", Section 2-32.*

✉ Declaration from the producer/supplier of the filling/stuffing material showing that the requirement is fulfilled.

✉ For natural fillings and stuffing materials such as down, feathers or ones with no chemical additives or treatments: Declaration from the producer/supplier that no chemical additives or treatments have been used.

Background to the requirement

In this product group, filling and stuffing materials will often be in close contact with the user of the product, as the materials lies just below the textile. This makes it highly relevant to address potential exposure to hazardous chemicals from filling and stuffing materials. The background text for requirement O33 contains a background text for all substance groups on the list. The following provides more specific background for filling and stuffing materials.

Fluorinated organic compounds are used for e.g. impregnation of down and other filling materials. Chlorinated paraffins may be used as flame retardants and as softeners, so that substitution of chlorinated paraffins will depend on the effect to be achieved.

Organotin compounds: Polyurethane foam (PU) may contain organotin compounds such as dibutyltin (DBT) and tributyltin (TBT) which can, for example, be applied as an antibacterial treatment[123].

Halogenated flame retardants

Halogenated organic compounds such as chlorinated paraffins or brominated compounds can, for example, be used as flame retardants in foam materials and polystyrene balls[124].

The Danish Environmental Protection Agency has placed the flame retardant tris(2-chloro-1-methyl)phosphate (TCPP), which is mainly used in polyurethane foam (PU foam), on the LOUS list as a consequence of the Danish Environmental Protection Agency's self-classification (based on QSAR predictions) of the substance as Muta 2, H341 (Suspected of causing genetic effects) and Repr 2, H 361 (Suspected of damaging fertility or the unborn child).

[123] Survey, emissions and health assessment of chemical substances in baby products, Danish Environmental Protection Agency, 2008.
[124] Survey, emissions and health assessment of chemical substances in baby products, Danish Environmental Protection Agency, 2008.

On the basis of analogies drawn with tris(2-chloroethyl)phosphate (TCEP), TCPP is also classified as Carc. 2; H451. Tris(1,3-dichlor-2-propyl)phosphate (TDCP) is mutagenic in vitro, but not in vivo, and is also classified as Carc 2, H451.[125]

Brominated flame retardants such as hexabromocyclododecane, CAS no. 25637-99-4, (HBCD) are used extensively, especially in Europe. HBCD may, for example, be used in extruded and expanded polystyrene foam. Substances were found in polystyrene balls in two nursing pillows investigated in the Danish Environmental Protection Agency's analysis from 2008[126].

O51 Emission requirements for foamed synthetic materials

For foamed synthetic materials such as PU foam, latex foam and expanded polystyrene, emissions of the following substances and substance groups shall not exceed the levels stated in the table below.

Emission of volatile organic compounds mg/m³	
Substance or substance group	**Requirement limit**
Formaldehyde (50-00-0)	16
Toluene (108-88-3)	0.1
Styrene (100-42-5)	0.005
Vinylcyclohexene (100-40-3)	0.002
4-Phenylcyclohexene (4994-16-5)	0.03
Vinyl chloride (75-01-4)	0.002
Aromatic hydrocarbons	0.3
Volatile organic compounds	0.5

Emission testing must be performed according to the ISO 16000 standard, parts 3, 6, 9, & 11.

✉ Test reports showing that the requirement is fulfilled.
✉ Alternatively, a certificate from either Oeko-Tex class I Baby or CertiPUR may be used as documentation for the requirement.

Background to the requirement

Filling and stuffing materials can include hazardous chemicals, either as residue from polymer production, or additives in the material. For example, polyurethane (PU) foam and polystyrene balls may contain and emit volatile organic compounds which may be hazardous to health[127]. As the user will be in close contact with these materials, and be exposed to any emissions, a requirement has been set for the most important substances. Several certification schemes have the same emission requirements for these filling and stuffing materials and here a requirement has therefore been set, which can be documented with commonly used certification schemes. According to Europur, up to 80% of the cups in bras are made of polyurethane foam. PU foam is also used in shoulder pads and other elements of textile products[128].

[125] Chemical substances in child car seats and other products with textile for children, Danish Environmental Protection Agency, 2015.
[126] Survey, emissions and health assessment of chemical substances in baby products, Danish Environmental Protection Agency, 2008.
[127] Survey, emissions and health assessment of chemical substances in baby products, Danish Environmental Protection Agency, 2008.
[128] Europur – the European organisation for manufacturers of foam products, https://www.europur.org/applications/consumer-goods (accessed 20.08.2019).

There are small differences, for example that CertiPUR has a threshold value for aromatic hydrocarbons of 0.5 mg/m^3 instead of 0.3. It is, however, still considered appropriate to document the requirement with a CertiPUR certificate.

O52 Polycyclic aromatic hydrocarbons (PAHs):

For foamed synthetic materials such as PU foam, latex foam and expanded polystyrene the content of each individual PAH stated in the requirement shall be below 0.5 mg/kg.

The requirement concerns the following PAHs:

Substance name	CAS no.
Benzo[A]Pyrene	50-32-8
Benzo[E]Pyrene	192-97-2
Benzo[A]Anthracene	56-55-3
Dibenzo[A,H]Anthracene	53-70-3
Benzo[B]Fluoranthene	205-99-2
Benzo[J]Fluoranthene	205-82-3
Benzo[K]Fluoranthene	207-08-9
Chrysene	218-01-9

Must be tested in accordance with ISO 18287 or ZEK 01.2-08 (GC/MS).

✉ Test report showing that the requirement is fulfilled.
✉ A certificate from Oeko-Tex 100 class I Baby can also be used as documentation.

Background to the requirement

There are more than 100 PAH compounds. Several of the PAHs are carcinogenic and classed as Carc.1B and genotoxic. The PAHs usually originate from two types of additives, which are plasticising and process oils (extender oils) and carbon black, which is found in rubber and plastic products, and which is known to contain PAHs. Plasticising and process oil is a mineral oil product which originates from crude oil (petrogenic PAHs), while carbon black is a product that is produced by incomplete incineration or thermal degradation processes for heavy oils such as coal tar (primarily pyrogenic PAHs). Carbon black is used as a dye, amongst other things. PAHs have been found in expanded polystyrene[129] and PU foam[130] for consumer products, which makes this requirement relevant here.

The eight PAHs in the table are restricted in REACH and under EU legislation the level of each PAH must thus not exceed 1 mg/kg. Clothes, shoes and gloves are some of the consumer products covered by this REACH limitation[131]. The criteria requirement goes further than REACH, as it sets a maximum level of 0.5 mg/kg for each PAH.

O53 Polyurethane foam (PU foam)

Fillings, stuffing materials and padding made from polyurethane foam shall meet the following requirements:

[129] Si-Qi Li, PAHs in polystyrene food contact materials: An unintended consequence, Science of The Total Environment, Volume 609, 31 December 2017, Pages 1126-1131.
[130] Survey and risk assessment of chemical substances in bicycle helmets, The Danish Environmental Protection Agency 2018.
[131] Guideline on the scope of restriction entry 50 of Annex XVII to REACH: Polycyclic aromatic hydrocarbons in articles supplied to the general public, European Chemical Agency 2018.

- CFC, HCFC, HFC, methylene chloride or other halogenated organic compounds shall not be used as blowing agents.
- Isocyanate compounds shall only be used in a closed process with the prescribed protective equipment in accordance with the official requirements.

✉ Declaration from the foam manufacturer/supplier that the requirement is fulfilled.

Background to the requirement

Blowing agents

Halogenated organic compounds may not be used as blowing agents or auxiliaries for these. Historically, CFC, HCFC and HFC have been used in the production of PU foam, and it is generally known that these substances are harmful to the environment, especially as greenhouse gases and as ozone depleting substances. The requirement prohibits the use of halogenated organic compounds that are used as blowing agents or auxiliaries for these. Many producers of PU foam have replaced CFC and HCFC with carbon dioxide but ensuring that they are not used is still considered relevant.
Blowing agents are only relevant for PU foam, as the production of latex foam does not require blowing agents. Expanded polystyrene uses water or pentane as a blowing agent.

