Swan-labelling of Cleaning Products

Background to ecolabelling

Draft consultative document
21 June 2012

Nordic Ecolabelling

Nordic Ecolabelled cleaning products – Background to ecolabelling
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1 Summary

Nordic Ecolabelling has established that the most significant parameters for hand dishwashing detergent are:
-the health and environmental hazard of ingredients
-dosage and performance
-packaging
Several changes have been made in this version of the criteria compared to version 4. The most significant changes are:

- Changed limit values for CDV (R15) and biodegradability (R14). The sole use of chronic data for CDV calculations.
- New limit value for weight-to-benefit ratio (WBR) for ready-to-use products.
- Prohibition on phosphorous (R11).
- Prohibition on fragrances in professional products (R9). New limit values for substances that are not readily aerobic or anaerobic biodegradable (R15).
- Changed calculations and changed limits for environmentally hazardous substances (R13).
- Prohibition on substances of very high concern, vPvB substances and PBT substances (R6).
- Tightened requirements regarding allergens in sprays (R4 and R10).
- The inclusion of professional products with microorganisms for sanitary cleaning (R12). We wish for comments regarding the limit values, test methods and definition of the sanitary cleaning product category.
- Updated performance test. The user test is only applicable to professional products, while laboratory testing can be used for both professional and consumer products (R17 and R18). With regard to these requirements we wish for comments regarding the appendices and their structure.
- New/updated subcategories, which are found in all requirements.

The performance tests and associated appendices have been updated to clarify the demands of the performance test.

2 Basic facts about the criteria

Products eligible for labelling

The product group definition from version 4 has been retained in this version of the criteria. The criteria are primarily intended for general cleaning products and not specialist cleaning products.
The product definition in the criteria is as follows:
The product group encompasses cleaning products intended for indoor, general and regular cleaning of the following areas:

- fixed surfaces (floors, walls, ceilings, doors, tiles and windows)
- kitchen equipment (for example tiles, work surfaces, kitchen machines, taps)
- sanitary installations (toilets, baths, showers, wash basins, taps)

Professional products (products are considered professional if more than 80% of sales are to the professional market) and/or consumer products can be labelled. Product categories are listed below.

Product categories
Previous versions have sorted the product categories differently under different requirements. The subcategories listed below in this version have been clarified to simplify the application process and so that the categories can be found throughout the criteria document.
Concentrated, professional: This category includes professional products that require dilution with water prior to use. It contains products for all the aforementioned surfaces, such as flooring, walls, ceilings, windows, kitchens, bathrooms, sanitary porcelain and showers. Tablets/capsules for lavatories are included in this category.
Ready-to-use, professional: Professional products that are pre-diluted and ready for use. This category includes products for kitchens, bathrooms and showers, but also large areas* such as floors.
Ready-to-use WC, professional: Professional toilet cleaners that are pre-diluted and ready for use straight from the package. This category only includes products for use on toilets and excludes cleaners for other sanitary porcelain and bathroom cleaners.
Ready-to-use window cleaner, consumer and professional: Professional window and glass cleaners that are pre-diluted and ready for use straight from the package.
Concentrated, consumer: Concentrated products that require dilution with water prior to use that are designed the consumer market. This category contains products for all the aforementioned surfaces in the home, such as flooring, walls, ceilings, windows, kitchens, bathrooms, sanitary porcelain and showers. Tablets/capsules for lavatories are included in this category.
Ready-to-use WC, consumer: Consumer toilet cleaners that are pre-diluted and ready for use straight from the package. This category only includes products for use on toilets and excludes cleaners for other sanitary porcelain and bathroom cleaners.
Ready-to-use, consumer (other): Pre-diluted consumer products that are ready to use without dilution. This category includes products for kitchens, bathrooms and showers, but also large areas* such as floors.
**The term large areas refers to areas such as floors and tiled bathroom walls. RTU products shall be intended for use on smaller surfaces and local cleaning.*

Concentrated products that can be used both in a diluted state, such as diluted in a bucket of water, and in a more concentrated state, such as diluted with a small quantity of water for use in a spray bottle, must fulfil the requirements for both concentrated (diluted in bucket) and RTU (spray bottle) products.
Products that are sold on both professional and consumer markets must fulfil the requirements for professional products.
Products designed for several areas of use, such as toilet and tile cleaner (walls and floor) must fulfil the requirements of each applicable category.

Ready-to-use products
Ready-to-use (RTU) products that are pre-diluted at the time of purchase have been the subject of considerable discussion. Nordic Ecolabelling has performed an internal investigation regarding such products.

The investigation was started during the latest revision of the criteria for cleaning products. The premise was that the requirements for RTU products were more lenient than those on concentrated products, and generally more lenient for consumer products than for professional products.
The conclusion of this investigation was that RTU products and concentrated products are used on different types of surfaces and in different ways. The investigation suggests that professional concentrated products are used for larger areas and are dosed either with a dispenser or a measure. Consumers use vacuum cleaners more frequently for large areas and use concentrated products for cleaning. RTU products are primarily used for small surfaces such as toilets, kitchens, windows and bathroom fittings, while concentrated products are diluted and used for large areas such as floors.

The advantage of RTU products include having the right concentration from the start and not having to prepare an in-use solution. In comparison, with concentrated products, the user must add the correct quantity of cleaner to a given quantity of water. Another advantage is that on use only the quantity that is required for that task is used. By comparison, it is commonplace that too much solution is mixed from a concentrated product and that the surplus is thrown out after the task is completed.
The major disadvantages of RTU products are the unnecessary transport of water and health aspects. Less water is transported in connection with concentrated products since these are diluted on use while RTU products contain that quantity of water. The health aspects of RTU products relate primarily to spray products since exposure to aerosol is very different from that when adding concentrate to a bucket of water. RTU sprays are also often used in enclosed spaces such as bathrooms increasing the exposure of the user to the aerosol and its contents.
The market for RTU products is large, above all on the consumer market. If Nordic Ecolabelling should choose not to label such products a relatively large market segment would be entirely omitted which would reduce the overall environmental benefit of the criteria for cleaning products. The requirements on RTU products are stringent in this version of the criteria, above all regarding sensitization, packaging and CDV, to ensure that only the pest products with regard to the environment and health fulfil Nordic Ecolabel requirements.

Microorganisms
Nordic Ecolabelling has in these draft criteria chosen to include certain products that contain microorganisms. The use of microorganisms is limited to professional products intended for sanitary cleaning, such as public toilets. Microorganisms are already used in products for the professional market. There are products from several manufacturers available on the market. Products that are solely for odour control and products for drain cleaning are not covered by these criteria. See also the section "Products that are not eligible for labelling as cleaning products".
Nordic Ecolabelling has chosen in this version of the criteria to limit the use of microorganisms to concentrated professional sanitary products (for cleaning walls, floors, etc.).
For further description of microorganisms, see section 4 "Justification of the requirements” and R12 Microorganisms.

The definition of which products containing microorganisms are included in the criteria is as follows:
Products that contain microorganisms/bacteria may be Nordic Ecolabelled under these criteria if they are intended for professional use with the cleaning of sanitary areas as their primary area of use. The product must be concentrated and diluted with water prior to use, i.e. RTU products are excluded.

Products that are not eligible for labelling as cleaning products
During the revision period it has been evaluated whether cleaning wipes should be included in this product group. Wipes are often made of paper or textile and dampened with water and chemicals suitable to their intended area of use. The most common wipes are used for personal hygiene, such as baby wipes and face wipes. These are included by the Nordic Ecolabel criteria for cosmetics. There are also wipes intended for cleaning solid surfaces. Cleaning wipes are available on both professional and consumer markets. Consumer products are available for cleaning kitchens, bathrooms, toilets, windows and floors. Professional products are available for cleaning professional kitchens, restaurants, bars, hotels, etc. There are also some wipes with antibacterial effect designed for hospitals.

A lifecycle analysis has been performed by the French trade organisations AFISE in collaboration with Procter & Gamble [AFISE, 2004]. Wipes, RTU kitchen spray and a concentrated cleaning product diluted prior to use were compared. The LCA compares the use of the three products over a one-year period. There are however uncertainties regarding the estimation of cleaning habits since there many parameters that vary between households. This makes the study difficult to evaluate. According to the LCA report, it is somewhat unclear whether wipes are comparable with the other products since wipes produce more solid waste than the other products. It is difficult from a single LCA to evaluate the environmental benefits of wipes compared to other cleaning products. The use of cleaning wipes in the Nordic area is limited. In light of the aforementioned reasons, Nordic Ecolabelling continues to omit wipes for the criteria for cleaning products.

Version 4 of the criteria excluded scouring creams from the criteria. This version of the criteria allows their inclusion so long as they fulfil all requirements applicable to RTU consumer products. Scouring creams are primarily used to remove fat and stains on a variety of surfaces. There is in general no professional reason to exclude scouring creams so long as they fulfil all requirements on RTU consumer products. Scouring creams are primarily used by consumers.

The cleaning products listed below are not included in these criteria since the criteria are designed for more general products for frequent cleaning. Special products such as drain cleaner and cleaners for walk-in freezers are excluded.

Cleaning products intended for special cleaning purposes cannot be ecolabelled in accordance with these criteria. This includes products intended solely for the purpose of:

- calcium removal
- oven cleaners
- unblocking blockages, cleaning drains

- restricting or preventing biological growth (algae, fungus, bacteria)
- total or partial disinfection
- continuous cleaning, e.g. fragrance block for cleaning WCs
- cleaning products for refrigerated rooms

Wipes containing cleaning agents are not eligible for ecolabelling under the criteria for cleaning products or any other current Nordic Ecolabel criteria.In the event of dispute, Nordic Ecolabelling will determine which criteria a product may be ecolabelled under.

Justification for Nordic Ecolabelling

To achieve environmental benefits, each individual requirement must have relevance with regard to Nordic Ecolabelling's environmental objectives . There must also exist a demonstrated potential to differentiate environmentally more suitable products (there has to be a difference and it must "pay" to set the requirement). It must also be possible to control the environmental aspect in question through the environmental requirement.

These three aspects should be considered together and the approach is called Relevance-Potential-Controllability (RPC). Maximum environmental benefit is achieved by selecting the requirements that have the greatest relevance, potential and controllability with regard to the product's lifecycle.
Nordic Ecolabelling considers there to be many actors within the cleaning product market and that ecolabelling can provide those actors and products that are at the forefront of environmental development a competitive advantage.
The purpose of the criteria is to reduce the potential environmental impact of the product. Environmental aspects related to the actual use of the product, such as heating the water, overdosing and incorrect area of use, are not taken into regard since these are difficult for a cleaning product to influence.
The requirements are based greatly on the characteristics of the ingredients, which can be determined with acknowledged methods. The most significant environmental impact can also be regulated by the requirements in the criteria document, i.e. controllability is achieved.
Appendix 1a and b contains two MECO analyses, i.e. a summary of effects of the material, energy, chemicals and other (e.g. waste, transport) associated with a cleaning product. MECO can be described as a "light" version of a lifecycle analysis. Energy has been the primary focus in these analyses. It is important to note that there is no numeric factor for the environmental and health impact of the ingredients.
The appendices contain a MECO diagram for concentrated products (Appendix 1A) and one for RTU products (Appendix 1B). This is to highlight that the product categories present slightly different problems.
The assumptions that are made in the MECO diagram are described briefly in Appendix 1C.
The MECO analysis is used to identify which areas pose the greatest environmental and health challenges for cleaning products and are thus most relevant when stipulating requirements.

