About Nordic Swan Ecolabelled

Laundry detergents for professional use



Version 3.9 • 19 March 2014 - 31 December 2023

Background to ecolabelling

Nordic Ecolabelling

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This document is a translation of an original in Norwegian. 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:

Denmark
Ecolabelling Denmark
Danish Standards Foundation
Göteborg Plads 1, DK-2150 Nordhavn
Fischersgade 56, DK-9670 Løgstør
Tel. +45 72 300 450
info@ecolabel.dk
www.ecolabel.dk

Finland
Ecolabelling Finland
Urho Kekkosen katu 4-6 E
FI-00100 Helsinki
Tel. +358 9 61 22 50 00
joutsen@ecolabel.fi
www.ecolabel.fi

Iceland
Ecolabelling Iceland
Umhverfisstofnun
Suðurlandsbraut 24
IS-108 Reykjavik
Tel. +354 591 20 00
ust@ust.is
www.svanurinn.is

Norway
Ecolabelling Norway
Henrik Ibsens gate 20
NO-0255 Oslo
Tel. +47 24 14 46 00
info@svanemerket.no
www.svanemerket.no

Sweden
Ecolabelling Sweden
Box 38114
SE-100 64 Stockholm
Tel. +46 8 55 55 24 00
info@svanen.se
www.svanen.se

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1 Summary

Laundry detergents for professional use are a large product group on the Nordic market. Nordic Swan Ecolabelled laundry detergents for professional use are some of the least environmentally harmful products in the detergent area, because they meet stringent requirements concerning the environmental and health properties of the constituent substances and requirements relating quality and performance.

Laundry detergents for professional use are primarily used in commercial laundries, hotels and hospitals, but also in study centres, restaurants and communal laundries.

Large-scale consumers and professional users have different requirements to ordinary consumers with regard to wash time, hygiene and wash temperature. This affects the chemicals used in laundry detergents for professional use. Professional products are available both as single-component and multi-component systems (which may contain products such as pre-wash agent, main detergent and rinsing agent (fabric conditioner). Multi-component systems comprise several components that together make up a system. In general, this means that these products cannot be used individually – the entire system must be used. Characteristic of the sector is that large laundries use multi-component systems, while small professional laundries (OPL, On-Premises Laundry) mainly use single-component products. This trend is changing. A steadily increasing number of OPL are switching to automatic dosing systems, i.e. multi-component systems.

Multi-component systems give the laundries greater flexibility in controlling the wash processes in terms of, for example, wash time, wash temperature, and disinfection.

Laundry detergents can be made up of many components, including surfactants, enzymes, fragrances, preservatives, colouring agents and phosphates. A number of fragrances are both allergenic and environmentally hazardous, and certain preservatives accumulate in the environment, while others are less harmful.

Professional laundering generally takes place at higher temperatures with more effective, highly alkaline detergents, and using larger and more efficient washing machines than consumer laundering. High wash temperatures require a lot of energy, and thereby have greater environmental impact. Nordic Ecolabelling wishes to promote products that can wash effectively at lower wash temperatures and encourage customers (laundries) to wash at lower temperatures. This has prompted a requirement that the manufacturer must confirm testing of the product's effectiveness at a lower wash temperature.

When laundry detergents are used, chemicals are discharged to the wastewater, which after treatment is returned to the environment. There is also a risk that detergent residues remain in the washed fabrics, and so substances that are allergenic and harmful to health should be limited as far as possible.

The characteristics of Nordic Swan Ecolabelled laundry detergents for professional use are that the products:

- Have low levels of substances that are harmful to health and the environment
- Only contain substances that are readily degradable in nature and do not contain substances that are toxic or that accumulate in nature
- Do not contain fragrances and meet strict requirements concerning preservatives
- Work effectively at lower wash temperatures where this is possible without worsening the product's environmental impact.

- Provide user instructions that ensure optimum dosing, followed up by regular customer visits from the chemical supplier.

The revision from version 2 to 3 has focused on examining the possibility of tightening CDV requirements for various types of soiling, and setting more stringent requirements for degradability and phosphorus/phosphonates. Another objective has been to examine the opportunities and challenges arising from requirements for low-temperature washing where possible, without compromising on the product chemistry or requirements for wash time for satisfactory laundering.

In the revised criteria for laundry detergents for professional use the following criteria are set:

- recommended wash temperature the product/multi component system can perform wash effectiveness (O1 and O19)
- tighter CDV-requirements (O13)
- tighter requirement concerning phosphonates (O17)
- introduction of the Challenge Test for preservatives (O8)
- effectiveness test for chemothermal disinfection (O20) for products/multi-component systems marketed as having a disinfecting function
- a ban on microorganisms (via the product group definition)
- exemptions from the requirement for classification (O4) have been tightened for preservatives
- the requirement concerning environmentally harmful substances (O18) has been tailored to the degree of soiling

The requirement level regarding degradability is unchanged compared to version 2. However, the introduction of requirements regarding maximum wash temperature may be regarded as an indirect tightening of the requirements for degradability, because the chemistry changes at lower wash temperature.

The manufacturer must document the effectiveness of the products at 60 °C for heavy degree of soiling and 40 °C for medium and light degree of soiling (O19), and wash effectiveness must be shown at the same dosage recommended for the different degrees of soiling. In version 2 of the criteria, manufacturers could choose between an effectiveness test of industrial laundering processes, an effectiveness test in relation to the Nordic Ecolabelling criteria for laundry detergents for consumers, or a user test.

Nordic Ecolabelling has received clear feedback from the industry that one of the test methods referred to in version 2 of the criteria is not relevant for professional products. Experience also shows that none of the licensees have used this test to document effectiveness. A desire has been expressed to adapt the criteria to professional products. The efficiency tests have therefore been removed and only the user tests remains. This change was put forward in the consultation and supported by several respondents.

A new requirement has been introduced for products marketed as having disinfecting properties. Such products require an effectiveness test documenting that the project can disinfect at lower temperatures.

2 About the criteria

Which products can be awarded the Nordic Swan Ecolabel?

The phrase "laundry detergents for professional use" refers to products intended for washing fabrics in water, and that are used by large-scale consumers and professional users. Large-scale consumers include hotels and hospitals where somewhat larger washing machines are used than those in normal households. Professional users are laundries that use large washing machines, often with continuous batch washers, and that have external customers.

The criteria apply to both complete powder and liquid laundry detergents, and multi-component systems. Rinsing agents (fabric conditioners) and stain removal agents can also be awarded the Nordic Swan Ecolabel when they are constituents of a multi-component system that has the Nordic Swan Ecolabel.

Only products primarily intended for washing in soft water (0-6°dH) can be given the Nordic Swan Ecolabel.

A multi-component system is a detergent system based on the use of various components to build up a complete detergent, a stock solution, or a wash programme for automatic dosing. The advantage of multi-component systems is that the combination of the various components can be optimised in terms of, for example, wash programmes and dosage. This type of system may include several products, such as pre-wash agent, main detergent, wash booster, bleaching agent, fabric conditioner, disinfectants, neutralizing agents and detergent for washing delicate fabrics.

As a minimum, a Nordic Swan Ecolabelled multi-component system must contain the components that are necessary for the multi-component system to wash fabrics clean and fulfil the requirement for effectiveness (O19and O20). This is new in this version of the criteria.

In this version of the criteria, new requirements are introduced about maximum wash temperature and related requirements. Both CDV requirements (O13), requirements regarding phosphonates (O17) and effectiveness tests (O19) are to be documented in relation to the stated maximum wash temperature.

The criteria do not cover special impregnating agents with water-repelling or flame-retarding function. Dyes for colouring fabrics and products with specifically added microorganisms are also not covered by this product group. Impregnating agents nor dyes have no washing properties. Impregnation and colouring can help to extend the life of fabrics, which is positive from an environmental perspective. Nordic Ecolabelling has not developed quality tests and so cannot differentiate between alternatives that are better or worse for the environment. We know that impregnating agents contain undesirable environmental toxins, such as flame retardants and water-repelling chemicals. Colours that are intended to retain their strength even after several washes, are often not readily degradable, and so remain in the environment for a long time.

Laundry detergents for professional use that have specifically added microorganisms cannot be Nordic Swan Ecolabelled. This is a new requirement in version 3. During the work of evaluating laundry detergents for professional use in 2011, this was one of the points singled out for assessment in a future revision. All the major detergent producers in the Nordic region with which Nordic Ecolabelling has been in contact during this

revision have all given the same feedback that they do not use microorganisms in their professional laundry detergents.

Products that are wholly or partly sold to consumers in retail outlets cannot be ecolabelled in accordance with this criteria document. These products are covered by the criteria document "Nordic Ecolabelling for Laundry Detergents (for Consumers)".

The question has arisen about whether products for coin-operated laundries can be defined as consumer products or as laundry detergents for professional use. In most coin-operated laundries, customers take their own detergent, so this cannot be regulated by Nordic Ecolabelling. Other coin-operated laundries purchase their own laundry detergents, but this comprise only a very marginal part of the Nordic market for laundry detergents for professional use. No resources have been allocated to possible adaptation of the criteria to this customer group. Apart from present criteria, laundry detergents specially designed for coin-operated laundries are therefore not covered by the product group.

In Denmark in particular, but also in certain other areas in the Nordic region where the water is hard, laundries often soften the water for the wash process. Laundry detergents have better washing effect in soft water (0-6 °dH) than in hard water at the same dosage. Softening water usually involves the addition of a de-liming agent; this reduces consumption of laundry detergent and reduces limescale in washing machines. Criteria for laundry detergents for professional use therefore apply to products that are primarily intended for washing in soft water.

Which products can be awarded the Nordic Swan Ecolabel?
The phrase "laundry detergents for professional use" refers to products intended for washing fabrics in water, and that are intended for use by large-scale consumers and professional users. The criteria apply to both complete powders and complete liquid laundry detergents, and multi-component systems (in which fabric softeners and stain removing agents can be a part of). Fabric softeners and stain removing agents may also be Nordic Swan Ecolabelled when they are constituents of a multi-component system.

Only products that are primarily intended for washing in soft water (0-6 °dH) may be awarded the Nordic Swan Ecolabel.

Multi-component systems are detergent systems based on the use of various components to form a complete detergent, a stock solution, or a wash programme for automatic dosing. This type of system may include several products, such as pre-wash agent, main detergent, wash booster, bleaching agent, fabric conditioner, disinfectants, neutralizing agents and detergent for delicate fabrics.

The criteria apply to all products that come into contact with the laundry during washing, but do not apply to special impregnating agents that have, for example, a water-repelling or flame-retardant function. Dyes for colouring fabrics are not covered by this product group. Products with specifically added microorganisms are also not covered by this product group.

Products that are intended, wholly or partly, for consumers, and that are wholly or partly sold in retail outlets, cannot be awarded the Nordic Swan Ecolabel in accordance with these criteria. For these types of products, the criteria document "Nordic Ecolabelling of laundry detergents and stain removers", Version 7.0 or later, applies.

Justification

Laundry detergents for professional use are a large product group in the Nordic market, where the largest customers are primarily large laundries, hotels and healthcare institutions.

Nordic Ecolabelling experience from textile services is that the products on the market vary greatly. For example, many laundries use products with undesirable ingredients such as optical brighteners, LAS, and substances that can have undesirable effects on

reproduction. Many laundries have an unnecessarily high consumption of chlorine as a bleaching agent. Overdosing exposes the environment to unnecessarily high quantities of substances that, overall, lead to high toxicity combined with poor degradation.

Large laundries tend to wash at higher temperatures than is common in domestic washes, not least to meet customer requirements for effectiveness and disinfection. Laundry detergents are gradually being developed that can wash effectively and disinfect at lower wash temperatures, without sacrificing quality or wash time. Washing at lower temperatures reduces energy consumption, which benefits both the environment and the laundries' finances. It is important that laundry detergents are developed that can wash effectively at lower temperatures, in order to reduce energy consumption at the laundries.

Use of laundry detergents for professional use is harmful to the environment when chemicals are discharged into wastewater. This wash water passes through the sewage system to a treatment plant, and then on to the recipient. Discharge to the recipient can lead to algal bloom and the spread of toxic compounds and compounds that are not readily degradable. Many of the substances present in the products, such as chlorine compounds, complexing agents, and fragrances, are a problem because their properties are harmful to the environment and health. It is therefore important that the wash water contains as small a proportion of environmentally hazardous compounds as possible.

It is therefore important to limit the substances in the products in order to restrict emissions of environmentally harmful substances into the water.

Nordic Swan Ecolabelled laundry detergents for professional use contain few substances that are harmful to the environment and health. Substances that are bioaccumulative or toxic, and that cannot be degraded easily in the environment, are permitted in limited amounts in Nordic Swan Ecolabelled laundry detergents for professional use. Furthermore, Nordic Ecolabelling prohibits fragrances and limits the content of preservatives. The products must also be as effective as comparable products with the same function, there must be an optimal dosage, and the packaging must have minimal environmental impact. Laundry detergents for professional use are dosed both manually and automatically. Nordic Ecolabelling wishes to prevent overdosing, so correct dosage, and maintenance of dosage devices so that they function optimally, is important.

Nordic Ecolabelling also wishes to promote effective laundering at low-temperatures where possible, without compromising the product chemicals, wash time, or the customer's requirements for hygiene.

Why choose the Nordic Swan Ecolabel?

- Enterprises that manufacture laundry detergents for professional use may use the Nordic Swan Ecolabel trademark in their marketing of the product. The Nordic Swan Ecolabel is well-reputed and well-known in the Nordic region.
- The Nordic Swan Ecolabel is a cost-effective and simple way of communicating, to customers and suppliers, environmental work and environmental commitment.
- An environmentally conscious business often has lower costs, due to reduced energy consumption and less packaging and reduced quantity of waste.
- Business activities that are adapted to the environment often provide scope for reducing costs by, for example, reducing the use of environmentally harmful chemicals, energy, and water, and reducing the quantity of waste., in addition to prepare the business for future environmental requirements.

- Environmental issues are complex, and it can take a long time to gain an understanding of specific issues. Nordic Ecolabelling can be seen as a guide to this work.
- The Nordic Swan Ecolabel not only sets requirements relating to the environment and health, but also in relation to quality, as environment and quality often go hand-in-hand. This means that a Nordic Swan Ecolabel licence can also been seen as a mark of quality.

Criteria versions and validity

The first version of the criteria document for Nordic Ecolabelling for laundry detergents for professional use was adopted by the Nordic Ecolabelling Board (NMN) in March 2006. The criteria have since been revised twice.

Version 1, adopted on 23 March 2006

Version 2, adopted on 15 December 2009

Version 3, adopted 19 March 2014

In Version 2, a number of specific chemicals were prohibited, such as LAS, DADMAC, PFAS, triclosan, fragrances, EDTA and NTA. The following were also prohibited: PBT substances, vPvB substances, and substances on the EU list of substances suspected of endocrine disruption. Requirements were also tightened regarding CDV (Critical Dilution Volume), aNBO (aerobic non-biodegradability) and anNBO (anaerobic non-biodegradability).

LAS:	*linear alkylbenzensulfonates*
DADMAC:	*diallyldimethylammonium chloride*
PFAS:	*polyfluorinated alkylated compounds*
EDTA:	*ethylenediaminetetraacetic acid*
NTA:	*Nitrilotriacetic acid*
PBT-stoffer	*Persistent, bioaccumulative and toxic substances*
vPvB-stoffer	*very Persistant and very Bioaccumulativ substances*

The Nordic market

The Nordic market for laundry detergents for professional use is relatively large, which is reflected by the sales of professional laundry detergents for professional use in each Nordic country.

Table A - Sales of professional laundry detergents in the Nordic countries[1]

Country	Total sales
Denmark	Estimated EUR 10 million
Finland	EUR 10.9 million
Norway	NOK 60 million
Sweden	EUR 10.4 million
Total for Nordic countries	Approximately EUR 40 million

[1] Background to Ecolabelling of laundry detergents for professional use, version 2

The sector in the Nordic region is characterised by a few large operators, some of them international. The companies in the Nordic region that manufacture laundry detergents for the professional market are small, medium-sized and large. Some companies only produce for the local market, while others also export to the rest of the Nordic region and/or the rest of Europe. Because of the requirements we place on laundry detergents for professional use, Nordic Ecolabelling can have positive environmental effects in the Nordic region on account of the large volume of the products.

The products are sold to small and large laundries, both in the Nordic region and in Europe. Laundry can be divided into various categories, such as mops, work clothes, hotel laundry (e.g. towels, bedclothes), restaurant laundry (e.g. tablecloths, napkins), and hospital laundry (e.g. sheets, patient clothes). The products are also sold to small laundries, like communal laundries, and to the public sector (e.g. hospitals and healthcare institutions).

Table B - The largest manufacturers/suppliers of laundry detergents to the professional market in the Nordic region. Products are not manufactured in every country.

Manufacturer/supplier	Denmark	Finland	Norway	Sweden
Christeyns		x		x
Danlind	x			x
Diskteknik		x		x
Ecolab	x	x	x	x
Farmos		x		
Gipeco				x
ITW	x			
Johnson Diversey	x	x		x
KiiltoClean		x		
Lilleborg			x	
Rekal				x
Sæbefabrikken	x			x
Cleano				x

Many of the manufacturers also produce other chemical-technical products in their factories, such as cleaning detergents and dishwasher detergents, both for the consumer and professional markets.