Isocyanates

To ensure a healthier work environmentIsocyanate compounds shall only be used in a closed process with the prescribed protective equipment in accordance with the official requirements. Diisocyanates are the second most important raw material in PU production. Toluene diisocyanate (TDI, CAS no. 26471-62-5) and methylene diphenyl diisocyanate (MDI, CAS no. 32055-14-4) are the two technical options currently found in the market. TDI, MDI or a mix of the two chemicals may be used, although the use of pure TDI appears to be the most customary choice among manufacturers today. TDI and MDI carry a large number of hazard statements, such as H351: Suspected of causing cancer, H317: May cause an allergic skin reaction and H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled. TDI also has H330: Fatal if inhaled and H412: Harmful to aquatic life with long lasting effects[132]. MDI appears to be less problematic, especially with regard to inhalation of the substance, and for the environment. Manufacturers believe, however, that their production systems take this into account, since personnel's exposure to TDI is controlled, and TDI is used in a significant share of the market in Europe. Foam made from MDI also has higher density (+30%), which requires more of the raw material, making the foam more expensive.

CertiPUR prohibits the use of CFC, HCFC and dichloromethane (methylene chloride), but does not set requirements concerning isocyanates.

O54 Latex

Fillings, stuffing materials and padding made from synthetic latex or natural latex shall meet the following requirements:

- The butadiene content shall be lower than 1 mg/kg latex.

[132] Updated Working Document for THE REVISION OF THE EU ECOLABEL CRITERIA FOR BED MATTRESSES, version 4 2013.

- The concentration of n-nitrosamines* shall not exceed 0.0005 mg/m^3, measured by the climate chamber test conducted in accordance with the standard ISO 16000-9.

* *n-nitrosodimethylamine (NDMA), n-nitrosodiethylamine (NDEA), n-nitrosomethylethylamine (NMEA), n-nitrosodiisopropylamine (NDIPA), n-nitrosodi-n-propylamine (NDPA), n-nitrosodi-n-butylamine (NDBA), n-nitrosopyrrolidine (NPYR), n-nitrosopiperidine (NPIP), n-nitrosomorpholine (NMOR).*

Test method: Butadiene can be determined according to EN 13130-4 or similar method.

✉ The latex producer must state test results in accordance with the requirement.

Background to the requirement

1,3-butadiene

Several synthetic latex materials contain substances that are harmful to health and the environment, including substances that are (suspected) carcinogens, such as 1,3 butadiene, CAS no. 106-99-0, in SBR rubber, which has the following classification: H340: May cause genetic defects and H350: May cause cancer. Butadiene functions as a monomer in the production of latex and the requirement aims to ensure that work is conducted to achieve the lowest possible monomer content in the final product.

Nitrosamines

Substances that are harmful to health, such as nitrosamines, can be formed during the vulcanisation process. Latex is an elastomer which, on vulcanisation, can be changed so that the material is virtually insoluble in a solvent at boiling point

5.14 Hides/skins and leather

O55 Origin of hides/skins and leather

Only the use of raw animal hides and skins originating from the production of milk, wool and/or meat/fish production is permitted.

Only raw hides and skins from the following animals are permitted: fish*, sheep, goats, cows, horses, pigs, elk, deer and reindeer.

* fish skin from fish red-listed as endangered[133] is not accepted.

✉ The applicant must submit a declaration from the leather producer or leather supplier, confirming that the raw hides/skins used derive from animals raised for milk, wool and/or meat/fish production.

Background to the requirement

The requirement has been set to ensure the use of only raw skins and hides that are a by-product of meat/milk/wool production. This reduces the environmental impact of livestock farming and ethically it also makes good sense that the leather and hides/skins produced make use of raw hides that are by-products of meat/milk/wool production. In this generation of the criteria, the requirement now also permits fish skin, as long as it does not come from red-listed endangered

[133] The IUCN Redlist, https://www.iucnredlist.org/

species. Fish skin shall meet the same requirements as other types of hide/skin and leather.

O56 Chromium content in leather and hides/skins

- The content of chromium (total) in the final treated leather or hide/skin (including finishing) shall be less than or equal to 0.1% (mass of chromium per total dry weight of leather or hide/skin) according to EN ISO 5398.
- There shall be no chromium (VI) present in the final treated leather or hide/skin (including finishing), in accordance with EN ISO 17075 (detection limit of 3 ppm) or equivalent.

✉ The applicant shall submit a test report for both total chromium and chromium (VI), demonstrating fulfilment of the requirement.

Background to the requirement

The requirement has been tightened to include a requirement on total chromium, which shall be less than or equal to 0.1% (mass of chromium per total dry weight of leather or hide/skin). The requirement that no chromium (VI) shall be present was also part of the previous generation 4. Regulation (EU) No 301/2014 adds a chromium (VI) restriction to Annex XVII of Regulation (EC) No 1907/2006 (REACH). Under this restriction, leather elements that come into contact with the skin must not contain chromium (VI) at a level of 3 mg/kg (3 ppm) or more.

The EN ISO 17075 standard recommends a detection limit of 3 ppm. The requirement here in these criteria goes further than the EU legislation by requiring testing and verification as the means of documentation.

Leather products can release Cr (VI) compounds, which is a problem because hexavalent chromium compounds are contact allergens. Cr (VI) is considered one of the most widely known allergens. Hexavalent chromium (Cr (VI)) is not used in the tanning industry and has no purpose in the tanning process. Chromium (III) salts may, however – under certain conditions – be converted into Cr (VI) compounds[134].

Whichever tanning process is used, it is relevant to ensure a low level of chromium and particularly chromium (VI) in the finished leather. Standard ISO EN 15987 defines different types of tanning and for "chromium-free tanning" permits up to 0.1% total chromium in the finished leather. "Vegetable tanning" is permitted up to a total of 0.3% tanning metals (Cr, Al, Ti, Zr, Fe) in the leather. The EU's Best Available Techniques (BAT) Reference Document for the Tanning of Hides and Skins[135] does not declare a particular tanning process to be a BAT. Each process has different key environmental and health aspects.

The most widely used tanning agent is chromium sulphate. Around 80-90% of global leather production uses chromium (III) salts in the tanning process. The rest of the leather industry tends to use a vegetable, aldehyde or mineral tanning process. The choice of tanning technology depends largely on the properties

[134] Survey and health assessment (allergies only) of chromium in leather shoes.

required in the finished material, cost, the production facilities available and the type of raw material being processed. Because of its particular properties vegetable tanned leather is often used for shoe soles and other hard leather products.

O57 Cadmium and lead

Cadmium and lead shall not be found in processed hides/skins or leather.

The content of cadmium and lead shall be tested according to the methods AAS, ICP-OES or ICP-MS (detection limit 10 ppm).

✉ A test report from the tannery showing that the requirement is fulfilled.

Background to the requirement

The requirement is set to ensure that there is no cadmium and lead in the finished hides/skins or leather. Heavy metals such as cadmium and lead can also be found in hides/skins and leather. Lead occurs most often due to contaminants in the chromate during chromium tanning.

O58 Chemical overview for leather and hides/skin production

All chemical products used in the various processes during the production of hides/skins or leather shall be stated, with safety data sheets as documentation.

The following information must be submitted for each chemical product:

- trade name
- the function of the chemical
- the process step in which the chemical product is used
- supplier, that uses the chemical product

The requirement also applies to all chemical products used for coatings or other finishing.

✉ Overview providing the required information for all the chemical products used.
✉ Safety data sheet for every chemical product, in line with Annex II of REACH 1907/2006.

Background to the requirement

To gain an overview of which chemicals are used in the various processes for the production of hides/skins and leather, the criteria require the submission of a list of all the chemicals used.

O59 Classification of chemicals

The chemicals used shall not be classified as any of the hazard categories set out in the table below. The requirement applies to all chemicals used in every step of manufacturing leather and hides/skins (including finishing).

CLP Regulation 1272/2008		
Hazard class	**Hazard category**	**Hazard code**
Toxic to aquatic life	Aquatic Acute 1 Aquatic Chronic 1 Aquatic Chronic 2	H400 H410 H411
Hazardous to the ozone layer	Ozone	H420
Carcinogenicity*	Carc 1A or 1B Carc 2	H350 H351
Germ cell mutagenicity*	Muta. 1A or 1B Muta. 2	H340 H341
Reproductive toxicity*	Repr. 1A or 1B	H360

	Repr. 2 Lact.	H361 H362
Acute toxicity	Acute Tox 1 or 2 Acute Tox 3	H300, H310, H330 H301, 311, 331
Specific target organ toxicity with single or repeated exposure	STOT SE 1 STOT RE 1	H370 H372
Sensitising on inhalation or skin contact	Resp. Sens. 1, 1A or 1B Skin Sens. 1, 1A or 1B	H334** H317**

** Including all combinations of stated exposure route and stated specific effect. For example, H350 also covers the classification H350i.*

*** Applies only to pigments, dyes and colourings*

✉ Declaration from the chemical manufacturer that the requirement is fulfilled.