Relevance

Relevance is assessed on the basis of the environmental problems caused by the product group and their magnitude.

Volume
Large volumes of cleaning products are sold in the Nordic area, both on the professional and the consumer market. In 2009 in Sweden alone, roughly 100,000 tonnes of cleaning products were sold. This equates to annual sales of roughly 270,000 tonnes in the Nordic area . Alternative methods of cleaning, such a microfiber cleaning cloths, are used on both the professional and consumer market. Nevertheless, the use of traditional cleaning products is still large.

Dosage and performance
The overdosing of concentrated products is an issue since users do not follow the recommendations on the packaging instead simply pouring an unmeasured amount into a bucket. This can lead to overdosing. Overdosing leads to the increased resource consumption and the increased emission of chemicals post use into the waste water system.The risk of overdosing RTU products is less since these are pre-diluted on purchase. They can however be overdosed by applying more cleaner than is required.Requirements on performance are linked to the recommended dosage since poor performance further increases the risk of overdosing.

Ecotoxicity and biodegradability
Consumer cleaning products is used in homes and facilities that are connected to a district sewage system and ones that are not (such as holiday homes, small youth hostels and restaurants).
The use of hand dishwashing detergent is more commonplace than other cleaning products at locations lacking a connection to a municipal waste water system. Nonetheless, cleaning products are also used at such locations. It is therefore important to avoid emissions to the environment of substances at are persistent, highly ecotoxic and/or bioaccumulating.

Ecotoxicity and biodegradability are the most important parameters for the constituent ingredients/chemicals since cleaning products are flushed away with the waste water and enter the waste water system or the environment directly. Products that contain toxic ingredients are more harmful to the environment.

Requirements on biodegradability are important since there are negative environmental aspects besides toxicity. Furthermore, in addition to the negative aspects of which we are aware today, we should count on the discovery of other negative aspects in the future. By placing requirements on biodegradability, Nordic Ecolabelling wishes to minimise the quantity of chemical compounds that accumulate in the environment and that can cause problems for coming generations.

Particular requirements are set of surfactants, which are the largest single ingredient and functionally the most important in the product.
Fragrances and preservatives often contain substances that are classified as environmentally hazardous and/or sensitizing. Accordingly, special requirements are stipulated to limit the use of such.

Health
Health is a very important parameter in regard to concentrated cleaning products. The user comes into direct skin contact with the product and is thus subject to risks such as allergies. Products sold in spray bottles produce aerosols that can be inhaled by the user. Some of the substances in the aerosol, such as enzymes and fragrances, can affect the respiratory system. It is therefore important that spray products are only used on small surfaces to minimise the risk of sensitization and other adverse effects. Fragrances in professional products increase the risk of sensitization. The risk is greater for professional products than for consumer products since professional users suffer greater exposure to the product than consumers.

Use phase: Energy and water consumption
The energy consumed to heat the water for concentrated domestic cleaning products is a significant environmental aspect. This is however not a parameter regarding RTU products since these are used without dilution.

Concentrated professional cleaning products do not necessarily require hot water. Many products are used in cleaning machines that have integrated water heaters. This item in the MECO analysis regarding energy consumption for water heating is therefore most relevant to consumer products and those professional products that require hot water.
In the energy section of the MECO analysis regarding products that are diluted in hot water, water heating is one of the most significant parameters in comparison to transportation, water purification, primary production and packaging.

Primary production
Significant aspects of primary production are the large consumption of energy and the use of finite resources. Cleaning products contain several ingredients such as surfactants, solvents, fragrances, preservatives, colouring agents and sometimes complexing agents.

The energy required for primary production for ingredients used in concentrated cleaning products is roughly similar to that required for packaging manufacture (consumer products) in the MECO analysis.

Regarding RTU products, the estimated energy consumption for primary production in the MECO analysis is considerably lower than other parameters since RTU products often contain more water than concentrated products.

Packaging
The quantity of packaging material used for household chemical products is great and the size and quantity of packaging can vary in comparison to the size of the content. Regarding RTU products, far more material is generally used for 1 litre of in-use solution than for concentrated products that are diluted on use. This is also shown by the energy consumed in the MECO diagrams in Appendix 1a and b.

Professional products often require less packaging per litre of in-use solution since they are sold in larger package sizes (from 5 litres up to 200 litres). This can also be seen in the MECO analysis in Appendix 1. The energy required for product packaging

for one litre of in-use solution of a consumer product is roughly double that of that required by a professional product.

Transport and distribution

The MECO analysis demonstrates that transport is a significant parameter for both the ingredients and finished product. The finished product is first transported from the manufacturing plant to stores or other sales points and warehouses. The end user then transports the product to its point of use.

Nordic Ecolabelling lacks data on the impact of the different stages of transport. Products are not always manufactured domestically but transported long distances by road or rail. For the MECO analysis it is assumed that products are transported roughly 5000 km by lorry. The energy consumption for transport is greatest for RTU products and is the most significant energy parameter in the analysis.

Potential

Potential is evaluated based on the environmental benefit within the specific product group and for each requirement area in the criteria.

Volume

Large quantities of cleaning products are sold on the professional and consumer markets in the Nordic area. The performance and environmental characteristics of the products vary. Accordingly, there is potential to influence this product group.
The quantity of cleaning products that are used could be reduced if all users dosed correctly and only mixed the quantity required for the task.

Dosage and performance

Clear instructions as to dosage on the packaging or a dispenser reduce the risk of overdosing since they make the user aware of how the product should be used. An increase in correct dosing would reduce the emission of chemicals into the environment. There is therefore potential in promoting the correct dosage.

The use of RTU products reduces the risk of incorrect dosing. However, RTU products are unsuitable for large areas and used primarily on small areas. The quantity of active ingredients in one litre of RTU product is however considerably higher than in one litre of in-use solution of a concentrated product that has been correctly dosed. There are pros and cons with both product categories. Nordic Ecolabelling sees that the products are used in different ways and that both variants are suitable for their respective areas of use.

Products that have passed the performance test have demonstrated that they are effective at the recommended dosage. This increases the chance that the user will be satisfied even at the correct, low dosage. The performance of products currently on the market varies. Nordic Ecolabelling ensures that labelled products offer good performance at the recommended dosage. Requirements on the performance of a product are both relevant and have potential.

Ecotoxicity and biodegradability
Products that contain ingredients with low ecotoxicity and that are both aerobically and anaerobically biodegradable impact less on the environment than products with persistent and toxic ingredients. Nordic Ecolabelling is aware that the ecotoxicity and biodegradability of and which ingredients are used in products on the market vary. There is potential to differentiate between products.
Nordic Ecolabelling prohibits and/or limits substances that are environmentally hazardous or harmful that can be found in non-labelled cleaning products. There is an opportunity to differentiate between different products found on the market.

Health
The potential regarding the health aspects of cleaning products is to reduce the number of new allergy sufferers by limiting the use of sensitizing substances. Today's products differ with regard to their content of allergens and other substances that are detrimental to health. Nordic Ecolabelling therefore sees potential in being able to differentiate between products and only label those with the least impact on health.

Regarding RTU products, Nordic Ecolabelling stipulates additional requirements prohibiting enzymes in sprays and placing more stringent limits on preservatives. RTU products in spray form create aerosol during use that may be inhaled by the user. Nordic Ecolabelling sees that there is potential in limiting the quantities of sensitizing substances.

Use phase: Energy and water consumption
Concentrated products require dilution with water which in turn requires heating. Heating 10 litres of water to 40-50°C requires 0.5 kWh of energy, which is also shown by the MECO diagram in the appendices. Products for professional cleaning machines do not in general require warm water. Water heating is not a significant parameter for RTU either.

There is limited potential in stipulating requirements on a lower water temperature since the majority of concentrated products are intended for hot water.

Primary production
Nordic Ecolabelling is convinced that the environmental consequences of fossil and renewable raw materials are considerable. The problem is that the associated potential and controllability is difficult to map and document.

In general, the use of less cleaning product (reduced overdosing) reduces the consumption of primary products. Lower levels of production mean lower less primary production, which both reduces the energy required for extraction and/or processing and also reduced the quantity of packaging for the primary product.

Packaging
Reducing the amount of product packaging gives savings during transport and distribution and also reduces the amount plastic required.
There are currently many different types of packaging for cleaning products that or more or less environmentally suitable. Accordingly, there is potential for Nordic

Ecolabelling only to approve products packaged to optimise the weight-to-benefit ratio. This potential is greatest on the consumer side since cleaning products are sold in smaller volumes. Professional products are generally sold in larger packaging, i.e. more doses per packaging. Further, professional product are generally more concentrated providing a greater number of doses per unit volume.

RTU products require a considerably higher proportion of packaging per litre of in-use solution than concentrated products. The potential is therefore considerable for RTU products where different packaging contains different amounts of material. One way to reduce the quantity of packaging for RTU products is to encourage the use of refills that are made of less material and lack spray nozzles. Refills for cleaning products have however not proven to be particularly popular products on the market.

Transport and distribution
The ingredients used in cleaning products are often transported long distances. Reducing these distances would reduce energy consumption and CO2 emissions. It is difficult to quantify their impact since transport and distribution occur in many different stages of a cleaning product's lifecycle. In general, the energy consumption (fuel) is related to whether the packaging contains many or few doses. I.e. the more concentrated the product, the less transport per dose.

Controllability
Controllability is an evaluation of the ability to set requirements with regard to significant environmental parameters.

Volume, dosage and performance
Controllability over consumers' dosage habits and use of cleaning product is very difficult to achieve. Nordic Ecolabelling requires however that clear information is provided to the consumer as to correct dosage.

Professional products are generally more concentrated than consumer products. Some manufacturers and suppliers offer dispenser that reduce the risk of overdosing. It is difficult to control the end user's dosing. However, clear instructions on the product label or data sheet do facilitate.

Products that prove to be effective at low doses do not require overdosing by the user to achieve satisfactory results and thus reduce the risk of overdosing. Nordic Ecolabelling therefore sees requirements on performance and dosage instructions as one way to steer towards more effective products that are also used correctly.