Nordic Swan Ecolabel licences

In 2013 there were 22 licences in the Nordic market in the area of laundry detergents for professional use.

Country	Number of licences	Number of products
Denmark (2013)	11	171
Finland	2	
Iceland	-	
Norway (2013)	4	29
Sweden (2013)	5	58

The number of licences has increased from 8 in 2009 and 10 in 2011 to more than 20 in 2013. Each licence applies to several products, so the number of products may have increased more than the number of licences.

It is the manufacturers themselves who hold the licences in the Nordic region. The manufacturers are small, medium-sized and large companies. Many of the licence holders also have licences in other chemical-technical product groups, such as cleaning detergents and dishwasher detergents for professional use.

An estimated 30% of the professional laundry detergents in the Danish market have the Nordic Swan Ecolabel. In Sweden and Norway about 10% of the products on the market are Nordic Swan Ecolabelled and in Finland approximately 20%[2].

Other ecolabelling schemes

The Swedish Society for Nature Conservation (SSNC[3]) has for many years had criteria for ecolabelling of laundry detergents for both private users and large-scale users. Good Environmental Choice has granted licences (each variant is awarded one licence) for laundry detergents for large-scale users to 11 manufacturers (or licence holders).

Some basic requirements for Good Environmental Choice are:

- All ingredients in the products must be readily degradable, and must not be toxic to aquatic organisms or bioaccumulative.
- Phosphorus is not permitted in the products.
- Requirements for dosage and classification.
- Requirements regarding substances such as surfactants, complexing agents, preservatives, colours and fragrances.

The EU Ecolabel has criteria for laundry detergents for industrial and institutional use (EU Ecolabel for Industrial and Institutional Laundry Detergents of 14 November 2012).

In addition to environmental labelling schemes, there are schemes such as the EISE Charter for Sustainable Cleaning, the Finnish Kay Flag System, and environmental management systems such as ISO 14001 and EMAS, and various 'chemical scoring tools', purchaser guidelines, etc.

3 About the revision

Goals of the revision

The main objective of the revision was to present a proposal for revised criteria for laundry detergents for professional use, Version 3.0, in March 2014. The evaluation of the criteria document for laundry detergents for professional use, Version 2, which was presented to NMN in December 2011, pointed out that the criteria should be revised, with focus as follows:

- consider more stringent requirements regarding CDV and degradability, and also with regard to washing at lower temperatures
- consider more stringent requirements regarding phosphorus and phosphonates, and also with regard to washing at lower temperatures

[2] Evaluation of Nordic Ecolabelled Laundry Detergent for Professional Use, Version 2 (2011)
[3] http://www.naturskyddsforeningen.se/bra-miljoval

- consider the possibility of developing energy-efficiency requirements for washing at lower temperatures.

The evaluation of criteria emphasised that, when reviewing whether requirements could be set for low-temperature products, it is primarily the single-component products for use in OPL (On Premises Laundry) that should be evaluated. However, the revision should also review whether it might be possible to set the same requirements for multi-component products.

Other points that were pointed out in the evaluation and that should be examined in the revision:

- clarification of requirement texts and appendices
- updating of CLP classification in the document
- comparison with the EU Ecolabel threshold values
- evaluation of products for hard water should be included, and how such products should be managed in terms of effectiveness.

About this revision

Members of the project team were Anne Kristine Feltman (product manager, Arne Godal and Lina Harström (product advisors). Karen Dahl Jensen was product development manager for the project. During the revision, the project group had continual contact with the sector, including manufacturers and license holders.

The new criteria was sent out for consultation in the period June-August 2013, and adopted by the Nordic Ecolabelling Board (NMN) in March 2014.

4 Background to the requirements

Laundry detergents for professional use are primarily used in large laundries, hotels, and hospitals/healthcare institutions, but also in smaller laundries in study centres, restaurants, communal laundries in blocks of flats, etc.

Generally, professional washing is carried out at higher temperatures, and using more effective, strongly alkaline detergents than normal consumer washing. Use of laundry detergents affects energy consumption, and causes discharge of chemicals to the wastewater, which after treatment ends up in the environment. The criteria for laundry detergents for professional use should involve requirements that reflect the areas we believe contribute to the greatest environmental impact and where ecolabelling can have an effect.

In the requirements for Nordic Swan Ecolabelled laundry detergents for professional use, the most important focus areas are:

Table C - Focus areas in the criteria for laundry detergents for professional use

Focus area	Goal
Limit substances that are harmful to health and the environment.	Requirements for classification of product and constituent substances Requirements regarding the critical dilution volume (CDV) of the product Exclude fragrances, LAS, optical brighteners, triclosan, EDTA and other substances. Limit phosphorus.
Exclude substances that are not readily degraded in the environment.	Requirements for readily aerobically and anaerobically degradable surfactants Limit substances that are not aerobically and anaerobically degradable
Limit substances that are bioaccumulators or toxic	List of substances that must not be present. Requirements regarding preservatives and the bioaccumulation of colouring agents. Requirements regarding CDV
Packaging that has minimal environmental impact.	The packaging is to be marked and is not to include PVC or halogenic plastic.
Dosage	Optimal dosage is guaranteed through a requirement for regular customer visits.
Effectiveness	Effectiveness testing that shows that the products are as effective as other products on the market with the same function.
Energy	Requirements for products that are effective in washing at lower temperatures.

Components and ingredients in laundry detergents for professional use

There are many different laundry detergents for professional use on the market. Some products for professional use are similar to laundry detergents for consumers, where all ingredients are part of a complete powder product or a complete product in liquid form (single-component products)

Other detergents comprise a number of components, where each component has a function (multi-component products). Multi-component systems are detergent systems comprising a mixture of different components that together comprise a complete system designed for a wash programme. Components/products that may be included are:

- pre-wash agent
- main detergent
- wash booster
- bleaching agent
- fabric softener
- detergent for delicate fabrics
- stain removal agent
- disinfecting agent

These components are mixed automatically on-site, so the composition of the detergent can vary to a certain extent, depending on the type of wash, type of wash programme, and the degree of soiling of the laundry to be washed.

OPL (On Premise Laundry) are mainly found in places like hotels, study centres, communal laundries, and blocks of flats. Here, washing is on a smaller scale than in traditional laundries, and both powder products (usually with manual dosing) and liquid products (usually with automatic dosing) are common. The washing machines used at these types of laundries are larger than normal household machines. The machines have several types of wash programmes, but are relatively simple to use. OPL use both single-component products and multi-component systems. Norske Vaskeriers Kvalitetstilsyn, NVK, reports a trend in which the laundries, regardless of size, are increasingly choosing to use multi-component systems. This gives them greater flexibility in terms of product composition, and thereby products that are more suitable for the wash programme.

Large, professional laundries use multi-component systems in their production. These laundries have large washing machines or long continuous batch washers through which the laundry passes. The batch washers may consist of up to 10-12 chambers, in which the water supply, temperature and chemical dosage is computer-controlled. The water from individual chambers is recirculated in the system, and the chemical dosage and water consumption can thereby be reduced. The batch washers enable laundries to control the chemical composition, dosage and water temperature to meet various needs relating to the degree of soiling and the type of laundry.

In large laundries, liquid, concentrated components are often used, containing different substances that are adjusted and mixed together to form a multi-component system. Powder detergents may also be mixed with stock solutions for use at the laundry. The powder must be free-flowing, clump-free and easily soluble.

Laundry detergents for professional use may have many properties; for example, the products may be acidic or alkaline, with or without enzymes, may be designed for white or coloured clothes, may contain fragrance and bleaching agent, or may be designed for washing at lower temperatures. There are also auxiliary products like fabric conditioners (may have both antistatic and softening effects), special detergents for pre-wash, wash boosters for heavily-soiled washes (for example, work clothes), impregnating agents for water-repellent fabrics, disinfecting agents, mop detergents, detergents for microfibres, and bleaching agent.

The products, both single-component products and multi-component systems, are based on quite complex formulations, and may contain a number of ingredients. Some of the most important ingredients in a laundry detergent are shown in Table D below. The ingredients have different functions, and some ingredients, such as surfactants, may occur in several different components in a multi-component system.

Table D - Ingredients and their functions in laundry detergents[4]

Type of chemical	Function
Surfactants/surface-active substances	Reduce surface tension and loosen/disperse/dissolve the dirt. Examples are alkyl sulphates, alcohol ethoxylates
Bleaching agent	Bleach stains that cannot be removed by surfactants. Examples are perborates, percarbonate, hydrogen peroxide, sodium hypochlorite.
Optical brighteners	Prevent white fabrics from becoming grey.
Preservatives	Prevent the growth of microorganisms in liquid agents.

[4] Grüttner (2008): Environmental Assessment of Laundry Detergents. European Textile Services Association. On the internet: http://www.eco-forum.dk/detergents/

Fragrances	Odour
Fillers	Give structure to the product; an example is sodium sulphate in powder products. Liquid products also contain water, but this is not considered a filler even if it has no function.
Enzymes	Specific stain removal, biocleaning, brightness, colour and fabric care
Auxiliary chemicals	Bind lime in the water and dirt in the fabric. Helps the surfactants to work on the dirt and improve the washing effect. Examples are phosphates, phosphonates, zeolites, silicates, carbonates, citrate, polycarboxylates
Fabric conditioner	Neutralises detergent residue, shortens drying time, makes ironing and mangling easier (faster)

The composition of the products depends on whether the product is designed for OPL or large laundries. Furthermore, the wash programme (i.e. type of laundry and degree of soiling) determines the composition of the product, and whether a single- or multi-component product is used.

The use phase

The use phase is an important part of the life cycle of laundry detergents for professional use, as there are many parameters that influence and are influenced by the detergents. For professional laundries, some factors are inter-related – wash temperature, wash time, chemicals, and mechanical action.

The type of chemical selected is affected for example by wash temperature, and may affect the wash time and drying time (lower wash temperature may increase drying time) and the result (white fabrics become grey, need for rewashing).

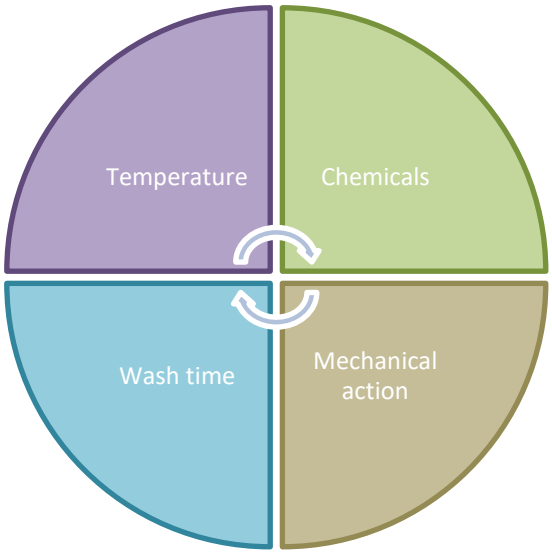
Changes in these factors affect what is most important for the customers of professional laundry detergents, i.e. clean laundry. Factors that determine whether the laundry becomes clean depend on combinations of the following parameters:

- wash temperature (disinfection)
- chemicals (wash, stain removal, bleaching, disinfection)
- dosage
- wash time
- water consumption
- disinfection
- water hardness
- wash technology/programme

All these factors affect each other to a greater or lesser extent if changes are made. In order to understand laundering, the final result and the factors that affect it are often represented using the Sinner Circle, shown in Figure 1. Washing is affected by four independent factors – temperature, chemicals, mechanical action, and wash time. If one factor is reduced, the loss must be compensated by increasing one or more of the other factors[5].

[5] http://www.voussert.com/sinner-circle-leg43.html

Figure 1 - Sinner Circle



Energy consumption, chemical content and chemical consumption are affected by wash temperature, type of washing machine, type of laundry, type of wash, degree of soiling and soiling type, and whether the laundering process complies with machine and chemical supplier recommendations. This means there are many ways to affect both wash temperature and chemicals, but at the same time there is no clear solution for how a laundry chooses to adapt its operation to reduce environmental impact. Nordic Ecolabelling therefore proposes to introduce, for example, differentiated CDV requirements according to maximum wash temperature.

MECO and RPS

In order to assess which requirements should be set for Nordic Swan Ecolabelled laundry detergents for professional use, a simplified LCA, known as a MECO analysis, was conducted in conjunction with the evaluation of the criteria in 2011. In this MECO analysis, the environmental impact of laundry detergents for professional use was assessed in five phases of the life cycle.

1. Material/raw material manufacture (mainly production of chemical raw materials and packaging material)
2. Manufacture (manufacture of laundry detergent and packaging)
3. Transport (distribution of the products)
4. Use phase (energy in washing and drying, which is indirectly governed by the products)
5. Waste/removal (wastewater, packaging, discharge in waste treatment)

Within each of these five phases, the assessment focused on Material use/consumption, Energy consumption, Chemical consumption, and finally Other considerations. The MECO analysis is a good tool for avoiding requirements that simply shift environmental problems from one phase to another.

Nordic Ecolabelling is working to develop requirements relating to health and the environment for different products, and is using three parameters in the assessment of which requirements will be set: Relevance, Potential and Steerability (RPS).

Relevance – Is there an environmental problem?

Potential – Can anything be done about the problem?

Steerability – Can ecolabelling do anything about the problem?

The MECO matrix helps us to assess relevance on the basis of whether there is a health and/or environmental impact associated with materials, energy and chemicals in the various life cycle phases of laundry detergents for professional use. The next stage is to assess the potential for reducing health and/or environmental effects in the product's life cycle, before the final assessment of whether Nordic Ecolabelling has the steerability to realise the potential for environmental improvement.

In order to set relevant requirements that promote real environmental gains, all three parameters (RPS) must be assessed to establish the existence of Relevance, Potential and Steerability.

The MECO analysis in the evaluation showed that, in the case of laundry detergents for professional use, environmental impact is particularly significant in the use phase and waste phase, but the analysis also indicated high RPS values. This means that individual phases of the life cycle of a product may have significant environmental impact (high R), but very little opportunity for Nordic Ecolabelling to set requirements that can reduce environmental impact (low S).

Table E shows the parameters that influence environmental impact throughout the life cycle of laundry detergents. The energy values in the MECO matrix are based on average energy consumption of Nordic laundries when washing 1 kg of laundry.

Table E - Assessment of life cycle and environmental impact of laundry detergents[6]

	Raw materials	**Manufacture**	**Transport**	**Use phase**	**Waste**
Materials	Crude oil and biobased raw materials Land area and oil	Manufacture of plastic and plastic components Equipment	Diesel for distribution	Water consumption Raw materials for production of electricity Dosage	-
Energy	Energy for cultivation, refining and production of raw materials. 0.4 MJ/wash	Manufacture of end product, including packaging. 0.06 MJ/kg laundry	Energy for diesel 0.3 MJ primary energy/kg laundry	Energy consumption in washing and drying. 15.3 MJ/kg laundry	Energy for treatment of water 0.0001 MJ/kg laundry
Chemicals	Potential discharge/emission in manufacture.	Management of chemicals. Discharge/ emission from manufacture.	-	Exposure of chemicals.	Discharge of chemical substances after treat-ment of wastewater.
Other	Working conditions	-	Particulate matter and emissions from distribution vehicles.	Noise from washing machines and tumble driers.	-

[6] The average figures for energy consumption of Nordic laundries when washing 1 kg of laundry are obtained from "Evaluation of Nordic Ecolabelled Laundry Detergents for Professional Use (2011)"

Areas where Nordic Ecolabelling assesses that the RPS is high are shown in a green colour in the table above. These areas largely correspond with the areas in which the Nordic Ecolabelling sets requirements.

In the RPS and MECO analyses carried out in 2011, some points were emphasised, i.e. energy, volume, chemicals/raw materials (included disinfectants and perfume), dosage and packaging. Other elements that affect the environmental impact of laundry detergents are disinfection, fragrances and water hardness.

Energy

Energy consumption throughout the life cycle shows that the actual use phase is where most energy is used. A lot of energy is used in the actual washing and drying, and products that can wash effectively at a lower temperature can influence total energy consumption. In the MECO analysis that was carried out during the evaluation of criteria for laundry detergents for professional use in 2011, the total energy for recovery of raw materials of the products was calculated to be 0.4 MJ/wash. In comparison, the energy consumption for washing and drying of 1 kg laundry was calculated to be 15.3 MJ. The energy values in the MECO matrix are based on average energy consumption of Nordic laundries when washing 1 kg of laundry. Energy consumption also leads to emissions of CO_2.

Generally speaking, professional users (laundries and their customers) have higher standards when it comes to laundry and the end result than the ordinary consumer does.

Professional products must be able to handle a different type of soiling, and often more heavily soiled products, and the laundries have more stringent requirements regarding hygiene (disinfection) and shorter wash time. The wash temperature can vary between 30 and 85°C, depending on what is to be washed. Manufacturers of professional products also focus on developing products that can wash at lower temperatures, while maintaining requirements relating to cleanliness, hygiene and efficiency.