Background to the requirement

Nordic Ecolabelling strives to ensure that the health and environmental impacts of the products are as low as possible. Therefore, there is a requirement prohibiting, for example, CMR classification, which thereby excludes some of the, in health terms, most problematic classifications of substances. The requirement covers all chemicals used in the production of hides/skins and leather, to ensure a focus on this in all processes that make use of chemicals.

In addition to chemicals for the tanning process itself, chemicals such as dyes, auxiliary chemicals, finishing chemicals, solvents, enzymes, biocides and various inorganic standard chemicals are also used. There is a significant variation in the amount of chemicals used, depending on the type of leather product and the chosen process. The most widely used inorganic chemicals are sodium sulphide, calcium hydroxide, acids, carbonates, sulphites and sulphates. The greatest variation can be found in the amount of tanning agents used[136].

O60 Classification of ingoing substances in chemical products

Chemical products shall not contain any ingoing substances* that have any of the classifications stated in the table below. The requirement applies to all chemicals used in every step of manufacturing leather and hides/skins (including finishing).

** See the definition of ingoing substances and impurities in section 5.2*

CLP Regulation 1272/2008		
Hazard class	**Hazard category**	**Hazard code**
Carcinogenicity*	Carc. 1A or 1B Carc. 2	H350 H351
Germ cell mutagenicity*	Muta. 1A or 1B Muta. 2	H340 H341
Reproductive toxicity*	Repr. 1A or 1B Repr. 2 Lact.	H360 H361 H362

** Including all combinations of stated exposure route and stated specific effect. For example, H350 also covers the classification H350i.*

✉ Declaration from the chemical manufacturer that the requirement is fulfilled.

Background to the requirement

[136] Best Available Techniques (BAT) Reference Document for the Tanning of Hides and Skins, JOINT RESEARCH CENTRE 2013.

The requirement is new in this generation of the criteria. The requirement excludes all constituent CMR substances to an absolute level of 0 ppm. There is thus no triviality limit for ingoing substances.

Ingoing substances are defined as all substances, whatever their concentration, in a used chemical (e.g. pigment or bleaching agent) or blend of chemicals (e.g. printing paste, coating), including additives (e.g. preservatives and stabilisers). Known products released from ingoing substances (e.g. formaldehyde, arylamine and in-situ generated preservatives) are also considered to be constituent. Impurities are defined as residual substances from production, including raw material production, that are present in a used chemical or blend of chemicals in concentrations of ≤ 100.0 ppm (≤ 0.01000 wt%, ≤ 100.0 mg/kg).

The prohibition of all constituent CMR substances in categories 1A, 1B and 2 now has its own separate requirement. Nordic Ecolabelling strives to ensure that the health and environmental impacts of the products are as low as possible. Therefore, there is a requirement prohibiting specific CMR classification, which thereby excludes some of the, in health terms, most problematic classifications of substances. The requirement covers all chemicals used in the production of hides/skins and leather, to ensure a focus on this in all processes that make use of chemicals.

O61 Prohibited substances

The following substances shall not be present as ingoing substance* in chemical products used to produce hides/skins and leather. The requirement applies to all chemicals used in every step of manufacturing leather and hides/skins (including finishing).

* *See definition of ingoing substances in section 5.2 Definitions.*

- Substances on the Candidate List (https://echa.europa.eu/candidate-list-table)
- Substances that are PBT (Persistent, Bioaccumulative and Toxic) or vPvB (very Persistent and very Bioaccumulative) as set out in the criteria of REACH Annex XIII
- Substances considered to be potential endocrine disruptors in category 1 or 2 on the EU's priority list of substances that are to be investigated further for endocrine disruptive effects. The list can be found at http://ec.europa.eu/environment/chemicals/endocrine/pdf/final_report_2007.pdf (Annex L, pages 238–249)
- Flame retardants (e.g. short chain chloroparaffins)
- Per- and polyfluorinated compounds, e.g. PFOA and PFOS
- Nanoparticles*
- Heavy metals in dyes and pigments **
- Azo dyes that may release carcinogenic aromatic amines (see Appendix 2)
- Phthalates
- Organotin compounds
- Chlorinated solvents, including chlorophenols and chlorobenzenes
- Alkylphenol ethoxylates (APEO)
- Linear alkylbenzene sulphonates (LAS)
- Aziridines and polyaziridines

- EDTA (ethylene diamine tetraacetic acid) and DTPA (diethylene triamine pentaacetate)

* An exception is made for pigments.

** Exemptions from the requirement are granted for metal impurities in dyes and pigments up to the amounts set out in ETAD, Annex 2 "Heavy metal limits for dyes": antimony (50 ppm), arsenic (50 ppm), cadmium (20 ppm), chromium (100 ppm), lead (100 ppm), mercury (4 ppm), zinc (1500 ppm), copper (250 ppm), nickel (200 ppm), tin (250 ppm), barium (100 ppm), cobalt (500 ppm), iron (2500 ppm), manganese (1000 ppm), selenium (20 ppm) and silver (100 ppm).

✉ Declaration from the chemical manufacturer or chemical supplier that the requirement is fulfilled.

Background to the requirement

The requirement is new, bringing together several requirements from the previous generation of the criteria (requirements O41, O44, O45, O46 and O47). The requirement now covers more substance groups. In addition to chemicals for the tanning process itself, chemicals such as dyes, auxiliary chemicals, finishing chemicals, solvents, cross-linking agents, enzymes, biocides and various inorganic standard chemicals are also used. Cross-linking agents may be used in the finishing stage. The following are sometimes used, for example: polyisocyanates, carbodiimides and aziridines.

Aziridines are highly toxic, and for this reason they have been replaced by **polyaziridines**, which are less toxic and can be used for base garments and outerwear. Ethylenimine-based cross-linking agents are used for the top finish. Ethylenimine is toxic and carcinogenic.

Per- and polyfluorinated compounds are sometimes used in leather production as water repellent, oil repellent and dirt repellent agents.

Flame retardants are only used on leather in certain specific contexts. These include aircraft and train seats and furnishings for public buildings. In addition, **phthalates** may be used in softeners and **azo dyes** often used in dyeing. Abrasives may be used on vegetable tanned leather to even out the colour of the substrate before the dyeing operation. This action is performed more rarely on chromium tanned leather. The chemicals used in this process are salts that release sulphur dioxide, oxalic acid, **EDTA**, bleaching syntans and so on[137]. See also the background text for requirement O33.

O62 Biocides and antibacterial substances

The addition and/or integration of substances that may have a biocidal and/or antibacterial effect into hides/skins or leather is not permitted.

The requirement also applies during the storage and transport of hides/skins and leather.

Biocides/antibacterial substances include silver compounds, organotin compounds, chlorophenols, nano silver and nanogold.

✉ Declaration from the producer of the hide/skin or leather that the requirement is fulfilled.

[137] Best Available Techniques (BAT) Reference Document for the Tanning of Hides and Skins, JOINT RESEARCH CENTRE 2013.

Background to the requirement

See background to requirement O34.

Biocides may be used in various tanning processes to protect the substrate against microbial attack.

O63 Discharges to wastewater

- Wastewater from tanneries shall contain no more than 1 mg chromium (total) per litre of water.
- COD in the wastewater from tanneries shall not exceed 10 kg/tonne of wet salted raw material (raw hide or skin).

The requirement covers both the tanning process itself and post-tanning.

Test method: COD content shall be tested according to ISO 6060 or equivalent.

Test report shall be submitted upon application and then the applicant shall have a routine to test annually according to the requirement as well as ensure compliance with the requirement. Nordic Ecolabelling shall be notified if the requirement is not complied with.

✉ Test report showing that the requirement is fulfilled.

Background to the requirement

Chromium

The most significant source of chromium is wastewater from the tanning process, but wastewater from post-tanning processes may also contain chromium, if chromium is used in post-tanning. Small quantities of chromium may also be flushed out during the wet process steps that follow chromium tanning or post-tanning. The requirement level for chromium in wastewater remains unchanged from the previous generation of the criteria. The EU Ecolabel criteria for footwear and Blaue Engel have the same requirement concerning the chromium content of wastewater.

COD

The limit of 10 kg / ton of raw material was set at the previous revision of the criteria and is based on input from the Swedish Garveriidkarföreningen and the BAT-Reference Document for the Tanning of Hides and Skins. The requirement has not changed since the previous revision, as it is still considered to be an ambitious requirement. The requirement is set so that the release of COD into the water is linked to the amount of skin and leather being treated. Water savings will otherwise have a negative impact on the amount of COD since a lower water consumption gives a higher content of contaminants even though the amount of pollution is the same. BAT-AELs for COD are 200 - 500 mg / l and this is therefore difficult to use as it is linked to water consumption and not to the amount being treated.