Ecotoxicity and biodegradability
The requirement on low ecotoxicity reduces the quantity of substances that are released into the environment. The manufacturer greatly influences which ingredients are added to the product and is aware of the environmental and health aspects of each ingredient. Accordingly, there is great scope to stipulate fully controllable requirements with regard to ecotoxicity and biodegradability, where the manufacturer has the opportunity to decide over the contents of the product.

Health
The Nordic Ecolabel criteria stipulate that only low levels of allergens may be included in the product and that fragrances may only be added to consumer products if these themselves contain low levels of allergens. The requirement as regards CMR (carcinogenic, mutagenic and reproductive toxic) classification is included to ensure that such substances are not included in the product.

The manufacturer greatly influences which ingredients are added to the product and is aware of the health aspects of each ingredient. Accordingly, there is great scope to stipulate fully controllable requirements with regard to ecotoxicity and biodegradability.

Use phase: Energy and water consumption
It very difficult to control user habits both regarding dosing and water consumption.

To require the use of less hot water for cleaning is today not controllable since most products (primarily consumer products) are designed for use in warm water. If in the future a product that works at low temperatures is developed, there may be cause to promote such in future criteria.

Nordic Ecolabelling stipulates requirements on user instructions and performance to encourage the more correct use of the products.

Primary production
The controllability of primary production is low since the licensee merely purchases the ingredients and has little control of the primary producer.
The availability of renewable ingredients for the product group is limited and insufficient for all manufactures of cleaning products.
Nor should all renewable raw materials be encouraged. For example, the production of palm oil creates significant environmental impact.

Packaging
The quantity of packaging material in relation to the capacity of the content is limited by the weight-to-benefit requirement. A low weight of packaging material and many doses per package is desired. With this requirement, Nordic Ecolabelling wishes to promote less “unnecessary packaging” per dose.

The use of refills for all RTU products is desirable from the viewpoint of packaging to reduce the amount of packaging material. It is however difficult for the manufacturer (often the licence applicant) to control the quantity of refills that are sold in the shops. Controllability over refills is therefore limited. Nordic Ecolabelling has therefore adapted the requirement on packaging material so that it better reflects market conditions.

The manufacturer is able to influence the packaging used for their products. Accordingly, there is great scope to stipulate fully controllable requirements with regard to packaging but not as to the number of refills that are sold.

Transport and distribution
There is limited scope for Nordic Ecolabelling to control the transport and distribution used by primary producers and manufacturers. Many manufacturers do not have control over all of their shipping and the alternative modes of transport can be limited.

Versions and validity periods

Previously the criteria for cleaning products were divided into separate criteria documents for all-purpose cleaners and sanitary cleaning products.

All-purpose cleaners - Version 1 – 3 September 1993
Version 1 impose the requirements relating to harmfulnes for health and the environment, the ecotoxicological properties of surfactants and individual requirements applicable to various substances/groups of substances.

All-purpose cleaners – Version 2
The changes from version 1 (3 February 1995 – 27 June 2000) to version 2 (10 December 1998 – 9 June 2003) generally consisted of the introduction of an environmental matrix in which the requirements are interconnected, and an increase in the stringency of the function test.

Sanitary cleaning products – Version 1 – 26 August 1994
Version 1 imposed requirements as to harmfulness on health and the environment, surfactants, complexing agents, disinfectants, preservatives, dyestuffs and fragrance. Requirements were also imposed with regard to the information text on dosage, requirements applicable to packaging and function, as well as individual requirements applicable to certain substances/groups of substances.

Sanitary cleaning products – Version 2
Between version 1 and version 2 (22 April 1999 – 24 February 2004) the changes generally consisted of the introduction of an environmental matrix (in which the requirements applicable to toxicity – degradability, phosphorus, NTA, non-potentially degradable substances, non-anaerobically degradable substances and the weight-to-utility ratio of the packaging are interconnected) and an increase in the stringency of the function test.

Cleaning products – Version 3 – 15 June 2003
The main changes in criteria version 3 relative to 2 were:
• the combination of the all-purpose cleaner and sanitary cleaning product documents
• a reduction of the maximum limit for substances with relatively high toxicity and low degradability
• the function test was made more flexible
• antibacterial products were excluded
• the product classification requirements were updated
• health-related requirements for fragrance (the proscription of carcinogens and mandatory declaration of allergenic ingredients)
• products that served only as decalcifying agents were no longer encompassed by the ecolabelling criteria

Cleaning products – Version 4 – 13 December 2007

The most significant changes in version 4 compared to version 3:
Strict limitations on substances classified as environmentally hazardous (R50/53) and the prohibition of CMR substances (substances that are carcinogenic, mutagenic or reproduction toxic).
Stricter requirements on sensitizing substances.
Stricter limits for the permitted quantity of substances classified as R51/53 or R52/53.
Product toxicity and biodegradability (according to the DID list) was replaced by CDV and the limit values tightened.
Version 4 contained a requirement of limited duration regarding fragrances. As of 1 January 2010, this requirement has been included as an alternative. Fragrances that are subject to declaration and/or classified as R42 and/or R43 must not be found at concentrations above 100 ppm (0.010%).

The Nordic Market

Professional and consumer cleaning products from small, medium-sized and large manufacturers can be found on the Nordic market. The products are manufactured both within and outside the Nordic region (primarily in the rest of Europe).

The consumer market

The consumer market offers private label products. These are primarily manufactured in the Nordic region (e.g. Nopa, Danlind and Cleano Production). Some private label products are manufactured in Europe (such as McBride and Dalli de Klok). Brand products from global manufacturers such as Colgate, Reckitt Benckiser, Unilever and SC Johnson are manufactured in Europe for the Nordic market. Lilleborg is the leading manufacturer in Norway and also has production in Norway.

The primary sales channel to consumers is through grocery stores. Grocery store chains thus have considerable influence over which products are available on the market. In Sweden, many consumer products are ecolabelled. This is in part due a strategy practiced by grocery stores to sell primarily ecolabelled household chemicals. Nordic Ecolabelled grocery stores are found in Sweden (188 stores), Norway (21 stores) and Denmark (2 stores). These all sell Nordic Ecolabelled household chemicals such as cleaning products. Finland does not currently have any Nordic Ecolabelled stores.

Professional market

The professional market has products from many manufacturers that are produced both within and outside the Nordic region. Manufacturers include Diversey, Ecolab, Nilfisk, Cleano Production, Iduna, Sæbefabrikken, Novadan and Lilleborg Profesjonell

The sales are directly B2B (e.g. to restaurants, hotels and cleaning firms) or via wholesalers such as Staples, Asko and Norengros.

Public procurement tends more and more towards environmentally suitable products increasing the demand for ecolabelled products.

Nordic Ecolabelling licences

There are 60 Nordic Ecolabel licenses for cleaning products (October 2011) and 9 Nordic EU Ecolabel licenses (October 2011. See Table 2.1. Each licence includes many products. 725 different products (trade names) carried the Nordic Ecolabel (October 2011).

The licences include both consumer and professional products.

Table 2.1. Number of licences on the Nordic market (October 2011)

	Licences		**Registrations**	
	Number of licences	Products/ Trade names	Number of registrations	Products/ Trade names
Sweden	24	158	13	63
Norway	5	20	17	76
Denmark	20	491	15	51
Finland	11	56	18	77

The number of Nordic Ecolabelled products has increased by over 100 products since 2010. With regard to professional products, public procurement's demand for environmental suitable products is one of the drivers behind the increased number of products

Regulatory requirement and other label systems

Detergents Regulation (EC) No 648/2004

The Detergents Regulation is EU legislation and must be observed. The regulation applies to all detergents and cleaning agents. Detergents and cleaning agents are defined in the regulation, as too are surfactants. The regulation applies to pure substances and preparations.

Biodegradability

The Detergents Regulation sets requirements on the biodegradability of surfactants in detergents and cleaning agents. Unlike previously, the regulation focuses on ultimate biodegradation rather than primary biodegradation.

Labelling

The regulation sets requirements on which constituent substances must be declared and how these shall be declared. There are requirements on dosage information and an ingredient datasheet as well as their publication.

All detergents and cleaning agents must bear a product name, trade name and/or trademark and contact details of the manufacturer. Information on from where datasheets can be ordered must also be provided. Detergents and cleaning agents must also be labelled with instructions for use and, if necessary, safety instructions. The Detergents Regulation does not annul the requirements on classification, packaging and labelling stipulated by the ClaP Regulation.

Type I ecolabelling

The Swedish Society for Nature Conservation has ecolabelling criteria, Good Environmental Choice, covering cleaning products (Swedish Society for Nature Conservation, 2006). There are roughly 107 cleaning products (within the subcategories all-purpose cleaner, soft soap, toilet cleaner and heavy-duty cleaner) labelled with the Good Environmental Choice label (www.snf.se, 25 October 2011). There is also a window cleaning product. Licences are issued for both consumer (48) and professional products (60).

New EU Ecolabel criteria were adopted on 28 June 2011 and published 29 June 2011. These criteria include cleaning products for both professional and consumer markets. Products containing microorganisms are prohibited by the criteria. Similarly, concentrated sanitary cleaners are excluded from the criteria. The EU Ecolabel has 2 licences in Sweden (covering 9 trade names), 6 in Denmark (38 trade names) and 1 in Finland (2 trade names).

Ecologo is a Canadian Type I ecolabel certified to ISO 14024 (www.ecologo.org). Ecologo has criteria for many different products, including cleaning products. Ecologo has divided its criteria for cleaning products into roughly 15 different documents, one for each product category such as floor cleaners, biotech-based cleaners, etc. Roughly 2000 products carry the Ecologo label (Ecologo, personal dialogue).

Other private labels

Avainlippu
Avainlippu (literally the key flag) is a label in Finland. The key flag can be awarded to products (or services) that are made in Finland. It is a registered trademark that is administered by Förbundet för Finländskt Arbete (Federation for Finnish Work). The key flag is not an ecolabel though many consumers believe it to be such due to regional production reducing transport distances. The label is also used on cleaning products.

Charter for Sustainable Cleaning
In 2005, the International Association for Soaps, Detergents and Maintenance Products (A.I.S.E.) initiated the pan-European "Charter for Sustainable Cleaning" to promote the sustainability of household and industrial/institutional products. The charter applies in all the EU 27 states as well as Norway, Iceland and Switzerland and is open to all companies manufacturing, distributing or placing on the market such products.

To participate in the program, a company must annually report key performance indicators (KPIs) to A.I.S.E. such as chemical safety evaluation, poorly biodegradable organics, energy and water consumption and packaging. There are however no limit values that must be met. A.I.S.E. has summarised the results in a "sustainability report". (A.I.S.E, 2009).

Association against Asthma and Allergy
The Association against Asthma and Allergy in each Nordic country has developed its own labelling system. Chemical products are among the products that can be labelled.