Energy consumption in the washing and drying processes is an important parameter for the total life cycle of the laundry detergent. Lower wash temperature reduces energy consumption in the heating of water, but the temperature in the final part of the wash process before drying can affect the drying time in the tumble dryer, and thereby energy consumption. Nordic Ecolabelling has no figures that show the extent to which energy consumption is affected by, for example, longer drying time, but feedback from the sector indicates that drying time is longer when the water temperature is lower in the final part of the wash process. The type of laundry also affects the drying time, depending on how much water is absorbed by the fabrics. The latter is not a factor that ecolabelling can steer.

In order to introduce requirements for low-temperature products, Nordic Ecolabelling has stated that a comprehensive review is needed, to assess whether such requirements can be set for laundry detergents for professional use. Washing at lower temperatures may mean that other chemicals must be added during the course of the washing process in order to attain satisfactory results. At the same time, the wash time can be extended as a result of washing at lower temperatures, which the laundries do not want. Greying (white fabrics become greyer after being washed a certain number of times) and rewashing (i.e. textiles must be washed again because they were not clean after the first wash) also entail an economic burden for the laundries, and must be considered in the discussion concerning low-temperature washing. In a laundry, machine type and water

consumption are critical factors in how much energy is used in the actual washing process, and can have as much influence as low-temperature washing. This also reduces steerability of energy consumption.

With regard to washing at lower temperatures, it is widely perceived that lower water temperature reduces energy consumption. Studies[7] show that extra chemical consumption – which can be a consequence of washing at lower temperatures – increases energy consumption in a life-cycle perspective. Admittedly, this report was only based on experience from washing of work clothes, and is not representative for other types of laundry. Conclusions from other studies of laundries are that there is great potential for saving energy by washing at lower temperatures[8].

During the consultation, the question was also raised as to exactly what the environmental benefit of washing at lower temperatures is, if it leads to increased use of chemicals. Nordic Ecolabelling is conscious that washing at lower temperatures affects the chemical content and quantity, and is trying to regulate this in part through the CDV requirement. At the same time, Nordic Ecolabelling is seeing the development of new products that are able to wash effectively at lower temperatures without increased dosing.

Previously, there have been no requirements about low-temperature washing, so this is not an area in which Nordic Ecolabelling has experience. In order to assess whether requirements about low-temperature products could be introduced, Nordic Ecolabelling has obtained information from the sector in the Nordic countries. This has given us a picture of the temperatures commonly used in washing, and also in relation to soiling, type of laundry, and health requirements. See Table F below.

Table F - Information about water temperature, obtained April/May 2013

	OPL and large laundries - wash temperature	Development of and considerations in washing at lower temperature
White and coloured fabrics	Normal wash temperature 40-60-85-90°C. Most common: 60-85°C, some never <60°C for white fabrics. For coloured fabrics, normal wash temperature is: 40-60°C, but some washing also up to 85°C. Mops: >60°C Residents' clothes 30°C Personnel clothes (coloured): 85°C	Lower wash temperature lengthens wash time Some operators are examining whether laundry could be washed at temperatures as low as 20-30°C, but the customers are not ready. Other operators are assessing washing at lower temperatures, but only if the dosage or wash time is increased. Many fabrics (e.g. bamboo) cannot be washed above 60°C, and are preferably washed at lower temperatures. Heavily soiled work clothes can be difficult to get clean. Bleaching is difficult at 40°C. Disinfection preferably at >60°C
Health requirements	Some textiles require disinfection at 60-85°C.	Thermal disinfection: 85°C Thermochemical disinfection: 60°C is effective.

The information obtained gives no clear picture, but shows that there is great variation in the sector, and so lower wash temperatures should be possible. We also observe that the sector is interested in washing at lower temperatures, but then it must be possible to

[7] Hansen & Holst, 2002 - Hansen, M. S. & Holst, J. K. (2002): Life Cycle Assessment Berendsen Profile Workwear - Focus on Chemicals (1st ed.) Sophus Berendsen
[8] Erberle & Möller (2006) - Erberle & Möller, 2006; Frederiksen, 2004; Hansen & Holst, 2002; Frydendal, 2001; Schmidt, 2000; Frydendal, 1998; Kalliala, 1997

compensate with chemicals and/or dosage to avoid significant changes in effectiveness and wash time. Nordic Ecolabelling therefore observes that other requirements relating to detergents may be affected if requirements about low-temperature washing are introduced, particularly requirements relating to CDV.

Volume

There are substantial sales of laundry detergents for professional use, and this in itself makes it relevant to set requirements for these products. In 2009, total sales in the Nordic region were approximately EUR 40 million €[9], indicating the large volume of products on the market.

Use of laundry detergents disperses chemicals because wastewater is released into the sewage system. Most professional detergents are used in facilities connected to a treatment plant. The wastewater passes through treatment plants and onward to recipients. Consequently, laundry detergents should contain the lowest possible amount of substances that have an impact on the environment.

Correct dosage and fewer toxic constituent substances help to ensure that the volume of environmentally harmful substances that are discharged is lower than in overdosing. Requirements about constituent substances and dosage enable Nordic Ecolabelling to reduce discharge of environmentally harmful substances.

Chemicals/raw materials

Many of the substances present in laundry detergents for professional use, such as chlorine compounds, complexing agents, preservatives and fragrances are problematical for both the environment and health. The chemical composition and water content of the products varies, and this affects the environmental impact involved in transport of raw materials and products. The quantity of aerobically and/or anaerobically degradable substances, i.e. substances that are not degraded under conditions with and without access to oxygen, varies in different products. This affects the aquatic environment when the products are discharged into the environment via wastewater after use.

Applicable health requirements for Nordic Swan Ecolabelled laundry detergents for professional, version 2, use relate to allergenic substances and CMR substances. Workers in laundries that use products that are dosed automatically have less contact with the products, while users of products that are manually dosed are more exposed to laundry detergents. The potential in terms of health aspects is to reduce the number of new people with allergies, and to avoid substances harmful to health, such as CMR-classified substances. Products that are not ecolabelled may contain these types of substances. Nor fragrances are permitted in Nordic Swan Ecolabelled laundry detergents for professional use, partly because of their health-harming properties but also because they often contain environmentally hazardous substances.

For detergents, there are official requirements about classification and some requirements that apply to content. However, these do not limit the constituent substances as much as Nordic Ecolabelling requirements. Consequently, the Nordic Swan Ecolabel can steer users towards products containing fewer toxic substances and smaller quantities of substances that are not readily degradable.

[9] Based on figures collected during the revision of Nordic Ecolabelled laundry detergents for professional use in 2009.

The manufacture of raw materials for professional laundry detergents has an environmental impact, and the origin of these raw materials varies. It could therefore be relevant to set requirements relating to raw material production and origin. Because of poor steerability further back in the chain, Nordic Ecolabelling considers that, currently, there are not sufficient grounds to set requirements relating to raw materials. However, this will be considered in the forthcoming revision.

Dosage

The complete detergent or multi-component system must be sufficiently effective at the recommended dosage for laundry with light, normal and heavy soiling. Dosing of laundry detergent is generally automatic, but may also be manual, especially in OPL. The trend is for On Premise Laundries (OPL) also to introduce automatic dosing units.

The advantage of automatic dosing is that dosing is optimal, enabling greater control of costs due to reduced water, energy and chemical consumption, avoidance of overdosing, and by increasing the life length of fabrics because they are washed correctly.

Maintenance of dosage devices to ensure correct and optimal function is also important. Consequently, it is important to have regular customer visits to the laundries to check dosage programmes and equipment.

For products that are dosed manually, the risk of overdosing is greater than in automatic dosing, and so clear dosage instructions are important, to prevent overdosing.

Requirements regarding customer visits ensure that dosage instructions and dosing devices are used in such a way that overdosing is avoided. Complete service also involves check of dosage programmes and service of dosage equipment. In setting such requirements, Nordic Ecolabelling is steering towards better dosing.

Packaging

Products like laundry detergents for professional use are sold in great volumes (100-200 litres), and this means large volumes of packaging. Most packaging is plastic.

The energy used in the manufacture of packaging is low compared with other parameters in the MECO analysis. Calculations are based on 10-litre packaging, which is considerably smaller than that used by most laundries. The figures should therefore be much lower for the most common packaging sizes of 100-200 litres. The potential for environmental gain through packaging requirements is not thought to be great, as energy consumption in transport of packaging is much greater.

Steerability does not affect packaging greatly, as many laundries already return packaging to the supplier/manufacturer for reuse/refilling. The packaging is preferably designed to meet transport requirements, i.e. there is little demand for packaging that has an unnecessarily large volume or weight. Consequently, introduction of VNF requirements are considered to have little effect on the design of packaging, and thereby the potential for attaining environmental benefit.

Disinfection

For laundries that treat clothes from healthcare institutions and the food industry, each country has its own standards that consider, for example whether the laundries are to treat such fabrics. One recommendation is that standards should be incorporated as quality requirements at the laundries. Sector standards reflect good professional practice

and the Norwegian standard "Smittevern for vaskerier som behandler tekstiler til helse-institusjoner mars 2011" ("Contamination protection for laundries handling institutional linen for healthcare institutions, March 2011") are based, for example, on recommendations from the CDC (Centers for Control Disease and Prevention in USA) and the RKI (Robert Koch Institute in Germany).

Bedlinen and towels from hotels and work clothes from private clinics are examples of laundry that must undergo thermal or chemothermal disinfection in Norway. In Denmark and Sweden, there are no general requirements for disinfection of hotel laundry.

In the laundry sector, the concept of disinfecting washing process is used for processes that disinfect the laundry, either thermally or chemothermally[10]. There are several ways to disinfect laundry: thermal disinfection (high temperature, e.g. 85°C for 10 minutes), chemical disinfection (chemicals, but lower temperature than thermal disinfection), and chemothermal disinfection (disinfecting washing process using chemical disinfection agent at lower temperatures than 85°C alternatively 70°C inclusive processes that are approved by RKI[11] or VAH[12].

Sector standards have no specific requirements about which chemical disinfecting agent should be used, but there are requirements for procedures to ensure that the chemical disinfecting agent is added in the correct quantities and at the correct point in the washing process, and that parameters such as correct pH are accurate.

The laundries should have procedures in place for fabrics that are subjected to a disinfecting washing process before after-treatment. If Nordic Ecolabelling aims to set requirements for low-temperature washing, so consideration must be taken to laundry that is to be disinfected. Thermal disinfection certainly takes place at higher temperatures for a limited time at the end of the washing process and it is possible to use lower temperatures for the main part of the wash.

Water hardness

Both past and current criterias for Nordic Ecolabelling for laundry detergents for professional use primarily apply to products for washing in soft water (0-6°dH). For laundries that only have access to medium-hard water (7-13°dH) or hard water (> 14°dH), the water may be softened, which is common for example in Denmark where the water is hard[13]. Some products have dosage recommendations for various degrees of water hardness. Hard water is softened by using, for example, a softening filter with a filter tank.

In detergents for consumers (Version 7), consideration is taken to various degrees of water hardness in requirements for dosage. In the new criteria for laundry detergents for professional use, requirements are primarily tailored to products for washing in soft water (0-6°dH).

[10] NVK Sector Standard "Contamination protection for laundries handling institutional linen for healthcare institutions", March 2011.
[11] Robert Koch Institute: List of disinfectants and disinfectant processes as tested and approved by the RKI.
[12] Verbund für Angewandte Hygiene (VAH): List of Disinfectants
[13] Dialog with the Danish industry.

The EU Ecolabel's criteria for laundry detergents (EU Ecolabel for Industrial and Institutional Laundry Detergents of 14 November 2012) set requirements concerning CDV and degradability in relation to water hardness (soft, medium-hard and hard water).

Fragrances

The criteria for laundry detergents for professional use do not permit content of fragrances. Fragrances have no cleaning effect, and are not desirable in Nordic Swan Ecolabelled laundry detergents for professional use because they can have harmful effects on the environment and health. Customers have pointed out that it is inconsistent of Nordic Ecolabelling to permit fragrances in consumer products and non-professional products. The ban on fragrances that was introduced in the previous version was a tightening of requirements compared to Version 1 of the criteria, and was a harmonisation with the criteria for textile services, where products containing fragrances are not permitted.

One important reason for the fragrances ban is consideration for users who eventually come into contact with the washed fabrics and for employees in the laundries. Private customers using laundry detergents for professional use can choose to use a product containing fragrances or not, but laundry customers, like hotel guests and patients, do not have this choice.

Fabric conditioners are used in nearly all types of washing, and are considered to serve an important function. They neutralise the detergent residue that is often alkaline, and also affect the surface tension on the washed textile, enabling it to dry faster and thereby reducing energy consumption. Fabric conditioner makes the clothes easier to iron and faster to mangle. Antistatic and acidifying agents (pH-regulating agents) have a good antistatic effect combined with neutralisation of the rinsing water in all types of laundry washing. These products often contain fragrances, but fragrance-free variants do occur.

Environmental requirements

Environmental requirements are divided into two parts - general requirements and total content of substances harmful to the environment.

Chapter 1.1, 'General Requirements', contains requirements that must be fulfilled by all products and all components in a multi-component system, and apply to all constituent substances unless stated otherwise.

Chapter 1.2, 'Total content of environmentally hazardous substances', contains requirements that apply to the total environmental impact in a complete laundry detergent or in a multi-component system.

Unless otherwise specified, the term 'constituent substances' refers to all substances in products, including additives in the raw materials (e.g. preservatives and stabilisers), but not impurities from primary production. Impurities comprise residues from primary production that may be found in the laundry detergent at concentrations below 100 ppm (0.0100% by weight, 100 mg/kg) Substances that are added to an ingredient, deliberately or for a purpose, are not regarded as impurities, regardless of concentration. Impurities at concentrations greater than 1.0% in the ingredient are regarded as constituent substances. Substances/products known to be liberated by a constituent substance are also regarded as constituent substances.

This definition has been retained from version 2 of the criteria.

Differentiated requirements concerning wash temperature:

Nordic Ecolabelling wishes to promote products that can wash effectively at lower temperatures, where this is possible without sacrificing the products' wash times or customer requirements for hygiene, and with acceptable use of chemicals. Contact with the industry shows that "regular" wash temperatures vary from 40-90°C, but that it is both possible and desirable to use products that can wash satisfactorily at lower temperatures.

Nordic Ecolabelling has therefore chosen, in version 3 of the criteria, to introduce differentiated requirements (Alternatives A and B) concerning the laundry detergent's ability to get laundry clean at lower temperatures:

The Manufacturer must account for recommended wash temperature in temperature interval 30-40°C (alternative A) or 40-60°C (alternative B).

As such, the technical data sheet/product data sheet or label must state the recommended wash temperature at which the product can wash effectively (Alternative A or B) with the stated degree of soiling and dosing, and must also state that the product has been performance tested at the recommended wash temperatures. Table G shows a common distribution of the laundry categories in relation to degree of soiling and recommended wash temperature.

Table G - Recommended wash temperature relative to degree of soiling

Degree of soiling	**Light soiling**	**Medium soiling**	**Heavy soiling**
Laundry categories	Bedlinen and towels from hotels and other overnight accommodation establishments Duvets and pillows Mats and mops Cloth hand towel rolls	Work clothes Institution/trade/service Hospitals/Nursing homes Laundry from hospitals and nursing homes and similar institutions, e.g. bedding, mattress covers, operation sheets, barrier sheets, and patient clothing.	Work clothes Industry/kitchen/butchering and equivalent use Kitchen equipment Clothes and towels Industry clothing Restaurant Cloths/napkins and similar for use in restaurants, industrial kitchens, etc.
Recommended wash temperature alternative A:	30 °C	30 °C	40 °C
Recommended wash temperature alternative B:	40 °C	40 °C	60 °C

The products may be used in washing processes with higher wash temperatures, but the manufacturer must document, with the help of a user test (requirement O19), that the product is effective for "Light", "Medium" or "Heavy" soiling for the temperature range 30-40°C (Alternative A) or 40-60°C (Alternative B).

Wash effectiveness is to be shown in relation to dosing for the different degrees of soiling at the recommended wash temperature. In addition, the requirements concerning CDV (O13) and phosphonate content (O17) must be documented for the given wash temperature (Alternative A or B) and dosing.

In order for laundries to save energy, laundry detergents have been developed that can wash effectively at lower temperatures and products that can completely disinfect at temperatures down to 60°C.

For products/multi-component systems marketed as having a disinfecting function (chemothermal), the effectiveness of the disinfection is to be documented under requirement O20 (Effectiveness of chemothermal disinfection) at max 40°C for products with a recommended wash temperature in the range 30-40°C (Alternative A) or 60°C for products with a recommended wash temperature in the range 40-60°C (Alternative B).

New requirements about maximum recommended wash temperature mean that where effective washing cannot be documented at a temperature of 60°C for 'Heavy soiling' and 40°C for 'Light soiling' and 'Medium soiling' (washing alternative A in Table G), products cannot be awarded the Nordic Swan Ecolabel. The manufacturer must present the maximum recommended temperature in relation to Alternatives A or B in Table G.