COD content in the wastewater is a parameter that has a high RPS. Organic compounds that use up the oxygen in the aquatic environment during decomposition can be a major problem if good treatment plants are not available. This is something that tanneries are actively working to reduce. Nordic Ecolabelling therefore set requirements to limit COD emissions.

O64 Water consumption for hides/skins and leather

The annual average water consumption for tanning leather shall not exceed 25 m^3/tonne of raw hide.

The annual average water consumption for tanning sheepskin shall not exceed 120 l/skin.

✉ State the water consumption and submit documentation confirming consumption, for example from suppliers or copies of invoices. State the total amount in tonnes of hides/skins/leather that has been treated and a calculation showing water consumption per tonne of hides/skins/leather.

Background to the requirement

Reducing water consumption is considered an important element of environmental work. According to the IPPC's draft from 2011[138], normal water consumption at modern tanneries can be cut from 40-50 m^3/tonne of raw hide to 12-30 m^3/tonne of bovine hide, if the tannery has effective control over its process. According to the draft, there are tanneries in Germany that consume 15-20 m^3/tonne and one tannery reports 9 m^3/tonne. A tannery in the Netherlands states that it consumes around 20 m^3/tonne of fresh bovine hides. Tanning calfskin requires more water – about 40 m^3/tonne. The conclusion in the draft is that BAT for water consumption for bovine hides ranges from 16-28 m^3/tonne of raw hide. Based on this information, Nordic Ecolabelling has chosen to set the requirement at 25 m^3 water/tonne of hide/skin/leather that is processed.

The requirement level of 25 m^3 water/tonne of hide/skin/leather remains unchanged from generation 4 of the criteria. However, a specific requirement level has been set for sheepskin in this generation of the criteria. Note that the unit for the sheepskin requirement is l/skin, not m^3/tonne[139].

However, it is uncertain whether it is possible to tan sheepskin without the use of organic chlorine compounds, which are excluded here in the criteria.

O65 Energy consumption

The amount of electricity (in kWh) and fuel consumed during tanning of hides/skins and leather shall be stated.

✉ State the consumption of electricity (in kWh) and the purchase of fuel and attach confirmation from the supplier or a copy of the invoice to document this. State the total weight (in kg) of the hides/skins and leather processed.

Background to the requirement

The requirement remains unchanged from generation 4 of the criteria. The greatest energy consumption relates to the thermal energy used to heat process water and to dry and heat the premises. It is necessary for data to be compared for the same phases in the leather production process. Ideally, energy consumption should be considered and reported separately for each stage of the process, and it is known that some of the most energy-efficient tanneries do this. Where more detailed data about energy consumption is available, it is important that comparisons between tanneries are based on the same underlying data. For example, "wastewater treatment" may possibly not include biological treatment,

[138] Best Available Techniques (BAT) Reference Document for the Tanning of Hides and Skin, Joint Research Centre 2013.
[139] Stefan Ryden, personal comments, March and December 2011.

which can account for more than 50% of the total energy consumed in the treatment of a tannery's wastewater.

5.15 Quality and performance requirements

Nordic Ecolabelling sets requirements concerning the performance and durability of textiles, hides/skins and leather. These requirements are important, since a Nordic Swan Ecolabelled product must offer good quality and, seen from an environmental and resource perspective, products must be usable for a certain length of time before they wear out and a new replacement is required.

If the Nordic Swan Ecolabelled product is not in production at the time of application, the quality requirements may be documented with tests of a similar textile product. In such cases, this must be described.

5.15.1 Quality and performance requirements for textiles

O66 Formaldehyde emissions from textiles

The amount of free and partly hydrolysable formaldehyde in the final textile shall not exceed 16 ppm.

Test method: The content of formaldehyde shall be tested in accordance with standard EN ISO 14184-1.

✉ Test report showing that the requirement is fulfilled.
✉ A certificate from Oeko-Tex 100 class I Baby or GOTS can also be used as documentation.

Background to the requirement

The requirement has been tightened from 20 ppm to 16 ppm since the previous generation of the criteria.

Formaldehyde is classified as hazardous to health, due to being carcinogenic and irritating to the eyes, throat and skin. Formaldehyde residues in textiles can often originate from finishing with anti-crease agents. A certificate for Oeko-Tex 100 class I Baby (> 16 mg/kg) and for GOTS (> 16 mg/kg) may be used as documentation, even though Oeko-Tex uses the test standard Japanese Law 112. Oeko-Tex, GOTS and the EU-Ecolabel accept higher formaldehyde emissions for certain types of textile. The EU-Ecolabel has a requirement level of max. 16 ppm for products aimed at children under 3 years old and products in direct contact with the skin. For garments with limited skin contact and home furnishings, the EU-Ecolabel has a limit of max. 75 ppm. Oeko-Tex 100 has requirement levels of 16, 75, 150 and 300 ppm, depending on the exposure scenario.

O67 Dimensional changes during washing and drying

Dimensional changes after washing and drying shall not exceed:

- ± 2% for curtains and upholstery covers that are removable and can be washed.
- ± 5% for woven products for duvets and pillows, in accordance with EN 13186.
- ± 3% for woven textiles not covered by the categories above.

- ± 7% for knitwear/hosiery
- ± 10% for 100% wool knitwear (after 10 washes)

The requirement does not apply to fibres or yarns, products clearly labelled "dry clean only" or equivalent (if the product in question is normally labelled in this way), nor upholstery that is not intended for removal and washing.

The following testing procedure must be followed:

- 10 washes for 100% wool textiles and 1 wash for other textiles
- Temperature, laundry program and detergent as stated on the care label
- drying as stated on the care label
- 100% wool textiles should be stretched back into shape after each wash

Test method:

The tests should be carried out in accordance with EN ISO 6330 "Textiles – Domestic washing and drying procedures for textile testing", combined with ISO 5077 "Textiles – Determination of dimensional change in washing and drying".

For professional textiles intended for industrial laundry, the standard ISO 15797 Textiles – "Industrial washing and finishing procedures for testing of workwear", combined with EN ISO 5077.

Woven products for duvets and pillows are to be tested in accordance with EN 13186 – "Specification of feather and down filled bedding articles".

✉ Test report showing that the requirement is fulfilled.

Background to the requirement

The requirement has been set to ensure the high quality of the Nordic Swan Ecolabelled textile. The requirement has been amended since the previous generation of the criteria. There is now a specific requirement for bed linen and duvets, which are covered by their own standard. At the same time, the requirement has been simplified, with fewer categories, plus it is now necessary for 100% wool knitwear to be washed 10 times before the final measurement. This is to ensure that the anti-felt treatment of the wool fibre also has effect after several washes. See additional background text on wool treatment in requirement O29.

O68 Colour fastness to light

The following levels shall be achieved for colour fastness to light:

- For textiles for outerwear, swimwear and UV protective clothing: level 3-4.
- For textiles for furniture, curtains and drapery: level 5

Level 4 is permitted for textiles for furniture, curtains or drapery, if the textile is both lightly dyed (standard depth <1/12 in accordance with 105 A06) and consists of blends with more than 20% wool or other keratin fibres, or of blends with more than 20% linen or other bast fibres.

The requirement does not apply to white textiles, mattress covers and mattress protectors.

Test method: Tests shall be performed in accordance with EN ISO 105 B02 or equivalent.

✉ Test report showing that the requirement is fulfilled. Alternatively, a GOTS transaction certificate may be used as documentation for the selected types of clothing.

Background to the requirement

The requirement has been set in order to ensure that a dyed or printed textile can resist colour changes (fading) due to the influence of light, so that the product retains its desired colour over a long period of time. The requirement thus helps to ensure that the textile has a long life.

The requirement in this generation of the criteria has been expanded to also include textiles for outerwear, swimwear and UV protective clothing, which has to survive prolonged exposure to sunlight. The requirement does not apply to white textiles.

Fade resistance expresses how quickly the colour disappears under the influence of light. A high degree of fade resistance is desirable, and this can primarily be achieved by using the appropriate choice of dye, while the actual dyeing process also has an influence. The requirement refers to the EN ISO 105 B02 standard: "Textiles – Testing of colour fastness – Part B02: Colour fastness to artificial light: xenon blue as light source". The artificial light represents daylight. A GOTS certificate may be used as documentation for the selected types of clothing, as it demonstrates the same requirement level. Oeko-Tex 100 do not set requirements in this area.

O69 Colour fastness to washing

Colour fastness shall meet the following conditions as a minimum:

- For colour change: level 3-4
- For discolouration: level 3-4

The requirement does not concern textile elements that are clearly labelled "dry clean only" or equivalent (if the product in question is normally labelled in this way), nor white products, products that are neither dyed nor printed, nor textiles that are not intended for removal and washing.