The label focuses on minimising the risk for allergies as a result of use of the product. The labels are administered differently in each Nordic country by the respective national association. The specific requirements on the products are not public and there is not full transparency regarding financing. This diminishes the credibility of the label.

3 About the revision

Purpose of the revision

Focus areas of the revision:
-Product categories/subgroups
-Product group definition
-CDV
-Environmentally hazardous substances
-RTU products and the impact on health and the environment
-Packaging
-Performance test

The other requirements have been reviewed and some minor changes have been made. For example, the classification requirement has been updated with CLP classifications.

About this criteria revision

This project has been driven as a Nordic project. On initiation, all countries submitted national reports on the criteria, sector and other national data. Throughout the project, manufacturers, trade organisations and other stakeholders in the different Nordic countries have been contacted to assemble knowledge, experience and interests in the area.

Project participants:

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4 Justification of the requirements

1 Environmental requirements

1.1 Description of the product

Version 5 clarifies the product categories and these are used throughout the document. The new subcategories are as follows. Further information about each category can be found under Section 2 "Basic facts about the criteria".

- Concentrated, professional
- Ready-to-use WC, professional
- Ready-to-use WC, professional
- Ready-to-use window cleaner, consumer and professional
- Concentrated, consumer
- Ready-to-use, consumer
- Ready-to-use WC, consumer
-

R1 Description of the product
The criteria for cleaning products cover several product categories with products intended for different areas of use and in different ways (with or without requiring dilution). Subsequently, Nordic Ecolabelling requires information regarding a product's area of use, dilution and market (professional/consumer). This is done to ensure that the product is covered by the definition of the product group.
The requirements in the criteria are organised by professional and consumer products and the subcategories (such as concentrated products, RTU, WC and window).

Professional products include products that are marketed for use in a professional context, such as institutional kitchens, catering kitchens, restaurants and public services. Products are not considered professional products if they are exclusively sold through retail outlets.
Nordic Ecolabelling is aware that some products are primarily designed for the consumer market but are also sold wholesale to professional users. Ecolabelling's control is then limited. Accordingly products that are primarily designed for the consumer market are treated as consumer products. A product is considered to be specific to a certain market (consumer or professional) if >80% of sales are on that market.

If Nordic Ecolabelling finds uncertainty as to the correct classification of the product, the applicant must submit sales statistics or similar demonstrating on which market the product is sold.

The tightening of this requirement for professional products is in line with the other chemical product groups that can be Nordic Ecolabelled, such as dishwasher detergent for professional use, laundry detergent for professional use and hand dishwashing detergent for professional use.

This categorization has been made since in previous versions many queries were received as to which category should be used for different products under each requirement. **The requirement should therefore be designed as follows:**

Detailed information must be supplied on the cleaning products for which a Nordic Ecolabel is sought. The following information must be submitted:

Description of the product regarding the need for dilution.

Description of the area of use of the product in accordance with "What products are eligible for a Nordic Ecolabel?".

Is the product designed for the professional or the consumer market?

✉ Product label and/or technical data sheet describing the area of use of the product and possible need for dilution (see also R23).

✉ Documentation specifying the market for which the product is designed. Marketing material, product information or similar for each country in which the product is sold.

R2 Information on formulation/recipe
Nordic Ecolabelling requires an exact recipe with all constituent substances. This is needed to check each requirement and perform the calculations stipulated by the requirements. The documentation requirement specifies that the safety data sheet must comply with legislation in force. At the time of writing, the REACH directive is applicable, i.e. the safety data sheet must comply with Directive 1907/2006/EC.

The requirement should therefore be designed as follows:
Applicants must provide detailed information on the formulation of the hand dishwashing detergent and enclose a safety data sheet for each ingredient. Information on the formulation must include:

- Trade name
- Chemical name
- Proportion (dry and wet sample)
- CAS no. for each ingredient. If an ingredient comprises several substances, this must be stated.
- Function of each ingredient.
- DID number for substances included on the DID list.
- Health and environmental classification.

The DID number is the number assigned to the ingredient on the DID list, which is used for the evaluation of chemical requirements. The DID-list is available from Nordic Ecolabelling. See page 2 for addresses.

✉ Comprehensive recipe for the product as stipulated by the requirement.

✉ Safety data sheet for each ingredient in accordance with European legislation in force.

1.2 Prohibited or limited constituent substances and mixtures

R3 Classification of the product
By setting environmental and health requirements, Nordic Ecolabelling ensures that products that are toxic or hazardous to health cannot be ecolabelled. The requirements are primarily stipulated for safety reasons since hand dishwashing detergents are not associated with such classifications.

Classifications such as flammable and explosive are removed from the draft since these are not considered relevant for this product group.

The classification very toxic is included to prevent the introduction of products with this classification. Nordic Ecolabelling does not consider the risk great of products

classified as very toxic appearing on the market but nonetheless includes the requirement.

The exemption for professional products containing substances classified as R20 (Harmful by inhalation), R21 (Harmful by contact with skin) and/or R22 (Harmful if swallowed) (H332, H312 and/or H302) is included for products that the manufacturer can demonstrate are packaged in such a way that the user does not come into contact with the product, i.e. the risk for contact with the product has been minimised. At technical description and instructions demonstrating how the user avoids contact with the product shall be provided.

The classification corrosive with R34 (Causes burns) and R35 (Causes severe burns) (H314 with Skin Corr 1A and/or 1B) are permitted for professional products and WC products if the classification is due to a very low or very high pH value. This exemption is included to permit highly concentrated products and products intended for areas of use that require extreme pH values to give satisfactory results. For example, very acidic professional cleaning products are sometimes necessary for sanitary areas. Such very concentrated products are often diluted automatically.

By defining requirements limiting or prohibiting substances with specific intrinsic characteristics, Nordic Ecolabelling can quell concerns regarding the safe use of chemical products and thus promote environmental and/or consumer issues. See also requirement 3. Prohibiting CMR substances is an important health parameter, which is why CMR classified substances are also prohibited at ingredient level (see requirement R3). But to avoid the introduction of products that are classified as CMR due to constituent substances (below the impurity limit of 100 ppm) reacting and forming compounds or products that demand that the detergent is classified as CMR, this requirement also prohibits products that are classified as CMR.

The documentation requirement specifies that the safety data sheet must comply with legislation in force. At the time of writing, the REACH directive is applicable, i.e. the safety data sheet must comply with Directive 1907/2006/EC.

The requirement should therefore be designed as follows:
Products must not be classified according to the European Dangerous Substances Directive 67/548/EEC with amendments and/or CLP Regulation (EC) No 1272/2008 with amendments, as specified in Table 1. Classification according to the EU Dangerous Substance Directive or the CLP Regulation may be used during the transition period, i.e. until 1 June 2015. Following the transition period, classification according to the CLP Regulation is to apply exclusively (see Table 1).

Table 1. Product classification

Classification	**Hazard symbol and risk phrase / Hazard class, category and statement**	
	CLP Regulation 1272/2008	Dangerous Substances Directive 67/548/EEC
Dangerous for the environment	Hazardous to the aquatic environment Category Acute 1 H400; Category Chronic 1 H410; Category Chronic 2	N with R50 R50/53 or R51/53. R52 R53 or R52/53 without N

	H411; Category Chronic 3 H412; Category Chronic 4 H413	
Very toxic	Acute toxicity, Category 1 or 2 with H330, H310 and/or H300, and/or Specific target organ toxicity – single exposure, Category 1 with H370	Tx (T+ in Norway) with R26, R27, R28 and/or R39
Toxic	Acute toxicity, Category 2 or 3 with H330, H331, H311 and/or H301, and/or Specific target organ toxicity – single exposure, Category 1 with H370, and/or Specific target organ toxicity – repeated exposure, Category 1 with H372	T with R23, R24, R25, R39 and/or R48
Harmful to health	Aspiration hazard, Hazard Category 1 with H304 and/or Specific target organ toxicity – single exposure, Category 2 with H371, and/or Specific target organ toxicity – repeated exposure, Category 2 with H373 Acute toxicity, Category 4 with H332, H312 or H302 Exceptions: Professional products may be classified as Acute toxicity, Category 4 with H332, H312, H302 if the packaging is so designed that the user does not come into contact with the product.	Xn with R20, R21, R22, R48, R65 and/or R68 Exceptions: Professional products may be classified as R20, R21 and/or R22 if the packaging is so designed that the user does not come into contact with the product.
Locally irritant	Spray products (consumer and professional): Xi with STOT SE with H335 Professional products: Eye Dam.1 with H318	Spray products (consumer and professional): Xi with R37 Professional products: Xi with R41
Sensitizing	Respiratory sensitisation, Category 1 with H334 or Skin sensitisation Category 1 with H317	Xn with R42 or Xi with R43
Corrosive	Skin Corr.1B with H314 and/or Sin Corr.1A with H314. Exceptions for professional products, and WC-products for consumers – if the classification is set because of pH.	C as R34 and R35 Exceptions for professional products, and WC-products for consumers – if the classification is set because of pH.
Carcinogenic	Carc 1A/1B/2 with H350, H350i and/or H351	T with R45 and/or R49 (Carc 1 or Carc 2) or Xn with R40 (Carc 3)
Mutagenic	Mut 1B/2 with H340 and/or H341	T with R46 (Mut 1 or Mut2) or Xn with R68m(Mut 3)
Reproductive toxic	Repr. 1A/1B/2 with H360, H361, H362	T with R60, R61, R64 an/or R33 (Repr1 or Repr 2) or Xn with R62,R63,R64 and/or R33 (Repr 3)

Classification according to EU Dangerous Substance Directive 67/548/EEC and EU Dangerous Preparation Directive 1999/45/EC with amendments.

Note that the producer is responsible for classification.

☒ Safety data sheet for the product in accordance with European legislation in force.

☒ Description of the design of the packaging of professional products classified as Xn with R20, R21 and/or R22 (H332, H312 and/or H302) demonstrating that the user does not come into contact with the product. Technical description and instructions demonstrating how the user avoids contact with the product.

✉ Documentation that demonstrates that the product (professional products and consumer WC products) is classified as corrosive due to its pH, permitting exemption for R34 and R35 classification (H314 skin corr. 1B and 1A).

R4 CMR substances

By defining requirements limiting or prohibiting substances with specific intrinsic characteristics, Nordic Ecolabelling can quell concerns regarding the safe use of chemical products and thus promote environmental and/or consumer issues and highlight consumer concerns.

The prohibition of CMR substances and the limitation of environmentally hazardous substances are standard Nordic Ecolabelling requirements for chemical products. The prohibition of CMR substances has an important symbolic value but is unlikely to influence the formulation of cleaning products in practice for the majority of manufacturers. Form a health perspective CMR substances are undesirable in cleaning products since the user often comes into direct contact with the product.