The maximum recommended wash temperature given by the manufacturer for the various laundry categories (Alternative A or B) must also be considered in requirements about CDV (R13), phosphonates (R17), and effectiveness (R19). For products that can wash at the recommended temperatures in relation to Alternative B in Table H, the manufacturer must show a documented wash effect at 40°C for 'heavy soiling' and 30°C for 'light soiling' and 'medium soiling'. Requirements regarding CDV and phosphonates are slightly more stringent for Alternative B than Alternative A

The manufacturer must report whether the products have the following recommended wash temperatures according to the alternatives in the table below.

Table H - Alternatives for recommended wash temperature

	Recommended maximum wash temperature	CDV requirements	Phosphonate content	Effectiveness
A	30/30/40°C*	Table 4 in criteria document	Alternative A, Table 9 in criteria document	O19 in relation to temperature.
B	40/40/60°C**	Table 5 in criteria document	Alternative B, Table 9 in criteria document	O19in relation to temperature.

** 30°C for light and medium soiling, 40°C for heavy soiling.*

*** 40°C for light and medium soiling, 60°C for heavy soiling.*

4.1 General requirements (apply to all products and all components in a multi-component system)

Description of product

In order to assess whether the product is covered by the product group definition, and to enable identification of the manufacturer, a description of the product and the manufacturer is required. Laundry detergents for professional use comprise a broad spectrum of products, ranging from single-component products to more composite multi-component products. A product that is to be Nordic Swan Ecolabelled must therefore be described on the basis of type of product, dosage, description of components, etc. In addition, the packaging of the product must be described with regard to the composition of the material, weight and marking.

Some requirement levels are associated with dosage in relation to degree of soiling, and so it is important to have an overview of this information.

To avoid unnecessary transport of water and unnecessary use of laundry detergent, the manufacturer is to recommend dosing, dependent on the degree of soiling. Correct dosing and more concentrated products lead to less transport of products.

The recommended dosing per kg of laundry for different degrees of soiling is to be stated in ml or grams on the label or technical data sheet. The type of laundry for which the dosing is recommended and the recommended wash temperature must be clearly stated.

Proposed requirements:

O1 Description of product

In the application for the Nordic Swan Ecolabel licence, the applicant must provide detailed information/user manual about the product/multi-component system and the packaging of the individual product. The following information must be provided:

- Information about the manufacturer's name and address (manufacturer of the product)
- Technical description of the product/products:
  - type of detergent
  - description of components in a multi-component system
- Technical data sheet/product data sheet and label giving the following information:
  - Recommended dosing* for light, medium and heavy soiling in ml or grams per kg laundry.
  - Confirmation that the product can wash effectively at (Alternative A: 30-40°C or Alternative B: 40-60°C) for the different degrees of soiling.

**If the dosing is given in intervals for each degree of soiling, the worst-case dosing is to be used in the assessment of the requirements in section 1.2.*

- Description of the product's packaging (type of material, weight).

If the product or multi-component system is also marketed as having a disinfecting function (chemothermal), this is also to be declared. In this case, the product/multi-component system is to document effectiveness in accordance with requirement O20 and in relation to the temperature interval (Alternative A or B) and stated dosing for the wash temperature.

✉ Complete descriptions in accordance with the requirement, plus technical data sheet/product data sheet and label giving the dosing instructions as per the requirement.

Formulation

Nordic Ecolabelling requires a complete formulation with all constituent substances in order to be able to check that the individual requirements shown below are observed. A complete formulation also specifies the content in raw materials/products, in contrast to a mixing formulation where only products to be mixed are declared.

Unless stated otherwise, the constituent substances include all substances in the product, including additives (e.g. preservatives or stabilisers) in the raw materials, but not impurities from the primary production. Impurities are defined as residual products from

primary production that may be found in the final product in concentrations below 100 ppm (0.0100% by weight, 100 mg/kg), but not substances added to a raw material or product deliberately and with a purpose, regardless of amount. Impurities at concentrations exceeding 1.0% in the raw material are regarded as constituent substances. Substances/products known to be liberated by a constituent substance are also regarded as constituent substances.

Proposed requirements:

O2 Formulation

A complete formulation for the product / all components in a multi-component system must be sent to Nordic Ecolabelling. For each ingredient, the formulation must contain:

- trade name
- chemical name
- quantity (% by weight), inclusive and exclusive water
- CAS number
- DID number
- function

Water content and function of the ingredient/raw material must be shown.

The DID number is the number of the ingredient on the DID List, which is used in calculation of chemical requirements. The DID List can be obtained from the Nordic Ecolabelling home page, see addresses on page 2. See appendix 3 for more information about the DID-list.

☒ Complete formulation in accordance with the requirement.

☒ Safety data sheet/product data sheet in line with applicable legislation in the country of application, e.g. Annex II to REACH (Regulation 1907/2006/EC) for each product and each ingredient.

Classification of the product

Some of the Nordic Ecolabelling policy concerns classifying environmentally harmful products not eligible for the Nordic Swan Ecolabel. In order to protect consumers, the appendices include a number of product classifications in relation to a number of properties that are harmful to health. These are prohibited.

Until 1 June 2015, a transition period applies in which classification applies in accordance with the EU Dangerous Substances Directive 67/548/EEC as amended and adapted, and/or the CLP Regulation (EC) No 1272/2008 as amended. After the transition period, only classification under the CLP Regulation will apply.

CLP stands for Classification, Labelling and Packaging of Substances and Mixtures. CLP is a harmonised system for classification, labelling and packaging of substances and substance mixtures in the EEA. The CLP Regulation is the EU's way to incorporate GHS (Globally Harmonised System of Classification) in European legislation.

One important function of laundry detergents for professional use is to remove stains such as rust, which are often seen on laundry but that cannot be removed in a normal washing process. To remove these types of stains, oxalic acid is often used, which is classified as Acute tox 4: H312, H302 / Xn; R21/22. There are no obvious alternatives

to oxalic acid (Köcher, 2008), and so oxalic acid is exempted from the health hazard classification. If oxalic acid were to be prohibited, the quantity of textiles that would be discarded would be considerable, which is negative for the environment.

Peracetic acid (CAS no. 79-21-0), which is produced by mixing acetic acid (CH3COOH, CAS no. 64-19-7) and hydrogen peroxide (H2O2, CAS no. 7722-84-1), is highly reactive, and has the advantage that it bleaches and disinfects at considerably lower temperatures than hydrogen peroxide alone. In the processes where peracetic acid is used, laundry can be washed at lower temperatures and thereby reduce energy consumption. In order to encourage Nordic Swan Ecolabelled laundries to reduce energy consumption, peracetic acid-based products are exempted from the requirement for classification (H332, H312, H373, H371 and H304). In addition, products containing peracetic acid and hydrogen peroxide used as bleaching agent may be classified and labelled as hazardous to the aquatic environment [Chronic Category 1 (H410), Chronic Category 2 (H411) or Chronic Category 3 (H412)], if the classification and labelling are triggered by the presence of these substances. Products marketed as disinfectants cannot be excluded because of the EU Biocidal Products Regulation (EU) no 528/2012.

Exemption from classification
Products that contain oxalic acid or acetic acid in such quantities that the product should be classified as Acute tox 4: H312, H332, STOT RE 2: H373, STOT SE 2: H371, Asp. Tox. 1: H304/Xn in accordance with R20, R21, R48, R65 and/or R68 are exempted from this classification.

Products that are classified Resp. Sens. 1: H334, Skin Sens. 1: H317/Xn in accordance with R42 and/or R43 because of enzyme content are exempted from this classification. However, this assumes that the enzymes are encapsulated or are in a slurry.

Table I - Classification of peracetic acid

	CLP Regulation 1272/2008	**EU Dangerous Substances Directive 67/548/EEC**
CAS no. 79-21-0	Org. Perox D: H242 Flam. Liq. 3: H226 if the flashpoint ≥ 23 degrees C Acute toxicity 4: H332, H312, H302 Skin Corr. 1A: H314 Aquatic acute 1: H400	O; R7 R10 Xn; R20/21/22 C; R35 N; R50

Products that are excluded are classified as 'Harmful to health with acute toxicity'. 4: H302/ Xn; R22 (harmful on inhalation) are exempted from the requirement for classification. This concerns products for professional use in laundries, where the dosing is automatic, and the employees have very little contact with the products. The risk of exposure on inhalation is minimal.

Proposed requirements:

O3 Classification of the product

The product must not be classified in accordance with hazard classes and risk phrases in Table 3.

Table 1 – Classification of the product

Hazard class	Hazard category and code / hazard symbols and R phrases	
	CLP Regulation 1272/2008	**EU Dangerous Substances Directive 67/548/EEC[1]**
Dangerous for aquatic environments***	Aquatic acute 1 H400 Aquatic chronic 1-4: H410, H411, H412, H413	N with R50, R50/53 or R51/53. R52, R53 or R52/53 without N.
Acute toxicity Specific target organ toxicity - single exposure	Acute toxicity 1, 2: H330, H300 STOT SE 1: H370	T+ with R26, R27, R28 and/or R39
Acute toxicity Specific target organ toxicity - single and repeated exposure	Acute toxicity 2, 3: H301, H330, H331 STOT SE 1: H370 STOT RE 1: H372	T with R23, R24, R25, R39 and/or R48
Harmful to health*	Acute toxicity 4: H332, H312 STOT RE 2: H373 STOT SE 2: H371 Asp. Tox. 1: H304 (R65)	Xn with R20, R21, R48, R65 and/or R68
Sensitising on inhalation or skin contact**	Resp. Sens. 1 H334 Skin Sens. 1 H317	Xn with r42 and/or Xi with r43
Carcinogenic properties	Carc. 1A, 1B, 2A, 2B, 2: H350, H350i, H351	T with R45 and/or R49 (Carc1 or Carc2) or Xn with R40 (Carc3)
Mutagenic	Muta. 1B, 2 H340, H341	T with R46 (Mut1 or Mut2) or Xn with R68 (Mut3)
Toxic for reproduction	Repr. 1A, 1B: H360FD Repr. 2: H361fd Lact.: H362	T with R60, R61, R64 and/or R33 (Rep1 or Rep2) or Xn with R62, R63, R64 and/or R33 (Rep3)

[1] *Applicable in the transition period to Regulation no. 1272/2008 from December 2010 until June 2015.*

** An exemption applies to products where the classification is the result of the content of oxalic acid (CAS 144-62-7), peracetic acid (CAS 79-21-0) or hydrogen peroxid (CAS 7722-84-1).*

*** Exemptions are products that are classified Resp.Sens. 1 H334 og/eller Skin Sens. 1 H317 / Xn with R42 and/or R43 because of enzyme content. However, this assumes that the enzymes are encapsulated or in a slurry.*

**** Products containing peracetic acid and hydrogen peroxide used as bleaching agent may be classified and labelled as hazardous to the aquatic environment [Chronic Category 1 (H410), Chronic Category 2 (H411) or Chronic Category 3 (H412)], if the classification and labelling are triggered by the presence of these substances. Products marketed as disinfectants cannot be excluded because of the EU Biocidal Products Regulation (EU) no 528/2012. See also requirement O12.*

The classification applies under the Directives 67/548/EEC and 1999/45/EU as amended and adapted, and the CLP Regulation (EC) No 1272/2008 in a transition period until 1 June 2015.

✉ Safety data sheet/product data sheet in line with applicable legislation in the country of application, e.g. Annex II to REACH (Regulation 1907/2006/EC) for each product.

Classification of constituent substances in the product

In Ecolabelled laundry detergents for professional use, the requirements are set regarding constituent substances in the laundry detergent to protect the user and the manufacturer's work environment. Ingoing substances in the products must not be classified as allergenic, carcinogenic, mutagenic or toxic for reproduction. Exemptions are made for enzymes and preservatives that may be allergenic. Exemptions are also made for NTA (nitrilotriacetat, CAS-nr 139-13-9), where these occur as an impurity in MGDA and GLDA (see also O7 Substances that may not be present in the product).

NTA (nitrilotriacetate, CAS no. 139-13-9) and its salts are complexing binders that since 2008 have been classified as carcinogenic (Carc3 with R40), with medium to low toxicity to aquatic organisms and ready aerobic degradability. NTA as a synthesis residue/impurity in MGDA and GLDA may be permitted up to 0.10% in the final product: NTA may not be present in the raw material in quantities exceeding 1.0%, at which level it will no longer be considered an impurity. This is wholly in line with the Nordic Ecolabelling criteria concerning chemical technology. The manufacturers of the alternatives have documented that the alternatives with NTA as an impurity in small concentrations are not carcinogenic, since NTA at certain low concentrations does not form the crystals that are suspected of having a carcinogenic effect.

There are many reasons why preservatives that are not allergenic are not suitable or permitted. Preservatives are often necessary in liquid products with high water activity.

One comment received during the consultation was that preservatives should not be exempt from the requirement concerning the classification of Sensitising on inhalation or skin contact, and that the use of allergenic preservatives such as isothiazolinones should be limited. Preservatives have been exempted from requirements concerning the classifications Resp. sens 1: H334/Xn; R42 and/or Skin sens. 1: H317/Xi; R43. Preservatives are used widely in liquid products and particularly in fabric softeners. Following the consultation, the requirement has been tightened, such that only preservatives present in liquid products in concentrations ≤ 0.02% are exempt from the requirement concerning the classifications Resp. sens 1: H334/Xn; R42 and/or Skin sens. 1: H317/Xi; R43.

Proposed requirements:

O4 Classification of constituent substances in the product

Constituent substances in the products must not be classified according to hazard classes and risk phrases in Table 2.

Table 2 - Classification of constituent substances

Hazard class	CLP Regulation 1272/2008	EU Dangerous Substances Directive 67/548/EEC [1]
Allergenic*	Resp. Sens. 1 H334 Skin Sens. 1 H317	Xn; R42 and/or Xi; R43
Mutagenic	Muta 1B, 2; H340 H341	T; R46 (Mut1 or Mut2) or Xn; R68 (Mut3)
Carcinogenic properties**	Carc. 1A, 1B; H350, H350i Carc. 2; H351	T; R45 and/or R49 (Carc1 or Carc2) or Xn; R40 (Carc3)

Toxic for reproduction	Repr. 1A, 1B; H360FD Repr. 2; H361fd Lact.: H362	T; R60, R61, R64 and/or R33 (Rep1 or Rep2) or Xn; R62, R63, R64 and/or R33 (Rep3)

[1] *Applicable in the transition period to Regulation no. 1272/2008 from December 2010 until June 2015.*

** Enzymes are exempt. Preservatives included in liquid products in concentrations ≤0.02% are exempt. See also O6 and O8 concerning requirements for enzymes and preservatives.*

*** An exemption is made for NTA as an impurity. Complexing agents of the type MGDA and GLDA may contain NTA as an impurity in the raw material in concentrations below 1.0%, as long as the concentration in the product remains below 0.1%. See also requirement O7.*

Note that, under this requirement, titanium dioxide is prohibited in solid mixtures (e.g. in enzymes) from 1 October 2021. Note: A transition period until 31 December 2022 applies.

☒ Safety data sheet/product data sheet for all constituent raw materials (in all products) according to applicable legislation in the country of application, e.g. Annex II to REACH (Regulation 1907/2006/EC).

☒ Completed and signed declaration from the manufacturer (Appendix 1).

☒ Completed and signed declaration from the raw material supplier (Appendix 2).

Surfactants, ready degradability, aerobic and anaerobic

Surfactants and surface-active substances make the detergent functional and effective. Surfactants may have the function of being water active (dissolve fat and bind fat in the water phase/wash water) or serve as foam dampener (break the surface tension in the soap foam and thereby reduce the amount of foam). Surfactants may also serve as emulsifiers, i.e. they help to mix two substances that in reality are not miscible (oil/water). The structure of a surfactant depends on its function, so it has different environmental properties.

All surfactants must be readily (aerobic) and anaerobically degradable. Compounds that degrade slowly or with difficulty accumulate in the environment and can comprise an immediate and future risk even if they are not acutely toxic. Knowledge is often lacking about the long-term effects of compounds that do not readily degrade. Rapid degradation under aerobic (oxygen-rich) and anaerobic (oxygen-deficient) conditions is therefore of great environmental importance. Surfactants are regarded as vital in this context, as they are a group of organic compounds that are used in large quantities in laundry detergents for professional use, and many surfactants are toxic to aquatic organisms. The requirement excludes surfactants such as linear alkylbenzene sulphonates (LAS) as they are not anaerobically degradable.

Proposed requirements:

O5 Surfactants, ready degradability, aerobic and anaerobic

All surfactants must be readily degraded aerobically in accordance with Test Method No. 301 A-F in the OECD Guidelines for Testing of Chemicals or other equivalent test methods.

All surfactants must be anaerobically degradable, which means at least 60% degradability under anaerobic conditions, in accordance with ISO 11734, ECETOC no. 28 or equivalent test methods. Documentation must primarily refer to the DID List dated 2014 or later. For surfactants that are not covered by the list, other documentation, such as test reports or literature references, may be used.

✉ Documentation must primarily refer to the DID List dated 2014 or later. For surfactants that are not covered by the list, other documentation, such as test reports or literature references, may be used (Annex 3).

Enzymes

Enzymes are added to laundry detergents, for example to ensure a more effective detergent that can also wash clean at low temperature, thereby also saving energy. Enzymes may often also replace more environmentally problematical substances.