Test method: The tests shall be performed in accordance with ISO 105 C06 (a single wash at the temperature stated on the product), or equivalent.

✉ Test report showing that the requirement is fulfilled. Alternatively, a GOTS transaction certificate may be used as documentation.

Background to the requirement

The requirement has been set to ensure high quality and a long lifetime for the products. The requirement refers to the ISO 105 C06 standard: "Textiles – Testing of colour fastness – Part B02: Colour fastness to domestic and commercial laundering". The GOTS standard also tests to ISO 105-C06 and sets the same requirement level. A GOTS transaction certificate is therefore acceptable as documentation.

The Oeko-Tex 100 standard tests to ISO 105-E01. ISO 105 Part E01 describes methods for determining how resistant the colour is to all forms of exposure to water, but not washing. The requirement remains unchanged from the previous generation of the criteria.

O70 Colour fastness to perspiration

Colour fastness to perspiration shall for underwear, sportswear and t-shirts meet the following conditions as a minimum:

- For discolouration: level 3-4
- For staining: level 3-4

Level 3 is, however, permitted for textiles that are dark in colour (standard depth > 1/1) and/or made from recycled wool.

The requirement does not cover white textile products or textile products that are neither dyed nor printed.

Test method: Tests must be performed in accordance with ISO 105 E04 (both acid and alkaline, plus comparison with textile of blended fibres) or equivalent.

✉ Test report showing that the requirement is fulfilled.

Background to the requirement

The requirement is new and has been set to ensure high quality and a long lifetime for the products.

O71 Colour fastness to rubbing (wet)

Colour fastness to wet rubbing shall be at least level 2-3.

The requirement does not concern white products or products that are neither dyed nor printed.

Denim indigo dye is exempted from the requirement level of 2-3 and must instead be documented as meeting level 1. When using this exemption, the product must be accompanied by information that the textile's dye may cause cross-staining.

Test method: Tests shall be performed in accordance with ISO 105 X12 or equivalent.

✉ Test report showing that the requirement is fulfilled.

Background to the requirement

The requirement has been set to ensure that the dye is well fixed in the textile. If the colour fastness to wet rubbing is good, the other characteristics, such as wash resistance and durability, will automatically also be good, since wet rubbing in accordance with ISO 105 X12 is a standardised method of checking the fixing of the dye on the fabric. The requirement has an exemption for denim indigo dye. Without finishing, it is not possible to achieve strong colour fastness for denim indigo dye. Chemicals are often used to fix the dye in raw denim to avoid the dye cross-staining. These chemicals tend to be harmful to health and the environment, and so will not comply with Nordic Ecolabelling's chemical requirements for finishing. Finishing is therefore not considered a good environmental solution.

The requirement refers to EN ISO 105-X12 "Textiles – Testing of colour fastness – Part X12: Colour fastness to rubbing". The scale is described in ISO 105-A03.

This requirement is relevant in relation to the textile's durability, and also to ensure that the dye does not cause cross-staining when the product is used. A GOTS or Oeko-Tex certificate cannot be used as documentation of the requirement, as these schemes have lower levels. The requirement remains unchanged from the previous generation of the criteria.

O72 Colour fastness to rubbing (dry)

Colour fastness to dry rubbing shall be at least level 4.

The requirement does not apply to white textile products, textile products that are neither died nor printed, curtains or other equivalent home furnishing textiles.

Denim indigo dye is exempted from the requirement for a minimum of level 4. Denim indigo dye must instead achieve at least a level 2-3. When using this exemption, the product must be accompanied by information that the textile's dye may cause cross-staining.

Test method: Tests shall be performed in accordance with ISO 105 X12 or equivalent.

✉ Test report showing that the requirement is fulfilled. Alternatively, an EU Ecolabel version 2014 or Oeko-Tex 100 Version 2019 certificate may be used as documentation for the requirement.

Background to the requirement

The requirement has been set to ensure that the dye is well fixed in the textile. If the colour fastness to dry rubbing is good, the other characteristics, such as wash resistance and durability, will automatically also be good, since dry rubbing in accordance with ISO 105 X12 is a standardised method of checking the fixing of the dye on the fabric. The requirement refers to EN ISO 105-X12 "Textiles – Testing of colour fastness – Part X12: Colour fastness to rubbing". The scale is described in ISO 105-A03.

A GOTS certificate cannot be used as documentation of the requirement, as GOTS requires lower levels. An Oeko-Tex 100 certificate may be used as documentation, since this scheme sets the same requirements for colour fastness to dry rubbing. The requirement remains unchanged from the previous generation of the criteria.

O73 Ban on fabricated fabric holes

The fabric shall not be made with "wear" holes, that are fabricated to look like wear.

✉ Declaration by the textile manufacturer that the requirement is fulfilled.

Background to the requirement

The requirement is to ensure, that the fabric is not manufactured with a design with fabricated "wear" holes. Fabricated "wear" holes will greatly reduce the wear resistance of the fabric and will significantly shorten the lifetime of the fabric. To stimulate a more circular economy in relation to the consumption of textiles, it is important to ensure design for longevity in order to keep the textile in use for as long as possible.

O74 Abrasion resistance

The requirement concerns textile elements accounting for more than 10 wt% of the total textile product.

The following textile products are subject to requirements concerning abrasion resistance, expressed as number of rubs/abrasions (Martindale):

- Domestic upholstery: 40,000
- Commercial upholstery: 80,000
- Professional workwear: 20,000
- Outdoor workwear and outdoor wear: 30,000

Test method: Tests shall be performed in accordance with EN ISO 12947-2 or an equivalent standard.

✉ Test report showing that the requirement is fulfilled.

Background to the requirement

The requirement has been set to ensure that the textile is hard-wearing in terms of its resistance to abrasion. Abrasion resistance corresponds to the number of abrasions needed for two threads on a woven piece of textile to be worn through. The requirement covers selected textile products that are often subject to hard wear, making abrasion resistance important for the lifetime of the product. Here, the abrasion resistance has been set at levels that are relevant for the specific textile product. For upholstery, the abrasion resistance can vary from 20,000 right up 120,000. Here it is relevant to take into account whether the upholstery is used for domestic or professional use. Technical textiles with a focus on durability have an abrasion resistance of 50,000-120,000 rubs, depending on whether they are sportswear or workwear[140]. Textiles with very high abrasion resistance are often used to reinforce the knees of trousers, for example. This very high abrasion resistance may be achieved by using two or three layers of specialist yarn.

O75 Pilling – upholstery

Upholstery shall have a pilling resistance corresponding to level 4.

For wool and wool blend upholstery fabric, the durability against pilling shall be at least level 3.

Test method: Tests shall be performed in accordance with EN ISO 12945-2 or an equivalent standard.

✉ Test report showing that the requirement is fulfilled.

Background to the requirement

The requirement is adjusted from the previous generation of the criteria. A specification is added with a new requirement level for wool or wool blend upholstery fabrics, as wool fabrics often have a natural pilling in the beginning when the fabric is used. With upholstery, it is relevant to ensure that the fabric does not pill easily, in order to give the product as long a lifetime as possible.

O76 Quality requirement for fleece

This requirement concerns fleece.

When tested for propensity to surface fuzzing and to pilling fleece shall achieve at least level 4 at 5,000 cycles (rubs).

Test method: ISO 12945-2 “Textiles – Determination of fabric propensity to surface fuzzing and to pilling. Part 2: Modified Martindale method”.

✉ Test report showing compliance with the pilling requirement in accordance with standard EN 12945 -2.

Background to the requirement

Pilling properties are an important quality parameter for fleece. The required testing must follow the standard ISO 12945 “Textiles – Determination of fabric propensity to surface fuzzing and to pilling”. “Part 2: Modified Martindale method” is usually used, although Part 3 specifically mentions fleece. The method uses a scale from 1-5, where 1 is major pilling and 5 is none. The test would

[140] https://www.dyntex.eu/en/product/abrasion-resistant-fabrics/ accessed 11.04.2019.

appear to involve 5,000 cycles (rubs)[141], but many testing labs only run 2,000 rubs for fleece.

5.15.2 Quality and performance requirements for hides/skins and leather

O77 Formaldehyde

The amount of free and partly hydrolysable formaldehyde in the final skin and leather shall not exceed:

- 20 ppm in products for children
- 75 ppm in other products

Test method: The content of formaldehyde must be tested in accordance with EN ISO 17226-1 or 2.

✉ Test report showing that the requirement is fulfilled.