The prohibition of CMR substances and the limitation of environmentally hazardous substances are part of Nordic Ecolabelling's environmental toxin policy. The prohibition of CMR substances has an important symbolic value but is unlikely to influence the formulation of hand dishwashing detergents in practice. Form a health perspective CMR substances are undesirable in hand dishwashing detergents since the product group is used by consumers in the home.

The term constituent substance refers to both substances contained in the ingredient and substances that can be liberated such as formaldehyde.

Lilial (CAS 80-54-6) has the self-classification Rep3 with R62 and is therefore prohibited by this requirement. Since fragrances are added intentionally and since they fulfil a function, a trivial lower limit is not applicable for fragrances. Lilial cannot therefore be added to a product due to this CMR requirement.

NTA is classified as Carc Cat.3 (EU, 2008b). NTA is therefore prohibited from use due to its classification.

Complexing agents that replace NTA (GLDA and MGDA) contain small quantities of NTA impurities from production (as specified on the MSDS for the ingredient). Nordic Ecolabelling's review of licensed products shows that there is a need to use such complexing agents in cleaning products. NTA, present as an impurity in complexing agents, is therefore exempted from the requirement. The concentration of the product must not however exceed 1.0% by weight and the concentration in the final product must not exceed 0.1% by weight.
The requirement should therefore be designed as follows:

The cleaning product must not contain substances that are or may decompose into substances that are carcinogenic (Carc), mutagenic (Mut) or toxic to reproduction (Rep) with the following hazard categories or risk phrase, or combinations of these (see Table 2):

Table 2 Classification of constituent substances

Hazard class	**Hazard category and hazard statement (Regulation (EC) No 1272/2008[1])**	**Equivalent hazard category and risk phrase (Directive 67/548/EEC[2])**
Carcinogenic	Carc. 1A or 1B; H350 Carc. 1A or 1B; H350i Carc. 2; H351 *	Carc. cat. 1 or 2; R45 Carc. cat. 1 or 2; R49 Carc. cat. 3; R40*
Mutagenic	Muta. 1B; H340 Muta. 2; H341	Muta. cat. 2; R46 Muta. cat. 3; R68
Reproductive toxic	Repr. 1A or 1B; H360F Repr. 1A or 1B; H360D Repr. 2; H361f Repr. 2; H361d Lact, H362	Repr. cat. 1 or 2; R60 Repr. cat. 1 or 2; R61 Repr. cat. 3; R62 Repr. cat. 3; R63 R64

1 Applicable from Dec. 2010
2 Applicable in transition period to Regulation (EC) no 1272/2008 from Dec. 2010 to June 2015
*MGDA and GLDA complexing agents may contain NTA contaminants in concentrations below 1.0%, so long as the concentration of NTA in the cleaning product is lower than 0.1%.

✉ Duly completed and signed declaration of conformity with product requirements (Appendix 3 or equivalent) and ingredient requirements (Appendix 4 or equivalent).

R5 Sensitising substances

Nordic Ecolabelling wishes to minimise the quantity of sensitizing/allergenic substances in products to minimise the risk of allergies.

When used, cleaning products often come into direct contact with the user, such as with the hands when wringing out a cloth. Another example is exposure to the aerosol from a spray product (such as kitchen and bathroom cleaner). Accordingly it is desirable to minimise the quantity of sensitizing substances with which the user can come into direct contact.

Preservatives

Since cleaning products contain a large quantity of water, there is sometimes a need to use preservatives, especially if the product's pH value is neutral. Since the CDV limit value has been tightened in this version, reformulation of the cleaning product may be necessary. To enable the use of preservatives, there is an exemption to the requirement on sensitizing substances in preservatives. The exemption is limited to cleaning products with a pH between 3.0 and 10.0. Products with a lower or higher pH are self conserving and do not require added preservatives.

The pH limit for self conserving varies slightly according to different manufacturers. The lower limit lies between pH 2.4 and 4 and the upper limit between 9 and 11.5. Nordic Ecolabelling has chosen a pH range of pH 3-10 for products containing preservatives.

The formulation of the product can also influence the need for preservatives. Some surfactants together with ethanol can provide a preserving effect (Miljøprojekt 1048, 2005). Fragrances can also help preserve the product since these contain solvents.

Spray products produce a different exposure scenario than products that are diluted in water and applied using a cloth. Spray products produce an aerosol that can be inhaled. This increases the risk for the user of exposure to allergens. Nordic Ecolabelling wishes to reduce the quantity of sensitizing substances in sprays and has therefore introduced even more stringent requirements on sprays in this version. The previous exemption permitting spray products to contain 0.1% of R43 classified preservatives has been removed since Nordic Ecolabelling following the review does not see the need for this.

See also requirement R7 on preservatives.

Fragrances

There is a separate requirement regulating the levels of sensitizing substances in fragrances. A total ban on allergens in fragrances would make it almost impossible to produce a fragrance. Nordic Ecolabelling has however in this version of the criteria chosen to prohibit fragrances in professional products, as stipulated by requirement R9. The quantity of sensitizing fragrances in spray products has been limited further in this version of the criteria since exposure to spray products differs from that to concentrated products.

Enzymes

Enzymes are exempt from the requirement on sensitizing substances since it is difficult to find enzymes that are not classified as sensitizing. Only enzymes in liquid or granulate form are permitted. This is to reduce the risk of dust during the manufacture of the cleaning product. Enzymes are not permitted in spray products since their use entails a greater risk of exposure to aerosol and respiratory problems than concentrated products that are diluted in a bucket.

The requirement should therefore be designed as follows:

Ingredients must not be classified as sensitising/allergenic with the following risk phrases/hazard categories:

· R42 / H334
· R43 / H317
· Any combination of these risk phrases/hazard categories.

The following substances are exempt from the above requirements, except in spray products:

- Enzymes in liquid form or encapsulated as granules.
- Fragrances in the final product, see requirements R9 and R10 on fragrances.
- <0.1% by weight of preservatives classified as R42/H334 and/or R43/H317 if the product's pH is 3.0-10.0. See requirement R7 for further requirements on preservatives.

Spray products:

- Fragrances in the final product, see requirements R9 and R10 on fragrances.
- The product must not contain any sensitising preservatives.

✉ Duly completed and signed declaration that sensitising substances are not included in the product. Use Appendix 3 (manufacturer's declaration) or equivalent. Duly completed and signed declaration that ingredients do not contain sensitising substances. Use Appendix 4 (declaration by supplier of raw materials) or equivalent.

✉ If the product contains preservatives classified as sensitising, documentation of the pH of the product (cleaning agent) and the concentration of the preservatives.

✉ Safety data sheet or equivalent demonstrating that enzymes are liquid or dust-free granulate form

R6 Substances that must not be present in the product

Nordic Ecolabelling primarily prohibits substances and groups of substances based on their classification. However, since there are undesirable substances that are not prohibited by other requirements, these have been collected in a list of substances/ingredients that may not actively be added to the final product or constituent ingredient.

APEO and APD: Alkylphenolethoxylates (APEO) or alkylphenol derivatives (APD) are a group of persistent surfactants that have displayed endocrine disruptive characteristics. These substances have been phased out in the majority of products through legislation. The substances are prohibited by the requirement on surfactants . Declaring APEO and APD along with other substances is considered a small burden for the applicant but simplifies processing the application.

Reactive chlorine compounds such as sodium hypochlorite, and organic chlorine compounds such as triclosan, are used as disinfectants/anti-bacterial agents. Such substances can in themselves or can product toxic and persistent or bioaccumulating substances. They can also produce bactericidal and antibiotic resistance in bacteria. Sodium hypochlorite is found on the list of undesirable substances since it is an environmental hazard that can produce organic chlorine compounds. This is particularly important for consumer products where there is a risk of poisonous chlorine gas being produced when mixed with an acid.

Quaternary ammonium salts that are not readily biodegradable. The criteria prohibit quaternary ammonium compounds of cationic surfactants with adverse environmental effects such as a lack of biodegradability. There are subsets (such as ester quats) that have better environmental properties that are not prohibited.

Quaternary ammonium compounds are often very toxic to aquatic organisms. If such a compound is also non-readily biodegradable it is classified as N with R50/53. Quaternary ammonium compounds are associated with bacterial resistance to antibiotics and with causing certain allergic reactions.

Benzalkonium chloride is an ammonium compound. Unlike the aforementioned substances, it is readily biodegradable and is classified as N with R50. Benzalkonium chloride is prohibited due to its toxicity, the risk of causing antibiotic resistance, and since it can produce allergic reactions [Heir et al, 2001], [Wikipedia Benzalkonium Chloride, 2012].

Ethylenediaminetetraacetic acid (EDTA) and its salts are not readily biodegradable and, according to the EU's risk evaluation, in conditions found in municipal wastewater treatment EDTA is non-biodegradable or poorly biodegradable (Cefic, 2009). There are now more environmentally suitable alternatives that are biodegradable and that can replace EDTA. One such is methylglycine diacetic acid (MGDA). The EU is also working actively to limit the use of EDTA in the paper and pulp industry (Official Journal of the European Union, 2006/C 90/04). Soap flakes are exempt to the requirement on EDTA since it has proven almost impossible to manufacture soap flakes without a small content of EDTA. The exemption means that Nordic Ecolabelling permits a maximum total content of 0.06% EDTA and phosphonates in soap flakes.

DTPA

Diethylenetriamine pentaacetate (DTPA) has similar properties to EDTA. DTPA can be considered an extended version of EDTA. DTPA has the same chemical structure as EDTA but with one extra ethylene, one extra amine and one extra acetate group. [Wikipedia DTPA, 2012].

Phosphonates

Phosphonates (DID no. 119) are a group of phosphorous compounds that are good complexing agents. Phosphonates are not harmful to aquatic organisms but are persistent and non-anaerobically biodegradable. Phosphonates contain phosphorous and can therefore cause eutrophication. Phosphonates are less commonly used than phosphate as a complexing agent since phosphate is a very strong complexing agent. See the exemption above applying to phosphonates and EDTA in soap flakes.