Manufacture of enzymes is regulated by EU Directive 90/219/EEC, in an amendment to REACH, and in the CLP Regulation. The Detergent Regulation sets requirements that enzymes must be declared on laundry and cleaning detergents, regardless of the quantity in the product, but there is no requirement to specify which enzymes are in the product.

Enzymes are exempted from the requirement on classification H317/R43 because all enzymes are classified, and it is not desirable to exclude the use of enzymes from chemical-technical products, as they make a significant contribution to the function of the products. The enzyme subtilisin is used, for example (which is as protease), to remove protein stains, even at lower temperatures.

Proteas (Subtilisin, EINECS 232-752-2, CAS 9014-01-1) is now reclassified as environmental hazardous with Aquatic Chronic2 (H411) regarding to the new regulation for long term testing of chronic toxicity, even though protease is easily degradable. Studies show that more than 99.99% of subtilisin is deactivated in treatment plants or in the sewage system on the way to the treatment plants. Subtilisin is an effective enzyme which is used primarily in laundry detergents (professional and consumer) and dishwashing (professional and consumer) to break down proteinbased stains. An exemption from the requirement regarding environmental hazardous substances is necessary for the manufacturers to be able to continue producing well-functioning laundry detergents. Protease can only be added in amounts that will not have an impact on the final products classification, meaning it will not cause more products with environmental hazardous classification.

Proteas/subtilisin classified as Aquatic Chronic 2 (H411) is exempted from O18 Environmental hazardous substances.

Consequently, Nordic Ecolabelling regards the negative consequences of the use of proteases as negligible in relation to the gains from washing at low temperature.

In liquid enzyme raw materials, it may be necessary to add stabilizers and preservatives to prevent the enzymes from degrading and thereby losing their activity. Preservatives in enzyme raw materials are exclusively to preserve the raw material, not the finished product.

To reduce the formation of dust during addition, enzymes used must be encapsulated (can be non-dusting granulate) or mixed into a slurry (liquid). The requirement is to reduce enzyme-related work environment problems during the manufacture of laundry detergents, because enzymes are classified as Resp. Sens. 1: H334 /R42 ('May cause allergy on inhalation'). The manufacturer must also implement their own health and safety measures to minimize exposure of employees to enzymes.

Proposed requirements:

O6 Enzymes

Enzymes must be in liquid form or in the form of non-dusting granulate.

Manufacturers of laundry detergents for professional use must have health and safety measures in place that prevent employees from being exposed to enzymes. In particular, there must be protection from high exposure.

✉ Declaration from the manufacturer of enzymes, or information on safety data sheets/product information sheets.

✉ Description of measures and methods for protecting personnel.

Substances that must not be present in the product

Nordic Ecolabelling primarily manages environment-related problems from laundry deter-gents by setting requirements that limit certain constituents, and by prohibiting a number of problematical substances, particularly substances that are not limited by other requirements such as classification.

Nordic Ecolabelling prohibits the following substances in laundry detergents for professional use:

Active chlorine compounds such as sodium hypochlorite, which have previously been used in large quantities at many laundries. These substances are much less used today, but our experience from the sector is that are still many laundries that use chlorine in cases where it is necessary, or use higher doses of chlorine than is necessary. Active chlorine compounds are toxic to the environment, but they are reactive and are therefore degraded; however, when they react with organic substances, chloro-organic substances may be formed whose properties are harmful to the environment. On the other hand, the use of chlorine can also mean that fewer fabrics are discarded. Examples of use are to remove mildew and a number of other very difficult stains on fabrics that can be removed by rewashing or by using chlorine. This is reflected in limit values for use of chlorine for the various fabric categories in the criteria for textile services, which are further divided to ensure that limit values reflect the actual need to the degree possible.

Alkylphenol ethoxylates (APEO) and/or alkylphenol derivatives (APD) are a group of surfactants that been shown to have endocrine-disrupting properties. These substances have been phased out in most products because of regulatory requirements, but we have observed that the substances are present in raw materials. These substances are however not included in the list of compounds that may not be present in Nordic Swan Ecolabelled laundry detergents for professional use, because they are ruled out by the requirements regarding degradability.

LAS (linear alkylbenzene sulphonates) is a group of surfactants that are not degradable in anaerobic environments, and are therefore undesirable. The substances are excluded through requirements for surfactants, but are also on the list to clarify that LAS are undesirable substances.

DADMAC (diallyldimethyl ammonium chloride) is a group of substances with very high ecotoxicity. Laundries often used these in the summer in the final rinse, to protect the textiles from mildew. Better production planning could prevent the use of this type of environmentally harmful substances. DADMAC substances are excluded in the

requirement regarding surfactants (O5), but are also on the list to clarify that DADMAC are undesirable substances.

PFAS (perfluorinated and polyfluorinated alkylated compounds) are used, for example, in connection with impregnation of fabrics in or after the wash process. The substances are persistent and are easily absorbed in the body[14]. The chemical substances in the group affect biological processes in the body and are suspected of both endocrine disruption and of having carcinogenic properties. It is difficult to find alternatives that are not excluded by Nordic Ecolabelling requirements.

Fluorosurfactants and other equivalent substances (with fluorinated hydrocarbon chains over 6) can degraded to the very stable PFOS and PFOA (perfluorooctanoic acid) and similar related substances. These substances are found all over the earth, in the large oceans, and in the Arctic. PFOS has been found in, for example, birds and fish and in their eggs. Studies show that the compounds may be present in some types of cleaning detergents as fluorosurfactants, but they can also be used in impregnating agents and similar chemical products. This group of substances is also relevant for other product groups, such as fabrics, shoes, furniture, greaseproof paper, and similar. The substances are persistent and are easily absorbed in the body [OSPAR, 2005], [MST, 2005b]. PFOS compounds are on the List of Undesirable Substances. OECD has issued a report [OECD, 2007] that includes a list of known problematical PFAS substances. It should be pointed out that the Nordic Ecolabelling definition of PFAS differs from that of the OECD; the Nordic Ecolabelling definition is broader. The list shows a number of the relevant substances that are excluded through prohibition of the use of PFAS.

Boric acid, borates and perborates: Borates are used in detergents as bleaching agents, and many of these as classified as harmful to reproduction (EU, 2008), including boric acid.

Phthalates[15] are used chiefly as plasticisers in plastic, and can be found in many products that we use on a daily basis. Phthalates in soft PVC and other plastic products are not chemically bonded. This means that the substances can leach into the environment from products while they are in use, or after their disposal. Phthalates can have negative long-term effects such as damage to the unborn child or impaired fertility. Phthalates are also excluded from the requirement concerning endocrine disruptors.

Boric acid, borates and perborates: Borates are used in detergents as bleaching agents, and many of these as classified as harmful to reproduction (EU, 2008), including boric acid.

Optical brighteners make the textiles artificially 'whiter' by lodging in the fibres and reflecting blue light, making the textile look whiter. Experiences from the laundry sector show that optical brighteners are not necessary. It is only when fabrics washed with and without optical brightener are held directly up against each other that the customer experiences that products without optical brightener do not appear quite as white. Optical brighteners can therefore be regarded as unnecessary, and even though in recent years more environmentally-friendly substances have been developed for use as optical

[14] Jensen, Poulsen & Bossi, 2006
[15] http://www.miljostatus.no (November 2013)

brighteners, Nordic Ecolabelling sees no reason to permit the use of optical brighteners in laundry detergents for professional use.

Fragrances may contain substances with properties that are harmful to health and the environment. Use of fragrances in the wash process can lead to involuntary exposure of the end users of the fabrics. Furthermore, fragrances are unnecessary to improve the wash result. Nordic Ecolabelling has always had focus on fragrances in Nordic Swan Ecolabelled products, and experiences that the debate about allergenic fragrance substances is active, particularly in Denmark.

Allergies are a growing problem, and people with allergies can experience allergic reactions after contact with products that contain substances that we know are allergenic.

Fragrances have no functional effect in the products, and are often classified as environmentally dangerous (N with R51/53/H411 Poisonous, with long-term effect on aquatic life).

Carcinogenic musk compounds may not be used. Musk compounds can only be partly degraded in treatment facilities, and can therefore enter the environment via sewage systems and wastewater from laundries. The compounds are stable in the environment and can also bioaccumulate in the food chain.

Most fragrances are classified as allergenic (Xi with R43/H317 May cause an allergic skin reaction), and some are also harmful to health (Xn with R42/H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled).

The EU Scientific Committee on Consumer Safety (SCCS) published a report in June 2012 on allergenic fragrances in cosmetic products. The report shows that the list of 26 fragrances cannot be regarded as sufficient to cover fragrances with scientifically documented allergenic effects. SCCS recommends that a total of 127 fragrances, including the 26 fragrances that are already restricted in the Detergent Regulation, should be declared by name on cosmetics. This report supports the decision of Nordic Ecolabelling to still prohibit fragrances in laundry detergents for professional use.

Triclosan is an antibacterial and disinfecting substance that is used in many different products. This is a problem because the use of antibacterial and disinfecting substances like triclosan may help to increase bacteria's resistance to antibiotic (Environmental Status in Norway, 2008A, and Environmental Protection Agency in Denmark, 2004). Triclosan is bioaccumulative and is classified N; R50/53 (Dye et al, 2007), and is on the authorities' Priority List.

Studies show that triclosan is degraded to dioxins that are harmful to health in contact with sunlight (Bakke, 2003). Triclosan has been found in a number of locations, such as in sewage slurry and in wastewater from treatment plants (Dye et al, 2007), which shows that the use of triclosan involves exposure in the environment.

EDTA is a powerful complexing agent that is capable of binding metal ions and is therefore also suspected of being capable of mobilising heavy metals in the aquatic environment. However, quite rightly, the sector has questioned this property (Cefic, 2003). EDTA is not readily degradable and the EU risk assessment concluded that conditions in municipal treatment plants are such that EDTA would not degrade or would only partially degrade (Cefic, 2002)

It has been pointed out to Nordic Ecolabelling that it is remarkable that EDTA is not permitted in raw materials for laundry detergents for professional use, but we, for example, permit EDTA in soap and cleaning agents in the form of solid green soap in very small amounts. There are many alternatives to EDTA as complexing agents in laundry detergents for professional use. Exemptions from EDTA requirements in small quantities in solid soap are because, in principle, it is impossible to manufacture solid soaps without small quantities of EDTA.

Quaternary ammonium compounds: Quaternary ammonium compounds are often cationic surfactants that tend to have undesirable environmental effects. They are used in laundry detergents and cleaning products and in cosmetics. Quaternary ammonium compounds are currently also used as process chemicals in the manufacture of textiles.

Normally only the quaternary ammonium compounds that are not readily degradable are excluded from use, since there are sub-groups (e.g. esterquats) with better environmental properties. Quaternary ammonium compounds (QAC) are often highly toxic to aquatic organisms and this, combined with the fact that they are not readily degradable, results in the environmental classification Aquatic Acute 1 with H400 and Aquatic Chronic 1 with H410. In this version of the criteria, quaternary ammonium compounds that are not readily degradable are excluded.

Siloxanes and silicon (including polysiloxanes) are considered to be non-readily degradable in the environment. Some of the siloxanes that are used in consumer products are found in the environment and in plants and animals (albeit in low concentrations). This suggests that the compounds bioaccumulate. Therefore siloxanes with known problematic properties are excluded, more specifically D4, D5 and HMDS. Other siloxanes or silicones are not inscribed on the list of substances that are not permitted in the product under requirement O7, but are limited under the requirements concerning CDV (O13) and degradability (O14 and O15).

Substances of Very High Concern (SVHC): Substances that are considered to be particularly problematic in accordance with REACH Article 59, Annex XIV. Nordic Ecolabelling is clear that SVHC are largely covered by the requirements concerning PBT, vPvB and CMR, but still chooses to set additional requirements for SVHC, since this is easier to communicate to producers and consumers.

The Candidate List is a list of the Substances of Very High Concern (SVHC) drawn up by the European Chemicals Agency (ECHA). The substances on the list are candidates for REACH, Annex XIV, which is a list of substances that cannot be sold and used without prior approval. Suppliers of such substances and of blends of substances and products containing at least 0.1% of a substance on the Candidate List must provide information on this to its customers. The Candidate List will constantly be updated with more substances[16].

PBT substances (Persistent, bioaccumulative and toxic) are substances that are persistent (slowly degradable), bioaccumulative (stored in living tissue) and toxic (poisonous). These types of substances are not desired in Nordic Swan Ecolabelled products, and so in accordance with the Precautionary Principle, these substances are excluded in the criteria. PBT substances are defined in Annex XIII in REACH (Regulation 1907/2006/EF).

[16] http://www.miljodirektoratet.no/no/Tjenester-og-verktoy/Veileder/Substitusjonsplikten/Om-kandidatlisten/

vPvB (very Persistent, very Bioaccumulative) substances are very persistent (hard to degrade) and very bioaccumulative (stored in living tissue) and toxic. These types of substances are not desirable in Nordic Swan Ecolabelled products and so, in accordance with the Precautionary Principle, these are excluded in the criteria. vPvB substances are defined in Annex XIII in the REACH[17].

Endocrine-disrupting substances: None of the constituent substances may be on the EU Priority List of substances that must be examined more closely for endocrine-disrupting effects Class 1 or 2.

Category 1: At least one study has shown evidence of an endocrine-disrupting effect in an intact organism.

Category 2: Potential for endocrine-disrupting effect. In vitro data indicates potential for endocrine-disrupting effect in an intact organism. The data also includes effect in vivo that can be derived through endocrine disruption, and may include structural analysis and metabolic considerations.

Halogenated flame retardants comprise a range of substances harmful to health and the environment; they are highly toxic to aquatic organisms, carcinogenic or harmful to health in other ways. The substances do not degrade readily in the environment, which increases the risk of harmful effects[18].

Flame retardants may occur at laundries, since specialist textiles impregnated with flame retardants usually have to be re-treated in order to retain their flame-retardant properties, and this may be done at a laundry[19].

Nanoparticles: Nanotechnology, which also includes nanoparticles, is being used to an increasing extent in many product areas, including those for which Nordic Ecolabelling has criteria. The greatest cause for concern is the use of nanoparticles that may be released and affect health and the environment. There is a worry among public bodies, environmental organisations and others about the lack of knowledge regarding the potential damaging effects on health and the environment.

The European Commission issued an agreed definition of nanomaterials on 18 October 2011, which states that: "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." Nordic Ecolabelling subscribes to this definition, but judges for itself what limits to set in the different product groups. In the recently revised Criteria for the Nordic Ecolabelling of Cleaning Products, Nordic Ecolabelling has set a limit value of 1% in order to cover more materials with a proportion of nanoparticles.

[17] Forordning 1907/2006/EF
[18] Miljøvejledninger, 2008: Halogenerede organiske forbindelser.
[19] Glensvig, D.; Buck, C.; Abildgaard, A. og Stuer-Lauridsen, F. (2005): Eksponering af kemiske stoffer i imprægneringsmidler. Miljøstyrelsen.

Proposed requirements:

O7 Substances that must not be present in the product

The following substances must not be present in the product:

- Reactive chlorine compounds (for example, sodium hypochlorite) and/or organic chlorine compounds
- APEO and APD (alkylphenolethoxylates and alkylphenol derivatives)
- LAS (linear alkylsulphonates)
- DADMAC (diallyl dimethyl ammonium chloride)
- PFAS (perfluorinated and polyfluorinated alkylated compounds)
- Phthalates. Also excluded through requirements relating to endocrine disrupting substances.
- Boric acid, borates, and perborates
- Optical brighteners
- Fragrances
- Triclosan
- EDTA (Ethylenediaminetetraacetate and its salts) and DTPA (diethylenetriamine pentaacetate)
- Quaternary ammonium compounds, which are not readily degradable***
- Siloxanes D4, D5 and HMDS
- Substances on the Candidate List*
- Substances that are judged by the EU as being PBT substances (persistent, bioaccumulative and toxic) or vPvB-substances (very persistent and very bioaccumulable) in accordance with the criteria in Annex XIII in REACH [Regulation (EC)1907/2006]).
- Substances assessed for potential endocrine-disrupting effects Cat I or Cat II within the EU list of substances with documentation for potential endocrine-disrupting effects. See following link:
  http://ec.europa.eu/environment/chemicals/endocrine/pdf/final_report_2007.pdf
- Halogenated flame retardants
- Nanomaterials/- particles*

** The Candidate List can be found on ECHAs homepage http://echa.europa.eu/candidate-list-table*

***Nanomaterials/-particles are defined according to the EU Commission definition of nanomaterials dated 18 October 2011, except that the limit for particle size distribution is reduced to 1%: "A nanomaterial is a natural, incidental or manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for at least 1% of the particles in the number size distribution, one or more external dimensions is in the size range 1-100 nm." Examples are ZnO, TiO2, SiO2, Ag and laponite with particles of nanosize in concentrations exceeding 1%. Polymer emulsions are not regarded as nanomaterials.*

**** According to test methods 301 (A-F) or 310 in OECD guidelines for testing of chemicals or other equivalent test methods.*

☒ Completed and signed declaration from the manufacturer (Annex 1)

☒ Completed and signed declaration from the raw material supplier (Annex 2)

Preservatives

Preservatives may be added in liquid form if the preservative is not bioaccumulative. The requirement excludes preservatives that may have undesirable long-term effect in the environment. Bioaccumulative compounds accumulate in the fatty tissue of living organisms, which is highly undesirable in combination with the toxic characteristic of preservatives. Use of preservatives is also limited for example by requirements relating to CDV (O14) and product classification (O3).