Background to the requirement

The requirement has been set to limit exposure to formaldehyde, which is classified as carcinogenic. The content of formaldehyde in the finished leather must not exceed 20 ppm in hides/skins and leather in products for children, and 75 ppm in other products. The requirement levels are identical with the formaldehyde requirements for the EU Ecolabel for Footwear and the Japanese label Japan Eco Leather.

The requirement has been tightened since the previous generation of the criteria, with the introduction of a separate requirement level for products for children.

O78 Tear strength for skin and leather

Tear strength shall be more than 20 N.

Test method: Testing shall be performed in accordance with ISO 3377 or equivalent.

✉ Test report showing that the requirement is fulfilled.

Background to the requirement

The requirement has been set to ensure the good quality of the skin and leather, in terms of strength. The requirement refers to the standard ISO 3377-1 “Leather – Physical and mechanical tests – Determination of tear load – Part 1: Single edge tear”. The requirement remains unchanged from the previous generation.

O79 Flexing test for leather

When testing leather’s flexing resistance, the leather shall manage 20,000 test repetitions (20 kc) without sustaining visible damage. The requirement only applies to leather with a surface coating.

Test method: The test must be performed in accordance with ISO 5402 or equivalent.

✉ Test report showing that the requirement is fulfilled.

[141] https://www.gabriel.dk/media/20274/String-Pilling-4-5-240117.pdf

Background to the requirement

The requirement has been set to ensure the good quality of the leather, in terms of its flexing resistance and how the surface finish is affected. The requirement refers to the standard ISO 5402 "Determination of flex resistance".

O80 Colour fastness to water - leather

Colour fastness when exposed to water shall be at least level 3 for leather that is dyed or has a surface finish.

Test method: The test shall be performed in accordance with ISO 11642 or equivalent.

✉ Test report showing that the requirement is fulfilled.

Background to the requirement

The requirement has been set to ensure as long a lifetime as possible for the leather, by requiring that dyed or finished leather has high colour fastness and low cross-staining when wet. The requirement refers to the standard ISO 11642 "Leather – Tests for colour fastness – Colour fastness to water". Leather that has not been dyed or given a surface finish is exempted from the requirement.

O81 Colour fastness to wear - leather

Colour fastness during wet and dry wear shall be at least level 3 for leather that is dyed or has a surface finish.

Test method: The test shall be performed in accordance with ISO 11640 or equivalent, with 20 repetitions for wet wear and 50 repetitions for dry wear. The results are to be assessed using ISO 105-A02 and ISO 105-A03 or equivalent.

✉ Test report showing that the requirement is fulfilled.

Background to the requirement

The requirement has been set to ensure as long a lifetime as possible for the leather, by requiring that dyed or finished leather has high colour fastness during wear. The test describes how the surface of the leather is affected by dry and wet rubbing. ISO 11640: "Leather – Tests for colour fastness – Colour fastness to cycles of to-and-fro rubbing".

5.15.3 Recycling of textiles and fabrics

O82 Unsold textiles and nonconformity productions

Unsold textiles and fabrics and nonconformity productions shall not be sent for incineration or dumped in landfill.

The manufacturer shall inform Nordic Ecolabelling about how unsold textiles and nonconformity productions are dealt with.

✉ Description of how unsold textiles and nonconformity productions are dealt with.

Background to the requirement

The requirement has been set to ensure that unsold textiles and nonconformity productions are used in the redesign of new textiles, sent for recycling or donated to a charity. The aim of this is to achieve as great an environmental benefit as possible, despite the textiles not being sold for their intended purpose. The requirement also seeks to increase the focus on producing the "right" quantities and so avoiding overproduction.

5.16 Packaging, storage and transport

O83 Chlorophenols, PCB and organotin compounds during transport and storage.

Chlorophenols (and salts and esters of chlorophenol), PCB and organotin compounds shall not be used in connection with the transport or storage of products and semi-manufactures.

✉ Declaration from the suppliers at every stage of the production chain that these substances or compounds are not used in the yarn, fabric and/or end product or a valid licence certificate for the EU Ecolabel, issued in accordance with the Commission decision from 2014.

Background to the requirement

The requirement that chlorophenols, PCB and organotin compounds must not be used during transport or storage includes the textile both before and after any finishing. These chemicals are sometimes used to prevent the textiles from being attacked by moths and other insects during storage and transport. They are all chemicals that are harmful to health and the environment and are therefore not permitted.

Chlorophenols and salts and esters of chlorophenol are seldom used, but are considered to remain relevant, as certain suppliers may still use these biocides during transport and storage. Their use is not permitted in the EU, but they could still be applied to raw materials originating from outside the EU.

GOTS version 4 and the version 5 set the following requirement for storage and transport: "In cases where pesticides/biocides must be used in storerooms/transport means, they have to comply with the applicable international or national organic production standard." It is unclear, however, what this entails and how it is controlled. Textiles with GOTS certification must therefore also document this requirement.

O84 Prohibition of PVC and PVDC

PVC and PVDC must not be used in the packaging.

✉ Declaration from the textile manufacturer or brand owner.

Background to the requirement

PVC may contain softeners such as phthalates that may be reprotoxic or harmful to the environment. In addition to the risk of phthalates in soft PVC, the waste treatment of PVC is particularly problematic. This is due to the fact that incinerating 1 kg of PVC generates 0.4-1.7 kg flue gas treatment residues, which are sent to landfill. The volume depends on the type of incineration process used[142]. In Denmark, for example, attempts have been made to develop methods to process these flue gas treatment residues in order to recover the salts, particularly CaCl2, but this has not proven financially viable, according to ARC (Amager Resource Centre) in Denmark, which also reports that the hydrochloric acid formed on the combustion of the chlorine in PVC can corrode the installations and the chlorine can lead to the formation of dioxins and furans. Besides the waste phase, PVC is also environmentally problematic in other areas.

[142] Memo: Ole Hjelmar, DHI – Institute for Water and the Environment in 2002 Memo on mass flows on incineration of PVC.

PVC consists of approximately 57% industrially produced chlorine and approximately 43% fossil coal from oil or gas. The electrolysis process in PVC production, for example, releases toxic chlorine gas (Cl2). In Plastic Europe's Cl2 Eco-profile, dioxin/furan emissions are stated as less than 1 mg for the production of 1 kg of chlorine. This is an average figure, however, so there is a risk of PVC/chlorine gas production with higher dioxin emissions than are stated here.

O85 Recyclable packaging material

It shall be possible to recycle the main material* in the primary packaging** via the existing waste systems operating in the Nordic region today.

** The main material is defined as the material that makes up 90 wt% or more of the total packaging.*

*** Primary packaging means the packaging that stays with the Nordic Swan Ecolabelled product all the way to the customer or individual packaging that accompanies the product to the retailer. Incineration with energy recovery does not count as material recycling.*

✉ Description of the main material in the packaging and how the material can be recycled in existing waste and resource systems.

Background to the requirement

Recyclability is an important step in the transition to a circular economy. This provides an opportunity for materials to stay in the resource eco cycle, thereby reducing the use of virgin resources. The extent to which a material is recycled depends on many factors, such as the sorting options in each country or local authority, and how the consumer ultimately sorts the waste. However, Nordic Ecolabelling has an opportunity to promote the recycling of packaging by setting design requirements that support this process.

The main material in the packaging must be recyclable. The EU's action plan for a circular economy focuses on recovery and reuse, particularly with regard to packaging materials. Waste collection can either lead to a high level of material recycling, where valuable materials are returned to the economy, or to an inefficient system where recyclable waste largely ends up in landfill or is sent for incineration. The EU has drawn up a plastics strategy, which includes focusing on making the recycling of plastic more financially viable and working towards global solutions and standards that promote plastics recycling[143].

Oxo-degradable and biodegradable plastics must not be used, since they "contaminate" the other recycled plastics streams in the Nordic region. Bio-based plastic in PET, PE and PP can be recycled in the same way as fossil-based plastic in PET, PE and PP.

O86 Design of recyclable packaging

The requirement covers primary packaging* for the Nordic Swan Ecolabelled product.

[143] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Closing the loop – An EU action plan for the Circular Economy, COM(2015) 614 final, http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52015DC0614

Only monomaterials** shall be used in the packaging. If various separate packaging elements are used, these may each be made of a separate monomaterials and shall be possible to separate in the waste sorting.

Multi-material hangers are allowed if these are collected and recycled in a textile manufacturer's take-back system.

Labels may be applied to the packaging if they make up no more than 5% by weight and do not prevent recycling of the material.

Plastic packaging

Plastic packaging shall be made from either polyethylene (PE), polypropylene (PP) or polyethylene terephthalate (PET).