Nanomaterials/particles

Nanomaterials/particles are natural, incidental or manufactured material containing particles, in an unbound state or as an aggregate or as agglomerate and where, for 50% or more of the particles in the number size distribution, one or more external dimensions is in the size range 1 nm-100 nm.
This definition is taken from the European Commission's definition of 18 October 2011 (EU Commission, 2011). According to this definition, a material is classed as a nanomaterial only if 50% or more of the particles are of nanosize except "in specific cases and where warranted by concerns for the environment, health, safety or competitiveness the number size distribution threshold of 50 % may be replaced by a threshold between 1 and 50 %".
Based on a precautionary principle, Nordic Ecolabelling wishes to set a limit value of 1% since there are no standardized method for the risk appraisal of nanomaterials and since there is great uncertainty as to the long-term effects on health and the environment.
The background to the European Commission's definition is provided by the report "Scientific Basis for the Definition of the Term "Nanomaterial" from the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR, 2010). The report identifies that there are large inadequacies and great uncertainties in the different definitions of nanomaterial. What is the definition of a material with particles larger than 100 nm? Where should the limit be set? If only a proportion of

particles are smaller than 100 nm, should the material be defined as a nanomaterial? The report also points out that both external and internal dimensions must be evaluated in order to catch the aggregate and agglomerate particles, but also to keep larger particles with inner nanostructure outside of the definition. The report groups nanomaterial into three groups:

- Natural nanomaterials
- Nanoparticles that are by-products of human activity (e.g. exhaust gasses)
- Engineered nanomaterials

All three categories are nanoparticles and should, according to the report, be included in the general definition.
Materials such as carbon black, TiO2, ZnO, SiO2 and Ag typically comprise of nanoparticles that are agglomerated producing larger particles with dimensions over 100 nm. But with the suggested definition, these materials are also considered nanomaterials since the definition covers nanoparticles in free and fixed states. Nanoparticles are used in an increasing number of products to generate new or improved characteristics. Nanoparticles can produce unintentional risks to health and the environment. The size of the particles means that they can reach parts of the body and environment are otherwise well protected. Their size increases their reactance since they have a very large surface area compared to larger particles (Teknologirådet, 2008). Research on the risks of nanomaterials has focused particularly on health effects and in some cases shown harmful effects. For example, nanoparticles can enter a cell and damage its DNA (Folkmann, 2009). This does not mean that all nanoparticles will cause harm. But there is currently a lack of knowledge regarding the health and environmental effects of nanoparticles, particularly their long term effects (Teknologirådet, 2008). According to the report from the Scientific Committee on Emerging and Newly Identified Health Risks [SCENIHR, 2009], methods of evaluating the risk of nanomaterials are still under development. To get these in place requires that knowledge on and methods for estimating exposure to nanomaterials and identifying their risks are further developed, validated and standardised.

Perfluorinated and polyfluorinated alkylated substances (PFAS)

Perfluorinated and polyfluorinated alkylated substances (PFAS) are a group of substances with undesirable properties. Fluorinated surfactants and other similar substances with fluorinated carbon chains longer than six decompose to the very stable forms PFOS and PFOA (perfluorooctanoic acid) and similar compounds. Examinations show that these compounds may occur in some types of cleaning products as fluorinated surfactants. The substances are persistent and are readily absorbed by the body. The substances in this substance group affect the biological processes in the body and are suspected to be endocrine disruptive (OSPAR, 2005; MST, 2005b). PFOA and PFOS compounds are a collection of substances that all potentially decompose to perfluorooctane sulphonate, which is persistent and can be found in the blood of humans and animals.

Methyldibromoglutaronitrile (MG)

Methyldibromoglutaronitrile (MG) is highly allergenic. Studies show that it is so allergenic that a product containing MG can cause allergic reactions even if washed

off immediately[1]. MG is classified as harmful to health, Xn with R20/21/22, and is accordingly not prohibited through other requirements on the classification of constituent substances.

Nitromusks and polycyclic musks generally have undesirable effects to both health and the environment. Several such compounds are prohibited through the requirement on CMR substances. Inquiries with fragrance manufacturers have confirmed that many European companies still use polycyclic musks in consumer products. The use of nitromusks is very limited but manufacturers outside Europe still use fragrances such as Musk Ambrette, which is prohibited by IFRA. Prohibiting the use of nitromusks and polycyclic musks is therefore still relevant as a preventative measure.

Nitro musks include:

Muskförening	CASnr
Moskusxylen	81-15-2
Moskusambrette	83-66-9
Mosken	116-66-5
Moskustibetin	145-39-1
Moskusketon	81-14-1
HHCB	114109-62-5, 114109-63-6, 1222-05-5, 78448-48-3 og 78448-49-4
AHTN	1506-02-1 og 21145-77-7

Potential endocrine disrupters are substances that can influence the hormonal balance in humans and animals. Hormones control a range of vital functions in the body and are especially important to the development and growth of humans, animals and plants. Changes to an organism's hormonal balance can have undesirable effects. In particular focus are hormones that control gender development and reproduction. Several studies have shown effects on animals that are presumed to result from changes in their hormonal balance. Emissions to the aquatic environment are the primary source of endocrine disrupting substances. (State of Environment Norway, 2008b). Nordic Ecolabelling prohibits the use of substances that are potential endocrine disrupters of Category 1 (evidence of endocrine disrupting activity in at least one species using intact animals) or Category 2 (at least some in vitro evidence of biological activity related to endocrine disruption) according to the original EU report on endocrine disrupters (EU, 2000) or subsequent studies (EU, 2002a, 2000b and 2007). See
http://ec.europa.eu/environment/endocrine/documents/final_report_2007.pdf

PBT (**Persistent, bioaccumulable and toxic**) and **vPvB** (very persistent and very bioaccumulable) organic substances are defined in Annex XIII of REACH (Directive 1907/2006/EC) (EU, 2006). Nordic Ecolabelling considers such substances as generally undesirable.

[1] Dobel, Shima, article published by Danish Environmental Protection Agency 15/4-05: "Dansk pres giver resultat: EU-forbud på vej mod konserveringsmidlet MG i kosmetik" (Danish pressure yields results: EU prohibition on MG preservatives in cosmetics soon in place)

The majority of PBT/vPvB substances are automatically excluded from use in hand dishwashing detergent by the restrictions on environmentally harmful substances (see R11). Since some substances, above all vPvB, are not excluded by R11, Nordic Ecolabelling prohibits these directly.

Substances that are inherently PBT or vPvB, or substances that form compounds that are PBT or vPvB can be found on the European Chemical Bureau's website. http://ecb.jrc.it/esis/index.php?PGM=pbt (ECB, 2009).

Substances that are "deferred" or "under evaluation" are not considered to have PBT or vPvB properties.

Substances of very high concern (SVHC) due to classification as Carc. Cat. 1 or 2, Muta. Cat. 1 or 2, Repr. Cat. 1 or 2, PBT or vPvB substances, or other substances for which scientific evidence suggests probable serious effects to human health or the environment (e.g. endocrine disrupters) are not permitted in hand dishwashing detergents.
Substances on the candidate list and substances waiting for inclusion on the candidate list for REACH registration, i.e. substances of very high concern, are not expected to be present in ecolabelled products since ECHA defines such substances as CMR classified. PBT and vPvB substances are already excluded by that requirement. However, substances can also be evaluated case-by-case for inclusion on the candidate list. Nordic Ecolabelling wishes therefore, based on a precautionary principle, to include substances of very high concern in this requirement.
The full list is available at:

http://echa.europa.eu/chem_data/candidate_list_en.asp.

The following substances/groups are not explicitly prohibited by this requirement since they are already prohibited by other requirements:
Linear alkylbenzene sulphonates (LAS)

Linear alkylbenzene sulphonates (LAS) are toxic to aquatic organisms and are not degradable in an anaerobic environment. LAS is a surfactant and prohibited by the requirement on non-anaerobic biodegradable surfactants (R16).

NTA
NTA is prohibited by requirement R4 since it is classified as carcinogenic.

The requirement in R6 should therefore be designed as follows:
The following substances/groups are prohibited from use in the final product and must not be actively added to ingredients:

- alkylphenolethoxylates (APEOs) and APEO derivatives
- reactive chloro-compounds such as sodium hypochloride
- chloro-organic compounds
- quaternary ammonium compounds that are not readily degradable
- benzalconiumchloride
- EDTA* (ethylene diamine tetraacetate) and its salts
- DTPA

- phosphonates*
- nanomaterials/nanoparticles**
- perfluorinated substances and polyperfluorinated alkylated substances (PFAS)
- Methyldibromo Glutaronitrile (MG)
- Nitromusks and polycyclic musks
- Substances with potential for endocrine disruption of Category 1 or 2 in accordance with official EU lists. The EU report on endocrine disrupters can be read in full at http://ec.europa.eu/environment/endocrine/documents/final_report_2007.pdf (from Appendix L, page 238)
- Substances that have been evaluated in the EU to be PBT (Persistent, bioaccumulable and toxic) or vPvB (very persistent and very bioaccumulable) in accordance with Annex XIII of REACH.
- Substances of very high concern listed on the candidate list http://echa.europa.eu/chem_data/candidate_list_en.asp.

* Solid soap products (e.g. soap flakes) may as a total contain 0,06 % EDTA and phosphonates.
** Nanomaterials/particles: "A natural, incidental or manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for 50% or more of the particles in the number size distribution, one or more external dimensions is in the size range 1 nm-100 nm ." Examples include ZnO, TiO2, SiO2, AgZnO and Ag. Polymer emulsions are not considered nanomaterials.
Note the definition of constituent substance and impurity in Section 1 of the environmental requirements.

✉ Duly completed and signed declarations that the above substances cannot be found in the final product (Appendix 3 or equivalent) and are not actively added to ingredients (Appendix 4 or equivalent).

R7 Preservatives
Preservatives are added to liquid products to prevent bacterial growth.
In general, preservatives are generally toxic to aquatic organisms and can produce hypersensitivity and allergies. Preservatives can be used in the product and the constituent substances only if they are not bioaccumulating. Bioaccumulating compounds collect in the fatty tissues of living organisms and can cause long-term damage to the environment.

If nothing else is proven, the substance is classified as bioaccumulating if $\log K_{ow} \geq 4.0$ in accordance with OECD guidelines 107, 117 or equivalent. Such a substance can be tested on fish according to OECD test method 305 A-E. If the substance's biologic concentration factor (BCF) is greater than 500, the substance is deemed bioaccumulating, and if lower than 500 non-bioaccumulating. If the substance has a BCF, this determines the substance's bioaccumulation potential.

Nordic Ecolabelling considers that there are many preservatives that fulfil this requirement, i.e. the potential is not great but rather the requirement is included to maintain the level that has been achieved. The requirement ensures that undesirable preservatives are not reintroduced and enter the ecosystem.

To avoid the unnecessary use of preservatives and to ensure that the quantity of preservatives is sufficient, a requirement is set regarding the quantity of preservatives in relation to the volume of the product. This is documented using a Challenge test and shall be performed during the development of the product. This is a new requirement in this criteria version that aims to avoid unnecessarily high quantities of preservatives in the product.
If small changes are made to the recipe that does not influence the quantity of preservatives, it is not required to repeat this test. If the preservative is changed or if other ingredients are substituted that influence the need for preservatives, the test must be repeated.