Experience from the sector shows that introduction of the Challenge Test would be relevant for products that contain preservatives. This is to ensure that microbiological growth does not take place and that the smallest possible quantity of preservatives is used.

In order to prevent unnecessary addition of preservatives and to ensure that the quantity of preservatives is sufficient, a requirement is set that the added quantity of preservatives must be optimised in relation to the volume of the product, and a test that shows this must be entailed, for instance by a Challenge Test, a load test/provocation test or equivalent.

The Challenge Test is a generic name for tests to determine the correct/necessary quantity of preservatives in products. The test is carried out by adding different concentrations of preservatives to a series/number of samples and a sample with no preservatives added. A mixture of bacteria, yeast and mould fungi are added to the samples, and the samples are tested for growth of these organisms after 7 days. This continues for a minimum of 28 days. The lowest concentration of preservatives where no growth occurs is the correct/optimal quantity of preservative for the product. Different manufacturers and suppliers of preservatives have different Challenge Tests[20]. Methods used to determine the correct content of preservatives include the Koko Test (Test Method SM 021), the USP Challenge Test (US Pharmacopoeia), and the CTFA Challenge Test (Cosmetics Toiletries and Fragrance Association).

A review of product data in the evaluation in 2011 showed that the two most common preservatives in the liquid products were MIT and BIT, which are both classified Skins Sens. 1 H334/R43. BIT is also classified Aquatic Acute 1: H400/R50. The quantities in which they are present were not reviewed, but both satisfy the requirements in Version 2.

In liquid products that contain liquid enzyme raw materials, it may be necessary to add stabilisers and preservatives to prevent degradation of the enzymes, which would cause them to lose their activity. Preservatives in enzyme raw materials are exclusively to preserve the raw material, not the finished product. These types of preservatives should be exempted from the requirement that excludes sensitising substances classified Resp. Sens. 1 H334/R41 or Skins Sens. 1 H334/R43) in the finished product, as the quantity of preservatives in the finished product is very small, and the preservatives serve an important function in an important raw material.

Following the consultation, more information was gathered on the amount of preservatives in laundry detergents for professional use. An examination of formulations shows that preservatives appear in products in all the Nordic countries. In general, the products with a neutral pH and high water content require preservatives. In products

[20] Benjamin D. Tanner, Ph.D. - President, Antimicrobial Test Laboratories - Introduction to Preservatives and "Challenge Testing"

with a higher pH, preservatives can be reduced or avoided. It is more common to find preservatives in OPL products, something that relates to the pH in the formulation, long storage time at wholesalers and so on.

Preservatives found in liquid products in concentrations ≤0.02% are exempted from the classification Resp. sens. 1, 1A, 1B: H334 and Skin sens. 1, 1A, 1B: H317.

Proposed requirements:

O8 Preservatives

Preservatives may be added in liquid products if the preservative is not bioaccumulative. Compounds are regarded as not being bioaccumulative if BCF < 500 or log Kow < 4.0. If there is data about both BCF and log Kow, the values for BCF are to be used.

The concentration of preservative must be optimised in relation to the product's volume, and a Challenge Test (appendix 4) or equivalent should be carried out to prove this.

✉ Documentation of BCF or log Kow.

✉ Test report of implemented Challenge Test or equivalent showing that an optimal concentration of the preservative is used in the product. See Appendix 4 for requirements concerning the test laboratory and for information about the Challenge Test.

Colouring agents

Colouring agents have no wash effect but are used for safety reasons. In liquid multi-component systems, colour is used to avoid mixing of components, such as bleaching agent and alkaline products, which can cause reactions and splashing of corrosive compounds. In systems with automatic dosing, colour substances help to show the presence of agents in pipes or when it needs to be refilled. Colour substances are normally present at a concentration of approximately 0.001% in a product.

Colour substances can therefore be added in liquid products, if the colour is approved as an additive in food or if it is not bioaccumulative, i.e. BCF < 500 or log Kow < 4.0. If there is data about both BCF and log Kow, the values for BCF are to be used.

Proposed requirements:

O9 Colouring agents

Colour substances in a product or an ingoing ingredient must not be bioaccumulative or must be approved for use in foodstuffs. Colour substances are not regarded as bioaccumulative if BCF < 500 or log Kow < 4.0. Colouring agents that are approved for use in food are accepted.

✉ Documentation of BCF or log Kow. Alternatively E-number can be stated. If there is data about both BCF and estimated log Kow, the values for BCF are to be used.

Packaging

Requirements are primarily set for labelling of plastic packaging and content of chlorinated plastic in packaging of laundry detergents for professional use.

The criteria for laundry detergents for professional use contain no requirement for the weight/utility ratio (WUR). This is because the packaging used by the various manufacturers does not seem to vary greatly. There is little demand for packaging with a special design or character among professional users, in the way there is for ordinary consumers. What is most important is that the packaging withstands transport and has a design that is appropriate in terms of logistics. There is little interest in unnecessarily large quantities of packaging, both among manufacturers and customers. Products are often delivered in large volumes, so the environmental impact of the packaging is small compared to that of the product, which is also shown in the MECO analysis in Chapter 4.

The plastic material in the packaging must be marked in accordance with DIN 6120, Part 2 (Marking of packaging and packaging materials for recycling purposes - Plastics packaging and packaging materials – Supplementary marking) or equivalent, to ensure easier sorting and reuse of the plastic material after use.

The labelling of the packaging must also show that the product does not contain PVC or other chlorinated plastics. The requirement must prevent the use of plastic material that may cause problems when incinerated, sends a signal to the customer, and gives Nordic Ecolabelling greater opportunity for control/steerability.

The plastic material must be marked in accordance with DIN 6120, Part 2 (Marking of packaging and packaging materials for recycling purposes - Plastics packaging and packaging materials – Supplementary marking) or equivalent, to ensure easier sorting and reuse of the plastic material. The marking must also show that the product does not contain PVC. The packaging sends a signal to the customer and gives Nordic Ecolabelling greater opportunity for control/steerability.

PVC and halogenated plastic are excluded from use in packaging in Nordic Swan Ecolabelled products because of undesirable environmental impact that arises when the packaging is discarded. When PVC enters the waste stream for incineration, it adds more chlorine to the waste stream. Chlorine promotes the formation of very toxic dioxins in the smoke from waste treatment plants. There are more sources of chlorine than PVC, so an increase in the quantity of PVC that is incinerated does not necessarily mean an increase in the quantity of dioxin, as chlorine is not the limiting factor in the formation of dioxin in incineration plants[21].

Proposed requirements:

O10 Marking of plastic packaging

Plastic material must be marked in accordance with DIN 6120, Part 2, or equivalent.

✉ Documentation of the primary packaging that shows the marking is in accordance with DIN 6120 or equivalent marking devices.

O11 Plastic packaging

PVC or other halogenated plastics must not be present in packaging or in the label.

✉ Declaration that the requirement is fulfilled.

[21] Hjelmar, 2002]1, [Erichsen & Hauschild, 2000]2

Information about the product

The declaration of contents must be in accordance with the Regulation (EC) 648/2004/ on Detergents.

The purpose of the requirement is to guarantee the user a minimum level of information about the contents of the product. Although the requirement only corresponds to the legal requirement, it has a purpose from a control perspective; it provides information that the product complies with legal requirements and that it will be checked during the processing of the application.

For laundry detergents to consumers, there is a requirement for user instructions on the packaging. The label/packaging must show washing instructions, e.g. information about temperature, dosage, and filling of laundry in the machine.

Consequently, manufacturers of laundry detergents for professional use will be contacted to review the situation about equivalent advice for professional users. Industrial laundries have automatic dosing equipment that is managed in collaboration between laundries and manufacturer/supplier of the detergent, who programme the dosing, wash temperature and level of filling. This is usually followed up with regular service visits, where calibration and other control measures are carried out.

Dosage instructions of a very general nature on the label are a challenge for laundry detergents for professional users, because the dosage intervals depend on, for example, degree of soiling in the laundry, level of filling of the machine, and wash programme. There is limited space for information on a label, and it is important to take into account that, for professional users, the information on the label/packaging is not important for them to use the products as they are intended.

For individual single-component products for OPL, it may be necessary to provide advice on the packaging or in the product data sheet, but this is not introduced as a requirement in these criteria. This can be assessed in the next revision of the criteria if it is deemed necessary.

If the final product contains peracetic acid and hydrogen peroxide as a bleaching agent and is classified and labelled, a text shall appear on the primary packaging or technical product sheet stating that the classification and labelling is due to peracetic acid and hydrogen peroxide which degrade into non-classified substances during the washing process.

Proposed requirements:

O12 Declaration of contents and user manual

The declaration of contents must be in accordance with the Regulation (EC) 648/2004 on Detergents.

It must be made clear on the safety data sheet, technical product data sheet or label which wash temperature the product or multi-component system has been function tested for, in accordance with requirement O19, for normally soiled laundry, e.g.: "Effective cleaning at 30°C for normally soiled laundry".

If the product or multi-component system is marketed as providing chemothermal disinfection, it must be made clear on the safety data sheet, technical product data sheet or label that the product or multi-component system has a chemothermal disinfection function at the wash temperature stated in O1.

Wash temperature and dosing must be in accordance with the information stated in O1.

If the final product contains peracetic acid and hydrogen peroxide as a bleaching agent and is classified and labelled, a text shall appear on the primary packaging or technical product sheet stating that the classification and labelling is due to peracetic acid and hydrogen peroxide which degrade into non-classified substances during the washing process.

✉ Safety data sheets, technical product sheet, or a copy of the label showing the declaration of contents, information on the effective wash temperature and, where applicable, the effective chemothermal disinfection temperature.

4.2 Total content of environmentally harmful substances

The following requirements apply to all complete laundry detergents or the total amount of washing chemicals in multi-component systems (grams) used to get 1 kg of laundry clean (g/kg laundry) (with the exception of requirement O20, which only applies to products that are marketed as having a disinfecting function).

Note that a complete laundry detergent and all sub-components that make up a multi-component system must also meet all the requirements in section 1.1.

All the sub-components that are to be Nordic Swan Ecolabelled are to be included in the calculations. All the limit values exclude water.

The calculations are to be made using the highest recommended dosing per degree of soiling.

The producer must specify the recommended wash temperature in the temperature range 30-40°C (Alternative A) or 40-60°C (Alternative B). Dosage and limit values for the various parameters depend on the degree of soiling of the laundry. Table 3 shows a common division of laundry categories according to degree of soiling.

Table 3 - Examples of laundry categories according to degree of soiling.

Light soiling	Medium soiling	Heavy soiling
Bedlinen and towels from hotels and other overnight accommodation establishments Duvets and pillows Mats and mops Cloth hand towel rolls	Work clothes Institution/trade/service Hospitals/Nursing homes Laundry from hospitals and nursing homes and similar institutions, e.g. bedding, mattress covers, operation sheets, barrier sheets, and patient clothing.	Work clothes Industry/kitchen/butchering and equivalent use Kitchen equipment Clothes and towels Industry clothing Restaurant Cloths/napkins and similar for use in restaurants, industrial kitchens, etc.

Critical dilution volume (CDV)

The critical dilution volume (CDV) is calculated for all chemicals that come into contact with the laundry, i.e. detergents, bleaching agents, starch, fabric conditioners, impregnating agents and stain removal agents.

The critical dilution volume is a theoretical value that takes account of the toxicity and degradation in the environment of the individual substance.

CDV can be calculated on the basis of the substances' acute toxicity" or "chronic toxicity". It is important to note that, on most occasions, the CDV limit value will differ according to whether acute or chronic toxicity is selected. Only one method may be selected per product, so either acute or chronic CDV must be calculated for all components in a multi-component system.

In the evaluation of the criteria from 2011, the CDV for multi-component systems and single-component systems were compared with each other, and also in relation to degree of soiling (light, medium, heavy). Variations in CDV for multi-component systems and single-components systems could be natural, but the evaluation showed that the distribution of median values within these two groups was larger than the distribution of CDV between these two groups. Consequently, introduction of separate requirements for multi-component systems is not regarded as relevant, as the CDV do not differ significantly. As before, CDV requirements are set for the degrees of soiling 'light', 'medium' and 'heavy'.

A review of the licence data in the evaluation from 2011 indicated that the limits for the different degrees of soiling could be tightened. Data from products that are not ecolabelled is obtained in order to carry out a more comprehensive assessment of whether the CDV requirements could be changed. In the criteria, both acute and chronic CDV are permitted, for example through consideration for criteria for textile services, where both values are permitted for products that are to be used in laundries.

For Nordic Ecolabelling, an objective is to set requirements that can reduce the total energy consumption, in order to reduce the climate impact by using Ecolabelled products. Products that can wash at lower temperatures without significantly changing the wash time, while still giving a satisfactory result, will lead to lower energy consumption, and these products Nordic Ecolabelling wants to promote. In conjunction with introduction of requirements for maximum wash temperature, higher CDV is permitted for example for products that can wash at a lower temperature (30-40°C) than products that require a wash temperature of 60°C.

It should be possible to wash lightly soiled laundry at 30°C, while heavily soiled laundry can be washed down around 40°C. It is important to emphasise that washing at lower temperatures can affect both the quantity and type of chemicals at this point in time.

Laundries that wash fabrics from hospitals/institutions, the food industry, mops, and some hotel fabrics, need to disinfect the fabrics. Disinfection usually takes place at high temperature (85°C). The most common methods of disinfection are thermal, thermochemical, or chemical disinfection, and choice of method affects wash temperature and thereby energy consumption.

Enabling laundries to save energy, products have now been developed that can disinfect at 60°C, and in some cases down to 40°C. When disinfection takes place at 40°C, it may be necessary to increase the quantity of chemicals and possibly use different types of chemicals. Laundry that is lightly soiled may be washed at 30°C, while heavily soiled laundry may be washed at 40°C. It is important to emphasise that washing at lower temperatures may influence both the quantity and type of chemical used.

In order to assess the limit values, data has been obtained from licences and non-Nordic Swan Ecolabelled products used in laundries that have the Nordic Swan Ecolabel.

Table J - Compilation of CDV levels

DEGREE OF SOILING	SOURCE	CDV acute	CDV chronic
Light	Laundry chemical 1	19 000	6 000
	Laundry chemical 2	20 000	9 000
	Licence median value	36 000	8 000
	Requirement Version 2	140 000	70 000
	EU Ecolabel (does not take temperature into account)	-	40 000-75 000
	CDV-limit temperature interval 30-40°C (alternative A)	140 000	70 000
	CDV-limit temperature interval 40-60°C (alternative B)	100 000	19 000
Medium	Laundry chemical 1	75 000	10 000
	Laundry chemical 2	121 000	21 000
	Licence median value	53 000	13 000
	Threshold value, Version 2	200 000	100 000
	CDV-limit alternative A:	200 000	100 000
	CDV-limit alternative B:	160 000	35 000
Heavy/hard	Laundry chemical 1	47 000*	8 000*
	Laundry chemical 2	369 000	49 000
	Licence median value	76 000	21 000
	Requirement Version 2	300 000	150 000
	EU Ecolabel (does not take temperature into account)	-	70 000-120 000
	CDV-limit alternative A:	300 000	150 000
	CDV-limit alternative B:	220 000	54 000

The obtained information supports the evaluation report from 2011, which shows clearly that the limits for the different degrees of soiling can be tightened. The variation in the data obtained from laundries merely shows there is great potential to improve the chemistry in terms of CDV.

Many laundries already wash today at 40-60°C (depending on type of customer, degree of soiling, type of laundry).

In view of the experience from laundries and data obtained from products, tighter CDV requirements are proposed. Requirements are set concerning wash temperature. The CDV requirement for washing at 30-40°C remains unchanged, but has been indirectly tightened via the requirements concerning wash temperature. The CDV requirement for washing at 40-60°C has been tightened in comparison with the requirements in version 2. In addition to the categories 'light', 'medium' and 'heavy' soiling, there is a category for laundry detergents where documentation is needed to show they have a disinfecting function, either at 40°C or 60°C.

For wash at low temperature (30-40°C) for textiles such as mops, where there is also a requirement for disinfection, the proposal is that the CDVacute level be unchanged (CDVacute = 140 000). The requirement is unchanged because of feedback from manufacturers that pointed out that it may be necessary to increase use of chemicals or

use another type of chemical – both of which will increase CDV for products intended for use at lower temperatures.

The EU Ecolabel does not take temperature into account, but differentiates between levels of water hardness (soft, medium and hard), and between powder, liquid, and multi-component systems. Table 16 shows the EU Ecolabel CDV requirements for the different degrees of soiling and water hardness. Powder products have the lowest CDV, while multi-component systems have the highest CDV. This is not specified in the table, but is shown in Directive 2012/721/EU. It is also important to note that the EU Ecolabel only uses chronic values, and not acute.