Coloured plastic cannot be used for virgin plastic feedstock. Only if at least 50% by weight of the plastic is recycled material***, colouring is permitted.

* *Primary packaging is defined here as packaging from the manufacturer that accompanies the product all the way to the consumer. Delivery packaging used by online retailers is not considered to be primary packaging.*

** *A monomaterial is defined as material components that are not composed of multiple material types. For example, the same plastic type and cardboard are monomaterials.*

*** *Recycled material is defined as post-consumer/commercial recycled material defined in the requirement according to ISO 14021:2016:*

"Post-consumer/commercial" is defined as material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.

✉ Description of primary packaging documenting compliance with the requirement.

✉ Multi-material hangers: Textile manufacturer's procedure, describing the take-back system for hangers.

Background to the requirement

The requirement has been set to enable the best possible recycling of the material in the primary packaging.

In physical stores, textiles are usually sold without any primary packaging. However, this does not always mean that the product had no primary packaging during its distribution to the store. With online retailers, the product often remains in its primary packaging when dispatched to the customer. The requirement is therefore not to encourage the use of packaging, if it is not necessary. But primary packaging for textile products can ensure that the product is not damaged in transit, for example due to moisture, dirt or cross-staining from other products. In relation to removing the primary packaging Patagonia has seen that polybags are critical to ensuring, that the garments stay clean from the finished goods factory through the transport to the consumer. Patagonia describes that if they eliminate the use of polybags, garments would be

damaged, resulting in much higher environmental costs than the one from the polybag[144].

The best way to ensure high quality recycling is to design the whole packaging in one material, so that individual parts of the packaging do not need to be separated out in the recycling process. Colour affects the recyclability of the packaging. Non-coloured or clear plastic packaging is preferred, because it has a wider range of recycling options than strongly coloured plastic. Colourless plastic has the highest recycling value.

Dark colours result in darker recycled granules, which is not the preferred choice, and carbon black creates problems in most automated sorting systems, as the NIR (near infra-red reflectance) detector cannot identify dark colours produced using carbon black. Only colourless plastic is accepted, unless it makes use of recycled plastic. If at least 50% by weight of the plastic packaging is recycled material, colouring is permitted.

Typical contaminants that affects the recyclability of the plastic foil materials (like a polybag) would be high proportions of paper labels, adhesives and non-polyolefin plastics. This leads to contamination and to a limitation of the recyclability of the plastic[145]. Hence the requirement sets a threshold requirement for the proportion of labels and ban of multi-material packaging.

Biodegradable plastic is not suitable for today's recycling systems and can cause problems in the material recovery process for the recyclable types of plastic.

O87 Information on recycling

The packaging shall carry information on how it can be sorted for recycling. This information shall be stated using text or symbols.

✉ Product label or artwork providing information on recycling.

Background to the requirement

To stimulate the sorting of packaging for recycling, a new requirement has been added concerning the provision of guidance on the packaging about how it should be sorted for recycling. The waste stage is affected by many factors, such as the sorting options in each country or local authority, and how the consumer ultimately sorts the waste. However, Nordic Ecolabelling can generally encourage greater recycling of packaging by setting requirements that support recycling options.

5.17 Social and ethical requirements

O88 Mechanical and chemical distressing of denim

The following shall not be used:

- manual and mechanical sandblasting or sanding of denim.

[144] Patagonia's Plastic Packaging: A Study on the Challenges of Garment Delivery https://www.patagonia.com/stories/patagonias-plastic-packaging-a-study-on-the-challenges-of-garment-delivery/story-17927.html

[145] Verification and examination of recyclability 2017 https://sharepoint.nordicecolabel.org/ProductDevelopment/horizontalthemes/Shared%20Documents/Recyclability_certification_EU_2017.pdf

- potassium permanganate (CAS no. 7722-64-7) for the treatment of denim fabrics/products, if used in open process.

✉ Declaration from the denim manufacturer stating the method used to treat the denim, plus a declaration that the requirement is fulfilled.

Background to the requirement

The requirement excludes the use of the treatments to achieve a pre-worn denim look that are most harmful to human health. The requirement is set to protect the health of the worker in the denim production.

Sandblasting and sanding

Both manual sandblasting and mechanical sandblasting can have major health impacts, since inhaling the sand (silica dust) can cause serious respiratory problems for workers; in cases of intense or prolonged exposure, it can lead to life-threatening illnesses such as lung cancer. Denim is sandblasted in order to achieve a pre-worn denim look. Although several brands have promised to boycott sandblasting, studies such as those conducted for the report "Breathless for Blue Jeans: Health hazards in China's denim factories" by The Clean Clothes Campaign in 2013 have shown that the denim industry in China and Bangladesh continues to use sandblasting. Manual or mechanical sanding is used as an alternative to sandblasting. There has not yet been any study into the long-term effects of sanding denim, but the processes also cause the air to be filled with dust from the denim fabric at levels that exceed recommended limits.

Potassium permanganate

Other methods of achieving a worn look include laser effects, stone washing, water-based treatments, dye application and spraying with chemicals such as potassium permanganate. Potassium permanganate (also known as PP spray) is mainly used to lighten denim. The process involves spraying the chemical onto the denim fabric and then washing it off, leaving the treated area a lighter colour than the surrounding fabric. Workers spray the chemical onto the denim fabric with a hose or sometimes use a brush. The process exposes the worker to harmful inhalation of chemical vapour. The recommended method usually involves spraying the denim fabric in a closed and ventilated cubicle[146]. Potassium permanganate has been placed on the European Union's Community Rolling Action Plan (CoRAP) list of substances[147]. A CoRAP report in 2018 concluded that the harmonised classification should be updated in 2020 to: Acute Tox 4* classification – H302; Skin Corr. 1C – H314; STOT RE 2 – H373 (brain). The chemical therefore cannot be accepted used in an open process.

O89 Fundamental principles and rights at work

The licensee must ensure that all processes in the textile production; all dyeing plants, tanneries and cut-make-trim (CMT) factories (e.g. sewing factories) used in the manufacture of the licensed product(s) comply with:

[146] Breathless for Blue Jeans: Health hazards in China's denim factories, The Clean Clothes Campaign 2013 http://www.setem.org/media/pdfs/Breathless.pdf

[147] SUBSTANCE EVALUATION CONCLUSION as required by REACH Article 48 and EVALUATION REPORT for Potassium permanganate 2018 https://echa.europa.eu/documents/10162/f91eb21d-12bb-7a7a-9708-9534f87c3440

- Relevant national laws and regulations
- The International Labour Organisation (ILO) Conventions below:

ILO Conventions:

1. Prohibition of forced labour (ILO Conventions Nos. 29 and 105)
2. Freedom of association, and protection of the right to organise and to conduct collective bargaining (ILO Conventions Nos. 87, 98, 135 and 154)
3. Prohibition of child labour (ILO Conventions Nos. 138, 182 and 79 plus ILO Recommendation No. 146)
4. No discrimination (ILO Conventions Nos. 100 and 111, UN Convention on the Elimination of All Forms of Discrimination against Women)
5. No violent treatment – Physical abuse or punishment, and threats of physical abuse are prohibited. The same applies to sexual or other forms of harassment.
6. Workplace health and safety (ILO Convention No. 155 and ILO Recommendation No. 164)
7. Fair pay (ILO Convention No. 131)
8. Working hours (ILO Conventions Nos.1 and 14)

Certification: The licensee of the production license shall submit either a valid certificate of a SA8000 certification, or other third-party verification of compliance with the requirement. This may be a BSCI audit report.

If the manufacturer is in the process of becoming SA8000 certified, this may be accepted under the following conditions: Final report from the certification body, including action plan with stated deadlines, submitted for assessment.

Brand owner procedures: The licensee of the brand owner license shall have written procedures in place to ensure compliance with the above conditions at all tanneries and cut-make-trim (CMT) factories used for the ecolabelled products.

Nordic Ecolabelling may withdraw the ecolabel licence, if the licensee no longer fulfils SA8000 or does not meet the stated deadlines in any action plans.

✉ **Production license:** SA8000 certificate or third-party verification of compliance with the requirement. E.g. a BSCI audit rapport.

✉ **Brand owner** shall submit and implement a procedure, for ensuring that the production facilities used for the ecolabelled products meet the requirement.

✉ **Brand Owner** shall submit a description of the Code of Conduct in place with its subcontractors.