Challenge test designates a group of tests used to determine the correct/necessary concentration of preservatives in products. Test samples are prepared with different concentrations of preservatives as well as a control without preservatives. A mixture of bacteria, yeasts and moulds are added to the samples which are tested for growth after seven days. This continues for a minimum of 28 days (some tests require a minimum of six weeks). The sample with the lowest concentration of preservatives that does not exhibit microbial growth has the correct/optimum concentration of preservatives. Different manufacturers and suppliers of preservatives use different challenge tests/methods to determine the correct concentration of preservative. Examples include: Koko Test (Test Method SM 021), USP Challenge Test (US Pharmacopoeia) and CTFA Challenge Test (Cosmetics Toiletries and Fragrance Association).

Nordic Ecolabelling does not wish to ecolabel products with anti-bacterial or disinfecting properties. This is also made clear by the section “What products are eligible for a Nordic Ecolabel?”. Some of these antibacterial substances, such as Nan silver, are explicitly prohibited by requirement R6. This requirement means that the manufacturer of the product/ingredient declares that the preservative is added to preserve the product but not for antibacterial purposes, thus preventing such products from being ecolabelled.

The requirements should therefore be designed as follows:

a) Preservatives that can be found in the product or in ingredients must not be bioaccumulating. Preservatives are considered biodegradable if BCF < 500 or $\log K_{ow}$ < 4.0. If both BCF and $\log K_{ow}$ values are available, the highest recorded BCF value shall be used.

b) The concentration of preservatives shall be optimised to the volume of the product. A challenge test or equivalent shall be used to demonstrate this.

c) Preservatives are only permitted to preserve the product or an ingredient. Preservatives may not be added to produce a disinfecting or anti-bacterial effect.

✉ Documentation of BCF or $\log K_{ow}$.

✉ Test report of conducted challenge test or equivalent demonstrating that an optimal concentration of preservatives is used in the product. See Appendix 2 for requirements on test laboratories and information on challenge tests.

✉ Duly completed and signed declaration that preservatives are only added to preserve the product or ingredient (Appendix 3 or 4 or equivalent documentation).

R8 Colouring agents

Nordic Ecolabelling does not wish to ecolabel products with anti-bacterial or disinfecting properties. This is also made clear by the section "What products are eligible for a Nordic Ecolabel?". Some of these antibacterial substances, such as Nan silver, are explicitly prohibited by requirement R6. This requirement means that the manufacturer of the product/ingredient declares that the preservative is added to preserve the product but not for antibacterial purposes, thus preventing such products from being ecolabelled.

The requirements should therefore be designed as follows:

Colouring agents that can be found in the product or in ingredients must not be bioaccumulating. A colouring agent is not considered bioaccumulating if BCF < 500 or $\log K_{ow}$ < 4.0. If both BCF and $\log K_{ow}$ values are available, the highest recorded BCF value shall be used. Colouring agents approved for foodstuffs may be accepted.

✉ Documentation of the colouring agent's BCF or $\log K_{ow}$ or specification of E-number (see Appendix 3 (manufacturer) and Appendix 4 (raw material supplier)

R9 Fragrances in professional cleaning products

Fragrances are not permitted in professional cleaning products. Normally, the users of professional products have not chosen these themselves which products they get to use since these are purchased by a purchasing department or similar. A janitor/cleaner is most often unable to choose whether the product is fragrance free or not and may be involuntary exposed to fragrances. A professional cleaner is exposed to more detergent than consumers since they use cleaning products all day long. A similar situation applies regarding public procurement where products are bought for entire boroughs, counties and institutions and the end-user (cleaner) has no influence over product choice.

Professional products include products that are marketed for use in a professional context, such as institutional kitchens, catering kitchens, restaurants and public services. Products are not considered professional products if they are exclusively sold through retail outlets.

Nordic Ecolabelling is aware that some products are primarily designed for the consumer market but are also sold wholesale to professional users, see requirement R1. I.e. the product is considered a professional product if 80% of volumes or more are sold to the professional market.

If Nordic Ecolabelling finds uncertainty as to the correct classification of the product, the applicant must submit sales statistics or similar demonstrating on which market the product is sold.

The tightening of this requirement for professional products is in line with the other chemical product groups that can be Nordic Ecolabelled, such as dishwasher detergent for professional use, laundry detergent for professional use and hand dishwashing detergent for professional use.
The requirements should therefore be designed as follows:

Fragrances are not permitted in professional products.

Professional products include products that are marketed for use in a professional context, such as institutional kitchens, catering kitchens, restaurants and public services.
If a product is sold on both professional and consumer markets, it is considered a professional product if more than 80% of sales are to the professional market. If there is doubt as to whether the product is for professional use or consumer use, Nordic Ecolabelling may request documentation supporting claims.

✉ Recipe as per requirement 2 that demonstrates the absence of fragrances.

R10 Fragrances
Fragrances do not enhance the cleaning performance of a product. Also, fragrances contain many substances that have negative health effects, above all sensitising, and also negative environmental impact.

The majority of fragrances contain substances that are classified as H334/R42 and/or H317/R43. But to totally prohibit fragrances is not considered justifiable in relation to the effect of fragrances at such low concentrations. It is considered likely that a total ban on sensitising fragrances would reduce the market share of Nordic Ecolabelled hand dishwashing detergents and thus reduce the total environmental benefit of ecolabelled products within this category, since many consumers prefer fragranced products.

Many consumers associate fragrance with cleanliness. Accordingly there is a demand for fragranced consumer products. The market for fragrance-free RTU products is small, particularly for sprays. Nordic Ecolabelling permits small quantities of sensitizing fragrances in such products to enable the addition of a small quantity of fragrance.

Since both stores and manufacturers consider fragrances important to the sales in this product group, fragrances are permitted for hand dishwasher detergents designed for the consumer market.
It is required to fulfil International Fragrance Association guidelines[2] (IFRA). This ensures that the manufacture, handing and use of fragrances in the product fulfil specific standards regarding prohibited substances, limited use and purity. IFRA guidelines support participation to offer products that are safe for consumers and the environment. The guidelines cover the manufacturing and handling of all fragrances for all applications and contain the complete IFRA standards.

The limitation of sensitising fragrances aims to reduce the risk of allergies among users of ecolabelled hand dishwashing detergents.

[2] See: http://www.ifraorg.org/GuideLines.asp.

The aim of the requirement on allergenic fragrances in Nordic Ecolabelled products is to reduce the risk to allergy sufferers. Nordic Ecolabelling considers it relevant to place more stringent requirements than the legal limits regarding allergenic substances and their declaration.

Requirement b covers the allergens on the 26 list (see the table in Appendix 2). These are subject to declaration in accordance with Regulation (EC) No 648/2004 on detergents and are limited to 100 ppm.

Requirement c covers all other fragrances that are classified as allergens with H317/R43 and/or H334/R42, the content of which is limited to 100 ppm.

In this version of the criteria, Nordic Ecolabelling has chosen to set extra stringent requirements for products sold in spray bottles since these are used differently and are not diluted prior to use. The use of spray products produces aerosol thus increases the risk of inhaling allergenic substances. Concentrated products that are diluted in water do not create aerosols. The threshold value is set to 50 ppm based on licensing data that Nordic Ecolabelling has received regarding consumer spray products. The allergens found in sprays are primarily found in the fragrances. Of these fragrances, those classified as sensitizing (R43 and/or R43) are generally found in concentrations between 5 to 100 ppm, and most commonly around 50 ppm. This requirement is therefore suitable to minimise the quantity of sensitizing substances to which the user is exposed.

Nordic Ecolabelling considers that there is strong justification for this requirement since hand dishwashing detergent comes into direct contact with the user's skin. The hands are subject to prolonged exposure making allergenic substances undesirable. The requirement contains a clarification that even fragrances from plant extracts are included in the definition.

Please note that nitro musks in fragrances are prohibited by requirement 7.

Note that Lilial (CAS 80-54-6) has the self-classification Rep3 with R62 and is therefore prohibited by this requirement. Since fragrances are added intentionally and since they fulfil a function, a trivial lower limit is not applicable for fragrances. Lilial cannot therefore be added to a product due to CMR requirement R3.

The exemption as to the level of allergens in refills has been added since some refills are concentrated to avoid the unnecessary transport of water. The requirement on these however is that the diluted in-use solution must have a level below 0.050% by weight (50 ppm).

The requirements should therefore be designed as follows:

a) The constituent substances that are added to the final product as fragrances must be manufactured and/or handled in accordance with the guidelines of the International Fragrance Association (IFRA). The manufacturer must follow the requirements stipulated by IFRA standards with respect to prohibited use, limited use and material purity.

b) Fragrances subject to declaration in accordance with Regulation (EC) No 648/2004 on detergents with amendments (see also Appendix 7) may not be present in concentrations greater than 100 ppm (>0.010%) per substance (n/a to spray products, see requirement d).

c) Fragrances that are classified as H317/R43 and/or H334/R42 must not be present at concentrations above 100 ppm (>0.010%) per substance (n/a to spray products, see requirement d).

d) Sprays: Fragrances subject to declaration in accordance with Regulation (EC) No 648/2004 on detergents with amendments (see also Appendix 7) and/or that are classified as H317/R43 and/or H334/H44 may not be present in concentrations greater than 50 ppm (>0.0050%) per substance.

*Refills for spray products may contain the aforementioned substances in concentrations up to 0.050% by weight (500 ppm) provided that the specified dilution means that the in-use solution has a concentration of 0.050% by weight (50 ppm) or lower.

☒ Duly completed and signed declaration from the manufacturer of the cleaning product that demonstrates that fragrances are handled and/or manufactured according to IFRA guidelines, as stipulated by requirement R10a. Appendix 3 and 4 can be used.

☒ Duly completed and signed declaration from the fragrance manufacturer as to the content of applicable fragrances (e.g. analysis certificate for the 26 allergens and information on substances classified as R42/H334 and/or R43/H317) and any plant extracts. Appendix 4 or equivalent may be used.

K11 Phosphorous

Phosphorous is one source of eutrophication. Phosphates used in farming are the primary cause of phosphates in the aquatic environment (EEZ, 2005). Phosphates in cleaning products are less significant, primarily since phosphates are effectively removed through sewage treatment. Generally, the emissions of phosphates from point sources such as waste water have dropped over the past 30 years. This is mainly due to improved waste water treatment in northern and Western Europe following the implementation of the Council Directive concerning urban waste water treatment (1991/271/EEC) (EØS 2005).

Regulation (EC) No 648/2004 on detergents has recently been reviewed and the use of phosphates discussed. A proposal (COM(2010) 597[3]) is to limit the use of phosphates and other phosphate compounds in household chemicals to 0.5% (phosphorous equivalent).

In Norway, national regulatory requirements[4] on phosphorous apply to chemical products such as cleaning agents. The restrictions mean that products may contain no more than 0.2% by weight of phosphorous. This requirement is however independent of the dosage required for use. Accordingly, highly concentrated products that require a low dose are penalised harder by the requirement.