Table K - CDV chronic values, EU Ecolabel and the Nordic Swan Ecolabel*

	CDVchronic (l/kg laundry)		
	Light	Medium	Heavy
EU Ecolabel requirement			
Soft water (0-6 °dH)	30 000-50 000	40 000-70 000	50 000-90 000
Medium water (7-13 °dH)	40 000-60 000	60 000-80 000	90 000-100 000
Hard water (>14 °dH)	50 000-75 000	75 000-100 000	90 000-120 000
Nordic Ecolabelling requirements CDVchronic (litres/kg laundry)			
Version 2, no temperature requirement	70 000	100 000	150 000
Proposal, Version 3, 40-60°C	19 000	35 000	54 000
Proposal, Version 3, 30-40°C	70 000	100 000	150 000

** In addition to degrees of soiling and water hardness, the EU Ecolabel has categories for 'powder', 'liquid' and 'multi-component systems' within each of the three levels of water hardness. The CDV for these product types are not given in their entirety, but are presented as intervals where the powder products have the lowest CDV and the multi-component systems have the highest CDV.*

What we also see is that the Nordic Ecolabelling values in version 2 are relatively high compared to those of the EU Ecolabel. In the new criteria, the CDV values are to be calculated for the dosing at a stated wash temperature (Alternative A or B). If the product/multi-component system can wash effectively within the temperature range 30-40°C (Alternative A), then the CDV values are on a par with the CDV requirements in version 2. In other words, the CDV requirement has been indirectly tightened in that it also takes account of the wash temperature.

If the product/multi-component system can wash effectively in the temperature range 40-60°C (Alternative B), then the CDV level has been considerably tightened in relation to version 2 and the values for the EU Ecolabel, specifically in the sense that version 2 and the EU Ecolabel criteria do not take account of wash temperature.

Consequently, the proposal is to introduce requirements for CDV at maximum wash temperature for different types of soiling.

Proposed requirements:

O13 CDV (Critical dilution volume)

The critical dilution volume (CDV) of the laundry detergent or multi-component systems may not exceed the limit values shown below in Table 6 or 7. Either acute values (CDV_{acute}) or chronic values ($CDV_{chronic}$) may be used.

For recommended wash at a maximum of 30-40°C, Alternative A is used (table 4).

For recommended wash at a maximum of 40-60°C, Alternative B is used (table 5).

Recommended wash temperature is documented through the requirement for Effectiveness, O19.

Table 4 - Alternative A) Wash at maximum temperature 30-40°C

Degree of soiling	Maximum temperature	CDV_{acute}	$CDV_{chronic}$
Light	30°C	140 000	70 000
Medium	30°C	200 000	100 000
Heavy	40°C	300 000	150 000

Table 5 - Alternative A) Wash at maximum temperature 40-60°C

Degree of soiling	Maximum temperature	CDV_{acute}	$CDV_{chronic}$
Light	40°C	100 000	19 000
Medium	40°C	160 000	35 000
Heavy	60°C	220 000	54 000

CDV is calculated using the following equations:

$CDV_{acute} = \sum CDV_i = \sum(dose_i \times DF_i \times 1000/TF_{acute})$

or

$CDV_{chronic} = \sum CDV_i = \sum(dose_i \times DF_i \times 1000/TF_{chronic})$

where:

$dose_i$ = the input quantity of the individual substance in g/kg laundry

DF_i = degradation factor for substance in

TF_{acute} = acute toxicity factor

$TF_{chronic}$ = chronic toxicity factor

Because of the degradation of the substances in the wash process, separate rules apply for the following two substances:

- Hydrogen peroxide (H_2O_2) – not to be included in calculation of CDV.
- Peracetic acid (CH_3CO_3H) – to be included in the calculation as acetic acid.

Documentation must primarily refer to the DID List dated 2014 or later. For substances not included in the list, other documentation may be used, such as test reports or literature references.

DID List: Detergents Ingredients Database.

☒ Calculation of CDV for a complete system or multi-component system that shows that the requirement is fulfilled. The parameters and calculation equations that are needed for documentation of the requirement can be found in Annex 3. It must be stated whether CDV_{acute} or $CDV_{chronic}$ are used.

☒ Recommended wash temperature and recommended temperature for disinfection must be documented through an effectiveness test in relation to O20 in addition to the user test in O19.

Degradability

The persistence of substances in nature is an important environmental parameter. The degree to which substances break down in an aquatic environment gives some indication of how long a substance may affect the environment. The degrading of substances in an aquatic environment depends on whether oxygen is present in the recipient body of

water. Reference is therefore made both to aerobic (with oxygen) and anaerobic (without oxygen) degradability.

By limiting the chemicals' content of organic substances that are not aerobically and anaerobically degradable, we are ensuring that discharge of substances is no more than necessary. In the DID List, the designations anNBO = Y (substances that are anaerobically degradable), and aNBO = R (substances that are aerobically degradable) are used.

The limit value levels are set on the basis of Nordic Ecolabelling's experience of current licences and data from products that are used in Nordic Swan Ecolabelled laundries.

Non-anaerobically degradable substances are organic substances that, under anaerobic conditions, are not degraded in the environment; this can lead, for example, to algal bloom and subsequent oxygen deficiency.

Feedback from manufacturers shows that it can be difficult to find data about anaerobic degradability, so worst-case values are used when calculating degradability.

The DID List will be revised on DD, but it is not certain whether more raw materials will be updated with data on anaerobic degradability. Using data from REACH, other toxicity data can also be secured and corrected so that it is more accurate in relation to the data currently available.

In order to assess the level of the limit values, data has been gathered from licences and non-Nordic Swan Ecolabelled products used in Nordic Swan Ecolabelled laundries. This is presented in Table L. Formulations were also collected for two representative multi-component systems that are not Nordic Swan Ecolabelled, presented as laundry chemicals 1 and 2.

Table L - degradability for products

DEGREE OF SOILING:	SOURCE	anNBO
LIGHT	Laundry chemical 1	0.27
	Laundry chemical 2	0.68
	Licence median value	0.14
	Threshold value, Version 2	0.50
	PROPOSED VALUE A)	0.50
	PROPOSED VALUE B)	0.50
MEDIUM	Laundry chemical 1	0.47
	Laundry chemical 2	2.28
	Licence median value	0.21
	Threshold value, Version 2	0.85
	PROPOSED VALUE A)	0.85
	PROPOSED VALUE B)	0.85
HEAVY	Laundry chemical 1	0.62
	Laundry chemical 2	6.4
	Licence median value	0.31
	Threshold value, Version 2	1.50
	PROPOSED VALUE A)	1.50
	PROPOSED VALUE B)	1.50

The anNBO values for Laundry Chemical 2 is several times higher than applicable limits. The other data is more or less of the same size as applicable limits, the limit values for degradability should remain unchanged. A more stringent requirement would have created unforeseen obstacles to low-temperature products.

Table M - EU Ecolabel aNBO values, Directive 2012/721/EU

	Light	Medium	Heavy
Powder	0.70-140	1.10-1.75	1.40-2.20
Liquid	0.50-0.70	0.60-1.75	0.70-1.20
Multi-component	1.25-2.50	1.75-3.75	2.50-4.80
Nordic Swan Ecolabel, Version 2	0.50	0.85	1.50

The EU Ecolabel considers soft, medium, and hard water, as well as degree of soiling, but does not consider wash temperature. The EU Ecolabel requirements to aerobically degradability is only partly presented as intervals, where the strictest requirements represent wash in soft water (lowest value), while products for use in hard water can have a higher content of aNBO-substances. The Nordic Ecolabelling requirements are stricter than the strictest EU Ecolabel requirement. EU Ecolabel does not have requirements regarding anaerobic degradability (anNBO).

In this version, Nordic Ecolabelling has set requirements regarding wash temperature, also for products that must have a disinfecting function.

Proposed requirements:

O14 Limitation of products' content of aerobically non-biodegradable substances (aNBO)

The quantity of organic substances that are aerobically non-biodegradable (aNBO), in complete laundry detergents or multi-component systems in accordance with the DID-list, must not exceed the limit values given in Table 6. For substances not on the DID List, other documentation in accordance with Appendix 3 may be submitted.

Table 6 – Requirements for aNBO

Parameter	Symbol (unit)	Light	Medium	Heavy
Aerobically non-biobiodegradable compounds	aNBO (g/kg laundry)	0.50	0.85	1.50

✉ Calculation of the amount of organic substances that are aerobically degradable (aNBO) in accordance with the DID List. The parameters and formulas needs for documentation of the requirements, see appendix 3.

O15 Limitation of products' content of anaerobically non-biodegradable substances (anNBO)

The quantity of organic substances that are anaerobically non-biodegradable (anNBO), in complete laundry detergents or multi-component systems in accordance with the DID-list, must not exceed the limit values given in Table 7. For substances not on the DID List, other documentation in accordance with Appendix 3 may be submitted.

Iminodisuccinate (DID 2555) may be omitted from the calculation of anNBO.

For cumene sulphonates (DID 2540), the manufacturer's own data may be used (i.e. on the basis of the manufacturer's own data, this can deviate from the value anNBO=N on the DID List).

Table 7 – Requirements for anNBO

Parameter	Symbol (unit)	Light	Medium	Heavy
Anaerobic non-biodegradable compounds	anNBO (g/kg laundry)	0.50	0.85	1.50

✉ Calculation of the amount of organic substances that are aerobically degradable (anNBO) in accordance with the DID List. The parameters and formulas needs for documentation of the requirements, see appendix 3.

Phosphorus

Phosphate is a complexing agent for lime and an auxiliary chemical for surfactants. A small quantity of phosphate in laundering chemicals contributes to effective laundering in limy water without requiring large quantities of active substances. Phosphorus is permitted, chiefly because of the Danish conditions of high water hardness. Even if the process water is softened, the wash water is harder than in Sweden or Finland.

The use of phosphorus is permitted in limited amounts. Eutrophication is caused primarily by the nutrients nitrogen and phosphorus. Eutrophication of lakes, oceans and watercourses causes a lack of oxygen that in turn creates dead zones. Norway and Sweden have specific national restrictions for phosphorus that have to be taken into account[22].

The total quantity of phosphates and other phosphorus compounds may not exceed the limits values given in Table 8, expressed as P/kg laundry.

Proposed requirements:

O16 Phoshorous:

The total quantity of phosphates and other phosphorus compounds may not exceed the limit values given in Table 8, expressed as grams P/kg laundry.

Table 8 - Limit values for phosphorus

Parameter	Symbol (unit)	Light	Medium	Heavy
Quantity of phosphorus	P (g P/kg laundry)	0.50	1.00	1.50

Products that contain more phosphorus than the amount permitted by Norwegian regulations may not be sold and used in Norway or in areas where there are regulations and prohibitions concerning the use of phosphorus in detergents.

Product Regulation FOR 2004-06-01 no. 922: Regulation on restrictions in using environmentally hazardous chemicals and other products. Chapters 2-12. Detergents - phosphorus content.

✉ Calculation of the total quantity of elementary phosphorus in complete laundry detergents or in multi-component systems.

Phosphonates/phosphonic acid

Phosphonates (DID no. 119) are a series of phosphorus compounds, and are very good complexers[23]. Phosphonates are added to laundry detergents to stabilise hydrogen

[22] Norwegian Product Regulation: FOR 2004-06-01 nr 922 Forskrift om begrensning i bruk av helse- og miljøfarlige kjemikalier og andre produkter. Chapter: 2-12 . Vaskemidler - innhold av fosfor

[23] Lindquist, 2002: Information about complex binding potential, handed out by Hans Lindquist according to criteria development for Dishwasher detergents for professional use, 2002.

peroxide and peracetic acid (which is used as a disinfecting and bleaching agent). The compounds are not harmful to aquatic organisms, but are persistent and are not anaerobically degradable. Phosphonates contain phosphorus, but are used in considerably smaller quantities than phosphate because of their very good properties as complexers.

Phosphonates are neither aerobically or anaerobically biodegradable, so it is desirable to limit their use as far as possible.

SCHER[24] considers that phosphonates used in zeolite-based, phosphate-free detergents may be a potential risk for aquatic environments, and the long-term effects should be studied in more detail (SCHER, 2007). When phosphorus compounds (phosphate and phosphonate) are used in Nordic Swan Ecolabelled products, the quantities are very small.

In the EU report on degradability of significant organic substances [25] in laundry and cleaning detergents that are not surfactant substances, there is focus on, for example, complexers like phosphonate, polycarboxylates, EDTA and salts of these, and NTA. The report states that there is still uncertainty about what applies for substances like polycarboxylates and phosphonates.

Phosphonates are generally barely degradable, and can increase mobilisation of heavy metals in treatment plants and in the environment. Phosphonates have relatively low acute toxicity to aquatic organisms. Small quantities of strong complexing agents are needed to stabilise bleaching agents such as percarbonates and hydrogen peroxide. As the use of NTA is prohibited for other reasons, the Nordic Ecolabelling criteria permit the use of phosphonates/phosphonic acid in limited quantities.

In Version 2 of the criteria, the requirements for phosphonates/phosphonic acids were that, together, they may not be present at more than 0.15 g/kg laundry, regardless of degree of soiling. At the same time, there was no requirement regarding wash temperature in the old criteria.

A review of available data for products showed no noticeable difference between single-component products and multi-component products in terms of phosphonate content. 6 of 36 licensed products contained 0.01-0.15 g phosphonate / kg laundry. The remaining products did not contain phosphonate.

The major manufacturers gave clear feedback that phosphonate is needed when washing at lower temperatures, as it is used to stabilise hydrogen peroxide and peracetic acid in connection with disinfection in the wash process, in addition to bleaching. It is seen as difficult to produce low-temperature products with the requirement level of 0.15 g phosphonate per kg of laundry as set out in requirement O17 Phosphonates/phosphonic acid. At the same time, experience suggests that several producers are managing to meet this requirement perfectly well, and products are constantly being developed for use at lower wash temperatures. Nordic Ecolabelling is therefore sticking with this requirement concerning effective washing of lightly soiled laundry at the recommended wash temperature in the range 30-40°C (Alternative A).

[24] SCHER, 2007: Non surfactant Organic Ingredients and Zeolite-based Detergents, SCHER, 29.05.2007.
[25] COM(2009), 208: Report from the Commission to the European Parliament and the Council, Pursuant to Article 16 of Regulation (EC) No. 648/2004 of the European Parliament and of the Council of 31 March 2004 on detergents, concerning the biodegradation of main non-surfactant organic detergent ingredients, 04.05.2009.

Consequently, differentiated requirements are proposed concerning the content of phosphonates in relation to the degree of soiling. If medium or heavily soiled laundry is to be washed at lower temperatures, greater use of phosphonates must be permitted for washing of medium and heavily soiled laundry. The changes in the requirements of contents of phosphonates are stated in table N.

Table N - Content of phosponate/ phosphonic acid in g phosphonate/kg laundry

	Version 2	Version 3		
		Light	Medium	Heavy
A	0,15	**0,15**	0,20	0,30
B	0,15	0,075	0,10	**0,15**

Proposed requirements:

O17 Phosponate/ phosphonic acid

Total phosphonates/phosphonic acid may not exceed the limit values shown in Table 9, expressed as g/kg laundry.

Table 9 - Phosphonates

	Parameter	Symbol (unit)	Light	Medium	Heavy
A	Phosphonates/phosphonic acids at 30-40 washes	g /kg laundry	0.15	0.20	0.30
B	40-60°C	g /kg laundry	0.075	0.10	0.15

✉ Calculation of total quantity of phosphonates/phosphonic acids, expressed as g/kg laundry.

Environmental hazard

Substances classified as harmful to the environment may be present in limited quantities in complete detergents or in multi-component systems.

Substances with poor degradability may cause environmental problems, immediately or in the future. The effects may be extremely serious if they also display acute toxicity. A restriction on substances with these undesirable properties reduces the risk of damage to the environment. It is important to limit the quantity of environmentally harmful substances in laundry detergent for professional use, since the wash water is flushed into the drains after washing.

Proteas/subtilisin classified as Aquatic Chronic 2 (H411) is exempted from the requirement. See background for exemption under Enzymes O6.

Peracetic acid is excluded from the requirement with the following justification. As a result of the implementation of the CLP Regulation peracetic acid, CAS-No. 79-21-0, has received the harmonized classification H400. In addition, some suppliers classify peracetic acid with H410. Peracetic acid is highly reactive and allows bleaching and disinfection at low temperatures. In processes in which peracetic acid is used, professional laundries have the possibility to wash at lower temperatures and thereby reduce energy consumption. Peracetic acid degrade into non-classified substances during the washing process.

Proposed requirements:

O18 Environmentally hazardous substances

The quantity of constituent substances with an environmental hazard classification as set out below (in accordance with the CLP Regulation (EC) No 1272/2008 as amended and the EU Dangerous Substances Directive 67/548/EEC as amended) in a single-component product or a multi-component system must not exceed these limits.

No constituent substances with the following environmental hazard classification (in accordance with the CLP Regulation (EC) No 1272/2008 and the EU Dangerous Substances Directive 67/548/EEC) may occur in a complete laundry detergent or multi-component system in quantities that exceed the limits stated in Table 10.