Background to the requirement

The requirement refers to the UN's Universal Declaration of Human Rights[148], which deals with respect for and the upholding of human rights, and the International Labour Organisation's (ILO) Conventions on relevant rights at work. These are recognised and widely used frames of reference for businesses in their work on human rights and workers' rights, and they underpin most of the systems and guidelines that address human rights, such as the OECD, ISO 26000, SA8000, the UN Global Compact, the UN Guiding Principles and the Ethical Trading Initiative.

[148] https://www.un.org/en/universal-declaration-human-rights/index.html

A new report from April 2019, compiled by Human Rights Watch[149], shows that low purchase prices and shorter lead times for textiles, combined with unfair sanctions and poor terms of payment, increase the risk of occupational accidents in textile factories. The severe financial pressure that many textile brands are putting their suppliers under gives those suppliers powerful incentives to cut costs in ways that worsen working conditions. Many brands demand that their suppliers uphold key workers' rights, while at the same time pressuring and encouraging them to do the opposite.

It is therefore considered relevant to expand the current requirement to include at least four new areas that are subject to ILO Conventions: "No violent treatment", "Workplace health and safety" (ILO Convention No. 155 and ILO Recommendation No. 164), Fair pay (ILO Convention No. 131) and Working hours (ILO Conventions Nos.1 and 14).

An SA8000 certificate with, for example, a BSCI audit report covers the ILO Conventions contained in the requirement[150]. A BSCI audit report may therefore be used as documentation for the requirement.

5.18 Quality and regulatory requirements

Quality and regulatory requirements are general requirements that are always included in Nordic Ecolabelling's product criteria. The purpose of these is to ensure that fundamental quality assurance and applicable environmental requirements from the authorities are dealt with appropriately. They also ensure compliance with Nordic Ecolabelling's requirements for the product throughout the period of validity of the licence.

These requirements have been expanded in this generation 4 with a new requirement regarding "Control and assessment of supplier".

O90 Control and assessment of suppliers

The requirement includes both the brand owner license and a production license.

The licensee shall submit an annual follow-up of its own subcontractors to Nordic Ecolabelling, which contain the following, as a minimum:

- Written documentation must be obtained annually showing that the responsible person at subcontractors who perform all or part of the textile production is familiar with the Nordic Swan Ecolabelling's requirements for the relevant processes and understands how the supplier can ensure compliance with these.
- An annual confirmation shall be submitted describing that only subcontractors approved on the license are used for the production of the Nordic Swan Ecolabelled textile. At the same time a list of the subcontractors

[149] "Paying for a Bus Ticket and Expecting to Fly" How Apparel Brand Purchasing Practices Drive Labor Abuses, 2019 https://www.hrw.org/sites/default/files/report_pdf/wrd0419.pdf

[150] amfori BSCI Code of Conduct, https://www.bsci-intl.org/sites/default/files/amfori%20BSCI%20COC%20UK_0.pdf?_ga=2.176261411.72067964.1557828371-2066962727.1556691248 accessed 14.05.2019

used for the production of the Nordic Swan Ecolabelled textile shall be submitted.

Changes in the production such as replacement of subcontractors, fibre raw materials or chemicals shall be approved by Nordic Ecolabelling before the change is initiated in production. See requirement O94 Planned changes for procedure for this.

The licensee shall submit documentation stated in the requirement annually to Nordic Ecolabelling. Documentation for each year of the validity of the license must be kept by the licensee.

✉ The licensee shall submit documentation annually showing that the subcontractor's responsible person is familiar with the relevant Nordic Swan Ecolabelling requirements.

✉ Licensee must annually submit confirmation that only subcontractors and raw materials approved for the license are used. As well as provide a list of the subcontractors used.

Background to the requirement

The requirement has been set to ensure that license is in compliance with the actual production of the Nordic Swan Ecolabelled textile, skin and leather.

O91 Responsible person and organisation

The company (both the holder of the production license and the holder of the brand owner license) shall appoint individuals who are responsible for ensuring the fulfilment of the Nordic Ecolabelling requirements, for marketing and for finance, as well as a contact person for communications with Nordic Ecolabelling.

✉ Organisational chart showing who is responsible for the above.

O92 Documentation

The licensee shall archive the documentation that is sent in with the application, or in a similar way maintain information in the Nordic Ecolabelling data system.

🔑 Checked on site as necessary.

O93 Quality of the product

The licensee shall guarantee that the quality of the Nordic Swan Ecolabelled product does not deteriorate during the validity period of the licence.

✉ Procedures for archiving claims and, where necessary, dealing with claims and complaints regarding the quality of the Nordic Swan Ecolabelled product.

🔑 The claims archive is checked on site.

O94 Planned changes

Written notice must be given to Nordic Ecolabelling of planned changes in products and markets, that have a bearing on Nordic Ecolabelling requirements.

✉ Procedures, of both the holder of the production license and the holder of the brand owner license, detailing how planned changes in products and markets are handled.

O95 Unplanned nonconformities

Unplanned nonconformities that have a bearing on Nordic Ecolabelling requirements must be reported to Nordic Ecolabelling in writing and journaled.

✉ Procedures detailing how unplanned nonconformities are handled.

O96 Traceability

The licensee must be able to trace the Nordic Swan Ecolabelled product in the production. A manufactured / sold product should be able to trace back to the occasion (time and date) and the location (specific factory) and, in relevant cases, also which machine / production line where it was produced. In addition, it should be possible to connect the product with the actual raw material used.

✉ Description of/procedures for the fulfilment of the requirement.

O97 Legislation and regulations

The licensee shall ensure compliance with all applicable local laws and provisions at all production facilities for the Nordic Swan Ecolabelled product, e.g. with regard to safety, working environment, environmental legislation and site-specific terms/permits.

✉ Duly signed application form.

6 Areas without requirements

Awaits.

7 Changes compared to previous generation

Awaits.

Overview of changes to criteria for xxx generation y compared with previous generation z.

Proposed requirement generation Y	Requirement generation Z	Same requirement	Change	New requirement	Comment
O1					
O2					
O3					

Criteria version history

Nordic Ecolabelling adopted version X.X of the criteria for XX on DAY MONTH YEAR. The criteria are valid until DAY MONTH YEAR.

New criteria

Awaits.

- New
- Even more

Appendix 1 Analysis and test laboratories

Requirements on the analysis laboratory (all)

The analysis laboratory/test institute must be competent and impartial.

The analysis laboratory used shall fulfil the general requirements of standard EN ISO 17025 or have official GLP status.

The applicant's analysis laboratory/test procedure may be approved for analysis and testing if:

- sampling and analysis is monitored by the authorities, or
- the manufacturer's quality assurance system covers analyses and sampling and is certified to ISO 9001 or
- the manufacturer can demonstrate agreement between a first-time test conducted at the manufacturer's own laboratory and testing carried out in parallel at an independent test institute, and the manufacturer takes samples in accordance with a fixed sampling schedule.

Appendix 2 Azo dyes and Carcinogenic aromatic amines

Carcinogene aromatic amines	**CAS no**
4-aminodiphenyl	92-67-1
Benzidine	92-87-5
4-chlor-o-toluidine	95-69-2
2-naphthylamine	91-59-8
o-amino-azotoluene	97-56-3
2-amino-4-nitrotoluene	99-55-8
p-chloraniline	106-47-8
2,4-diaminoanisol	615-05-4
4,4´-diaminodiphenylmethane	101-77-9
3,3´-dichlorbenzidine	91-94-1
3,3´-dimethoxybenzidine	119-90-4
3,3´-dimethylbenzidine	119-93-7
3,3´-dimethyl-4,4´-diaminodiphenylmethane	838-88-0
p-cresidine	120-71-8
4,4'-oxydianiline	101-80-4
4,4'-thiodianiline	139-65-1
o-toluidine	95-53-4
2,4-diaminotoluene	95-80-7
2,4,5-trimethylaniline	137-17-7
4-aminoazobenzene	60-09-3
o-anisidine	90-04-0
2,4-Xylidine	95-68-1
2,6-Xylidine	87-62-7
4,4'-methylene-bis-(2-chloro-aniline)	101-14-4
2-amino-5-nitroanisole	97-52-9
m-nitroaniline	99-09-2
2-amino-4-nitrophenol	99-57-0
m-phenylenediamine	108-45-2

2-amino-5-nitrothiazole	121-66-4
2-amino-5-nitrophenol	121-88-0
p-aminophenol	123-30-80
p-phenetidine	156-43-4
2-methyl-pphenylenediamine; 2,5diaminotoluene	615-50-9
2-methyl-pphenylenediamine; 2,5diaminotoluene	95-70-5
2-methyl-pphenylenediamine; 2,5diaminotoluene	25376-45-8
6-chloro-2,4-dinitroaniline	3531-19-9