Table 10 - Amount of ingoing substances with an environmental hazard classification

For light degree of soiling:	$100 * A_1 + 10 * A_2 + A_3 \leq 0,7$ g/kg textile
For medium degree of soiling:	$100 * A_1 + 10 * A_2 + A_3 \leq 1,0$ g/kg textile
For heavy degree of soiling:	$100 * A_1 + 10 * A_2 + A_3 \leq 1,3$ g/kg textile

where the calculation is based on the recommended dosing and where

A_1 = the quantity of substances classified Aquatic Chronic 1 H410 / R50/53 (g per kg laundry)

A_2 = the quantity of substances classified Aquatic Chronic 2 H411 / R51/53 (g per kg laundry)

A_3 = the quantity of substances classified Aquatic Chronic 3 H412 / R52/53 (g per kg laundry)

Proteas/subtilisin classified as Aquatic Chronic 2 (H411) is exempted from the requirement, see further handling of enzymes i requirement O6. Note that the product also must fulfil the requirement O3 regarding classification of the product.

Surfactants that are classified H412 are exempted from the requirement, assuming they are readily degradable* and anaerobically degradable**.

Peracetic acid, CAS-number 79-21-0, is exempted from the requirement.

** According to the DID List or documentation in accordance with Test Method no. 301 A-F or no. 310 in the OECD guidelines for testing of chemicals, or other equivalent test methods.*

*** According to the DID List or documentation in accordance with ISO 11734, ECETOC no. 28 (June 1988) or equivalent test methods, if at least 60% degradability is attained under anaerobic conditions.*

✉ Presentation of surfactants that will be exempted from the requirement (quantity, classification, degradability).

✉ Compilation of the products' content of H410 / R50/53, H411 / R51/53 and H412 / R52/53 classified compounds per kg laundry.

✉ Calculations that show that the requirement is fulfilled.

✉ Safety data sheet for every constituent raw material, stating the level of environmental hazard of the substance (acute aquatic toxicity), degradability, and/or bioaccumulative property). See O2.

If information about the level of environmental hazard of the substance is not available, the substance is regarded as environmental hazard H410 / R50/53.

4.3 Effectiveness of the laundry detergent

The complete laundry detergent or multi-component system must have satisfactory effectiveness at the recommended dosage for light, normal and heavy soiling, washed in soft water. Wash effectiveness must be shown at recommended wash temperature (alternative A or B specified in O1) at the same dosage for the same degree of soiling used in the calculations of environmental impact in the CDV requirement. The effectiveness of the detergent must be documented in accordance with O19 and O20 (the last requirement only applies to products that must document a disinfecting effect).

There are several methods for testing the effectiveness of a product, but the choice of efficiency test depends on factors such as wash temperature, type of laundry, and type of disinfection and need for disinfection.

In Version 2 of the criteria, the manufacturers were able to choose between an efficiency test based on the ISO 4312 standard, an effectiveness test that was developed for consumer products, or a user test, in order to document the effectiveness of the product. Today, there is no standardised wash test for industrial laundry, nor is there any standardised reference agent for industrial laundry. Feedback from the sector is that the effectiveness tests to which we have referred in our criteria are less relevant to the sector, and that a user test in line with the one we have is most relevant for comparing products. Because of this unanimous feedback (referring to effectiveness test that was developed for consumer products), the Nordic Ecolabelling wishes to adapt the criteria for laundry detergents for professional use, and so only includes an effectiveness test in the form of a user test (the user test is described in the following section "Effectiveness of industrial washing processes" that we have used until now. In the hearing proposal, an extended test period from 4 weeks to 3 months was proposed, with the perception that longer test period is needed to document, for example, greying and rewashing. Responses to the consultation were clear on how difficult it was, in practical and cost terms, to conduct a user test over such a long period, so we have chosen to go back to a test period of 4 weeks.

In addition to the ability to remove dirt, the user test assesses other parameters like bleaching (if relevant), colour retention, and greying of white fabrics (if relevant). What is relevant is seen in the context of the properties claimed in the marketing of the product.

With the introduction of a requirement that all products/multi-component systems must document wash effectiveness at the recommended wash temperature (Alternative A or B), Nordic Ecolabelling believes that account must also be taken of the wash temperature for products/multi-component systems that are marketed as having a disinfecting function. A supplementary requirement (O20) on testing effectiveness in chemothermal disinfection has thus also been introduced. Find out more about this in this background document, in the section “Effectiveness in chemothermal disinfection”.

Following the Norwegian industry standard “Contamination protection for laundries handling institutional linen for healthcare institutions”, it is the Association for Applied Hygiene (VAH) that certifies chemical disinfecting methods, including methods for chemothermal disinfection in washing processes. According to the standard, disinfecting washing processes that use chemical disinfectant agents must be approved by RKI (Robert Koch Institute) or VAH.

There are currently no VAH-approved test institutes in the Nordic region, and there are no facilities in Norway or Sweden approved by the health authorities. This means a laundry detergent manufacturer that wishes to test a product for chemothermal disinfection must have the product tested outside the Nordic region.

Proposed text for requirements about effectiveness tests

To document effectiveness, the user test in O19 is to be used. This applies both for single-component products (complete products) and multi-component products. The products are to be tested with a light, medium and heavy degrees of soiling, and are tested using to the dosage stated in requirement O1.

If the products are also required to document their disinfection performance (where the products are marketed as having a disinfection function), the effectiveness test for chemothermal disinfection is also to be carried out.

The effectiveness must be documented in a user test. Appendix 5 describes how such a user test can be carried out.

At least 80% of the test persons must be satisfied or very satisfied with the effectiveness of the laundry detergent or multi-component system (such as wash booster, detergent and bleaching agent). Each test site must assess the following aspects of the product or multi-component system:

- Functionality, dosability, compressibility, rinsability, and solubility.
- The ability to wash clean laundry with light, medium and heavy soiling at:
    - a recommended wash temperature of 30-40°C (alternative A) or
    - a recommended wash temperature of 40-60°C (alternative B)
- Primary wash effects such as dirt removal, stain removal and bleaching effect
- Secondary wash effects such as greying of white laundry, colour retention, and colour loss from coloured laundry.
- The effect of fabric conditioner on drying, ironing, or mangling
- How satisfied the test person is with the agreement about customer visit

Proposed requirements:

O19 Effectiveness of industrial washing processes

The laundry detergent must fulfil the requirements for a user test according to Appendix 5 (if the application relates to a multi-component system, all the components must be included in the test). The product must be tested at the manufacturers recommended wash temperature and dosages, or lower in accordance with the degrees of soiling "light", "medium" and "heavy" (as stated in O1).

If the dosing is stated in intervals for each separate degree of soiling, the worst-case dosing, i.e. the lowest dosing or lower, is to be used.

✉ Report of user test according to Appendix 5.

Effectiveness in chemothermal disinfection

If the product is marketed with a statement that it has chemothermal disinfecting properties, the disinfection performance must be documented.

There are institutions that check and certify disinfectant agents/processes, e.g. Germany's Association for Applied Hygiene (VAH) and Robert Koch Institute (RKI), both of which publish lists of approved agents/processes. The focus of RKI is on agents/processes that are used in epidemic outbreaks, for example, where the actions are governed by law. The procedure for obtaining certification is exhaustive. VAH requires lab test reports from two independent and approved laboratories, plus reports from two independent experts. VAH's committee then examines the documentation and issues certification that is valid for three years. The chemical content, dosing, temperature and contact times on which the approval is based are specified as part of this process. If anything is changed in the composition or dosing, VAH must assess the changes. The test methods used by VAH include DGHM/VAH's standard method 17 (an equivalent EU standard is being developed by CEN: prEN 16616) and a quantitative suspension test. The experts and test laboratories used must meet certain requirements, and VAH gives examples of approved laboratories. There are no approved laboratories in the Nordic region.

A couple of national laundry industry standards contain procedures for checking chemothermal disinfection processes at laundries. Industry bodies Norske Vaskeriers Kvalitetstilsyn (NVK) in Norway and Bransjeforeningen for Vask og Tekstiludlejning (BVT) in Denmark have such procedures. In both cases there is an assumption that the disinfection performance of the agent has already been documented (NVK requires approval by VAH or RKI) and the procedure checks that the whole washing process functions on site at the laundry.

The laundries that use Nordic Swan Ecolabelled laundry detergents for professional use can choose to disinfect thermally and wash at temperatures higher than 60°C. The purpose behind Nordic Ecolabelling setting requirements concerning disinfection testing of products marketed as having a disinfecting function is that the manufacturer must not be able to make statements that cannot be documented. In addition, Nordic Ecolabelling wishes to promote products that work well at lower wash temperatures.

Proposed requirements:

O20 Effectiveness in chemothermal disinfection

Products intended for chemothermal disinfection to be tested using sample fabrics in the washing process checked by using samples of cotton contaminated with indicator bacteria.

The sample fabrics are to be produced in accordance with the DGHM/VAH standard method number 17: Chemothermal washing disinfection – one bath procedure according to DIN 11905 with disinfection before the first dumping of the washing liquid (practical essay).

Each fabric sample must contain the following indicator bacteria:

- Enterococcus faeçium (ATCC 6057)
- Staphylococcus aureus (ATCC 6538)

Disinfection is achieved when all indicator bacteria have been killed.

The wash temperature and dosing stated in O1 are to be used in the washing process.

✉ For chemothermal disinfection, the wash temperature and dosing (stated in O1) are to be given by the manufacturer.

✉ A confirmation/declaration from a quality control carried out by an external and independent party, stating that:

- The washing process has been checked using cotton samples contaminated with the indicator bacteria enterococcus faeçium (ATCC 6057) and staphylococcus aureus (ATCC 6538).
- The sample fabrics are produced according to the DGHM/VAH standard method number 17: Chemothermal washing disinfection – one bath procedure according to DIN 11905 with disinfection before the first dumping of the washing liquid (practical essay).
- Chemothermal disinfection is achieved when all indicator bacteria have been killed.

Customer visit

The licensee must make a plan with each customer for whether and how often customer visits should be performed during the course of the licence validity. For customers who use automatic dosing devices, customer visits should preferably be part of a normal routine. The aim of the requirement is to ensure that the dosing instructions and dosing devices are used, and that overdosing and underdosing is avoided. Overdosing causes more discharges, but underdosing can often necessitate rewashing, which leads to more discharges and increased energy and water consumption.

The number of customer visits is regulated through an agreement between supplier and customer and can vary, but these generally take place 1-3 times a year. In rare cases, customer visits may be dispensed with, for example because of long distances and minimal sales. Customer visits may also be made by third parties, which can be an institute or a consultant firm.

Proposed requirements:

O21 Customer visit

The licensee must make a plan with each customer for whether and how often customer visits should be performed during the course of the licence validity. For customers who use automatic dosing devices, customer visits should preferably be part of a normal routine. The minimum outcome of a customer visit is calibration of dosing equipment and process controls, to ensure correct dosing. Customer visits can also be made by a third party.

✉ Written description of how customer visits will normally be implemented, indicating who will carry out the visit, what proportion of customers are visited, and how often they are visited.

Quality and regulatory requirements

To ensure compliance with Nordic Ecolabelling requirements, the following procedures must be implemented. It is necessary for Nordic Ecolabelling to know, at all times, who the licensee's contact person is for the Nordic Swan Ecolabel. The applicant must therefore appoint a person who is responsible for ensuring compliance at all times with the requirements applicable to the Nordic Swan Ecolabelled products. The contact person is also responsible for communication with Nordic Ecolabelling.

If the company's environmental management system is certified according to ISO 14 001 or EMAS, and the following procedures are implemented, it is sufficient for the accredited auditor to certify that the requirements are implemented.

The requirements ensure that the ecolabel licence holder is responsible for ensuring that safety, work environment, environmental legislation, and conditions/ consequences at the production facility are followed in the manufacture of ecolabelled products.

Changes to the ecolabelled production process may have repercussions for the Nordic Swan Ecolabel licence. A written report of all changes that may relate to the requirements set for the ecolabelled product must therefore be submitted to Nordic Ecolabelling. This will enable Nordic Ecolabelling to provide information on what needs to be done to ensure that the change does not impact on the licence.

In the event of unforeseen non-conformities, Nordic Ecolabelling can assess the consequences of the non-conformity and provide advice on what action the licensee should take.

Proposed requirements:

O22 Legislation and regulations

The licensee must guarantee adherence to safety regulations, working environment legislation, environmental legislation and conditions/concessions specific to the operations at all sites where the Nordic Swan Ecolabelled product is manufactured.

No documentation is required, but Nordic Ecolabelling may revoke the licence if the requirement is not fulfilled.

O23 Responsibility for the Nordic Swan Ecolabel

The company shall appoint a person responsible for ensuring the fulfilment of Nordic Ecolabelling requirements, and a contact person for communications with Nordic Ecolabelling.

✉ A chart of the company's organizational structure detailing who is responsible for the above.

O24 Documentation

The licensee must be able to present a copy of the application, and factual and calculation data supporting the documents submitted on application (including test reports, documents from suppliers and suchlike).

🔑 Checked on site.

O25 Quality of the laundry detergent

The licence holder must guarantee that the quality in the production of the Nordic Swan Ecolabelled laundry detergent for professional use is maintained throughout the period of validity of the licence.

✉ Procedures for collating and, where necessary, dealing with claims and complaints regarding the quality of the Nordic Swan Ecolabelled laundry detergents for professional use.

O26 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 detailing how planned changes in products and markets are handled.

O27 Unplanned nonconformities

Unplanned nonconformities that have a bearing on Nordic Ecolabelling requirements must be reported to Nordic Ecolabelling in writing and recorded in a journal.

☒ Procedures detailing how unplanned nonconformities are handled.

O28 Traceability

The licensee must have a traceability system for the production of the Nordic Swan Ecolabelled product.

☒ Description of/procedures for the fulfilment of the requirement.

Take-back system

There has previously been a voluntary industry agreement on packaging operations in Norway, which has led Nordic Ecolabelling to have a requirement to ensure that licensees for a number of (45) product groups comply with this regulation. Requirements for return systems have now been incorporated into the Norwegian Waste Regulations, which means that the Nordic Ecolabelling requirement for membership in a return company will be out of date and therefore no longer need to be managed by Nordic Ecolabelling in a separate requirement.

The Nordic Ecolabelling's Criteria Group decided on the 9 October 2017 to remove this requirement.

Marketing

The requirement is to ensure that ecolabelled products are marketed in accordance with "Regulations for the Nordic Ecolabelling of products". The regulations describe the appearance of the Nordic Swan Ecolabel, and include instructions for the correct placement of the label. The regulations also describe how the licence holder can use the Nordic Swan Ecolabel in the rest of the Nordic region, and what documentation is needed for registration. The Board of Directors decided on 17 November 2014 to remove O30 Marketing.

5 Changes compared to previous version

Comparison of requirements for laundry detergents for professional use, version 2 and version 3.

Require-ment, Version 3	Require-ment, Version 2	Same require ment	Change	New require ment	Version 3
O1	O1, O10, O11, O13		x		Description of product. Information on whether the recommended wash temperature is new.
O2	O2	x			Formulation
O3	O3		x		Introduction of CLP (Classification, Labelling and Packaging of Substances and Mixtures).
O4	O4		x		Introduction of CLP (Classification, Labelling and Packaging of Substances and Mixtures).
O5	O5	x			Surfactants, degradability
O6	O6	x			Enzymes
O7	O7		x		List of prohibited substances is updated in accordance with chemical-technical guidelines: - Quaternary ammonium compounds - Siloxanes and silicone - SVHC-substances Prohibition of microorganisms stated in " What can carry the Nordic Swan Ecolabel?"
O8	O8		x		Preservatives. Introduction of Challenge Test
O9	O9	x			Colouring agents
O10	O10	x			Marking of plastic packaging
O11	O11	x			Plastic packaging
O12	O12		x		Declaration of contents. The requirement is extended to include instructions regarding wash temperature.
	O13	x		x	Requirement regarding dosage instruction and recommended wash temperature is included in O1.
O13	O14		x	x	Wash temperature and disinfection introduced as parameters. Requirement for maximum recommended wash temperature CDV limits are tightened.
O14	O15	x			Degradability aNBO
O15	O16	x			Degradability anNBO
O16	O17	x			Phosphorus
O17	O18		x		Phosphonates
O18	O19		x		Environmentally hazardous. Updated with regard to CLP Regulation, and adapted degrees of soiling.
-	O20		x		Effectiveness of industrial washing processes - test removed.
-	O21		x		Effectiveness test according to criteria for laundry detergents consumer - test removed.
O19	O22		x		User test - introduced as standard test Proposal on longer testing period.
O20	-			x	Effectiveness of chemothermal disinfection
O21	O23	x			Customer visit
O22	O31	x			Legislation
O23	O24	x			Person responsible for Nordic Swan Ecolabel
O24	O25	x			Documentation

Require-ment, Version 3	Require-ment, Version 2	Same require ment	Change	New require ment	Version 3
O25	O26	x			Quality of laundry detergent
O26	O27	x			Planned changes
O27	O28	x			Unplanned nonconformities
O28	O29	x			Traceability

There have also been some changes in the degrees of soiling and laundry categories. Restaurant laundry, such as tablecloths, napkins and similar, has been moved from "Medium soiling" to "Heavy soiling".

6 New criteria

- Assess relevance and possibility of setting requirements on raw material production and origin.
- Consider setting requirements concerning degradability in relation to wash temperature.
- Consider alternative test methods to document the product's disinfection performance.