[3] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0597:FIN:en:PDF

[4] Product Regulation nr 922 of 1 June 2004 relating to restrictions on the use of chemicals dangerous to health and the environment and other products (Original title: Forskrift om begrensninger i bruk m.m. av enkelte farlige kjemikalier)

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Phosphorous is not particularly common in cleaning agents but can be found in solid soap products. In those cases phosphorous is found in Nordic Ecolabelled products, the quantities are very small. The majority of cleaning products in places connected to a municipal waste water system. In the associated product group of hand dishwashing detergents, there is no need for phosphorous.

In addition, in recent years concerns have risen over the size of phosphorous reserves and phosphorous may become a limited resource in the future.

We therefore wish to prohibit phosphorous from use in Nordic Ecolabelled cleaning products with the exception of solid soap products.

The requirements should therefore be designed as follows:

The final product may not contain phosphorous. Phosphorous may not be actively added to an ingredient. This requirement refers to the total quantity of phosphorous, calculated as P.

Note that products sold in Norway must also be labelled "Uten fosfat" (phosphate free). Note also that solid soap products (e.g. soap flakes) may contain a maximum combined total of 0.06% EDTA and phosphonates.

☒ Duly completed and signed declarations that phosphorous cannot be found in the final product (Appendix 3 or equivalent) and is not actively added to ingredients (Appendix 4 or equivalent).

☒ For products to be sold in Norway, documentation must also be submitted to demonstrate that "Uten fosfat" (phosphate free) is displayed on the label.

R12 Microorganisms

The microorganisms used in cleaning products are living microorganisms. They are primarily used in product for professional use for cleaning floors, sanitary areas and drains. Microorganisms are used in some cleaning products since they extend the duration of the cleaning effect of the product and enable the product to continue to perform even post cleaning. The Nordic Ecolabel criteria for cleaning products do not cover drain cleaners.

Briefly, microorganisms are found in nature in the form of spores. These spores develop into active microorganisms in contact with organic material which they eat/decompose. This decomposition continues until there is no organic material remains. Some of the microorganisms then die and some return to spores. When new organic material is available, the microorganisms once again become active. The function of microorganisms in cleaning products is to decompose organic material on the surface that is being cleaned. For example this could be fats and proteins on a floor surface (personal correspondence with Innu Science and Novozymes). Decomposition continues until there is no more organic material to decompose. Some microorganisms return to spores and are reactivated when new organic material becomes available while some die. It is therefore necessary to add new microorganisms periodically to continue this decomposition (personal correspondence with Innu Science and Novozymes).

Cleaning products with microorganisms also contain other ingredients such as surfactants. Surfactants are necessary since there is a delay before the microorganisms take effect. Surfactants provide an immediate cleaning effect alongside mechanical cleaning. After that, the microorganisms take effect and decomposition products form on the surface and can be wiped off.

The primary advantage of products containing microorganisms is that the surface remains clean longer. They are also effective on surfaces that can otherwise be difficult to keep clean such as grouting between tiles. The long-term effect of microorganisms can reduce the need for heavy-duty/strong cleaning agents, which in the long-term can reduce the use of cleaning chemicals (personal communication with Innu Science and Novozymes).

Another advantage of these products is that the decomposition of organic material also removes bad odours. The need to mask such odours with fragrances is considerably reduced. Cleaning products containing bacteria can reduce bad odours since they reduce the growth of other microorganisms by decomposing the organic material on which these odour-forming microorganisms feed.

The most commonly used organisms are Bascillus Sp (personal correspondence with Innu Science), which are microorganisms found naturally throughout the world. I.e. these microorganisms are well known and well documented in various contexts. In contact with producers of microorganisms, Nordic Ecolabelling has learnt that the same or similar microorganisms as used in cleaning products are used in sewage works. The risks of these microorganisms are therefore low with regard to emissions to water. The quantities of microorganisms in the products are also low.

Risk Group 1
The microorganisms that Nordic Ecolabelling permits must be DNA identified and belong to Risk Group 1[5] according to Council Directive 2000/54/EC, i.e. non-harmful to human health. Risk Group 1 only includes microorganisms/bacteria that have been evaluated to ensure that they are not resistant to antibiotics and similar. Nordic Ecolabelling only permits microorganisms in Risk Group 1.

The Canadian ecolabel EcoLogoTM[6] has had criteria[7] since 2002 for products containing microorganisms. EcoLogo stipulates requirements on the number of colony forming units[8] (CFU), requires that bacteria are in Risk Group 1[9] and are DNA identified, and that the product does not contain E. Coli, Streptococci, Staphylococci, bacillus cereus or salmonella.

Professional products

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[5] Group 1: A biological agent that is most unlikely to cause human disease.
[6] www.ecologo.org
[7] CCD 110, Cleaning and degraseing compounds: biologically based, http://www.ecologo.org/en/seeourcriteria/details.asp?ccd_id=455
[8] http://www.moldbacteriaconsulting.com/colony-forming-units-cfu.html
[9] Council Directive 2000/54/EC, Group 1: A biological agent that is most unlikely to cause human disease.

Nordic Ecolabelling has chosen in this version of the criteria to limit the use of microorganisms to concentrated professional sanitary products. Professional users have more experience of cleaning products and different equipment from consumers. The limitation to sanitary products is to avoid the inclusion of specialist products such as drain cleaner, which are not covered by the product group (see Section 2 - Basic facts about the criteria). It is also in sanitary areas that these products have most potential since there is much organic material and since the products reduce bad odours without the use of fragrances.

DNA identification
In order to set requirements of the constituent microorganisms, these must be DNA identified. Knowing what microorganisms are in the product is essential.
A strain identification protocol shall be used for this purpose.
Identification can be performed using 16S ribosomal DAN sequencing or FAME (fatty acid methyl ester profile) which are described in the following references:

Test	Reference
16S ribosomal DNA sequencing	Applied and Environmental Microbiology, 67: 4520-4530 (2001) Applied and Environmental Microbiology, 71, 1178-1183 (2005)
FAME (fatty acid methyl ester)	Applied and Environmental Microbiology, 71, 1178-1183 (2005)

Antibiotic resistance
Nordic Ecolabelling has included particular requirements on antibiotic resistance since resistant bacteria are a problem at large in society.
There are many antibiotics on the market. The major types are aminoglycosides, macrolides, tetracyclines and fluoroquinolones. The requirement is the same as that found in EcoLogo's criteria for biologically based cleaning products.

GMO
The decision to prohibit GMO-based ingredients is founded on a precautionary principle. Since GMO-based ingredients can be used during microorganism production, there is a ban on these.

GMOs are a contentious issue and the cultivation of GMOs is prohibited in several countries. Issues include food safety, the use of agricultural land, a lack of knowledge regarding the effects of GMO crops on local agriculture and forests, and the risk of negative environmental and health effects. The WHO defines the risk of GMOs as follows: the risk that genetically modified organisms spread their genes to wild populations; the continued presence of GMO following harvest; the sensitivity of non-targeted organisms to GMO; threats to genetic stability; a decline in biodiversity; and an increase in the use of chemicals in agriculture

Pathogen species
The inclusion of pathogen bacteria is not desired. This is already strictly regulated by only permitting microorganisms belonging to Risk Group 1. However, Nordic Ecolabelling considers it important to exclude pathogen species such as E. coli, streptococcus (Enerococcus), staphylococcus aureus, bacillus cereus and salmonella. This is the same requirement as stipulated by EcoLogo (EcoLogo, CCD 110).
The test methods are taken from the manufacturers of biological products and ingredients (personal communication with Innu Science and Novozymes).

Colony forming units
Colony forming units (CFU) refers to the individual colonies of bacteria, mould or yeast. CFU is a measure of how many colonies are found on a surface. This is evaluated by preparing a specimen that is spread evenly over an agar plate. This is then incubated at a suitable temperature and for a suitable period. The colonies that form are counted for a surface area or volume giving a measure of the number of colonies per kg, ml or similar (MBL, 2012).

The threshold for the number of CFU is based on data collected from the industry (personal communication with various manufacturers) and collaboration with EcoLogo. A limit value that there must be more than 1.0×10^4 CFU in the in-use solution ensures that the microorganisms are included to produce a noticeable effect and not merely for marketing. The limit value refers to the in-use solution and not the concentrated product since it is most relevant to consider the number of microorganisms in the solution that is used during cleaning.

Information on data sheet/label
So that is clear to the end user that a product contains microorganisms, this must be clearly state on the product's label and/or data sheet. This is so that the user can decide on where and how to use the product.

Performance
One of the advantages of products containing microorganisms is that offer a prolonged cleaning effect. To ensure that Nordic Ecolabelled products offer good cleaning performance, products containing microorganisms must comply with requirement R17 or R18 (as all other cleaning products) and demonstrate that the product breaks down starch, fat, oil and protein. This can be demonstrated through tests such as:

- Protein - degradation of solid or liquid medium or equivalent scientifically acknowledged method.

- Starch - degradation of solid or liquid medium or equivalent scientifically acknowledged method.

- Fat and/or vegetable oil - degradation of solid or liquid medium or equivalent scientifically acknowledged method.

Such tests are described by the following references:

Test	Method	Reference
Oil and grease degradation	Olive oil solid media	Journal of Bioscience and Bioengineering 107: 658–661 (2009)
Protein degradation	Casein solid media	Ann Microbiol 62:357–365 (2012) Bioresource Technol. 99: 7388–7392 (2008)
Starch degradation	Starch solid media	Microbial Cell Factories 10: 2-9 (2011) Bioresource Technology 99: 3071–3076 (2008)

The requirements should therefore be designed as follows:

a) The only products containing microorganisms to be eligible for Nordic Ecolabelling are professional concentrated sanitary products for dilution in water.

b) Only microorganisms that fulfil the following requirements may be included in the cleaning product:

- The microorganisms are found in Risk group 1 in Directive 2000/54/CE.
- The microorganisms' DNA is identified according to the strain identification protocol (using the 16S ribosomal DNA sequencing, FAME or equivalent method).
- Are not resistant to antibiotics (aminoglycosides, macrolides, beta lactam, tetracyclines and fluoroquinolones) according to the Beckman Dickinson BBL antimicrobial susceptibility disc method or equivalent method.
- Microorganisms must not be GMO.
- Microorganisms must not contain any of the following pathogen species when screened using the following or equivalent test methods:
    - E. Coli, test method ISO 16649-3:2005
    - Streptococcus (Enterococcus), test method ISO 21528-1:2004
    - Staphylococcus aureus, test method ISO 6888-1
    - Bacillus cereus, test method ISO 7932:2004 or ISO 21871
    - Salmonella, test method ISO6579:2002 or ISO 19250

c) Colony forming units (CFU) > 1,0 x 10^4 microorganisms per ml in-use solution.

d) The product must clearly display that it contains microorganisms through its label/product sheet or other marketing material.

e) Products containing microorganisms shall display superior cleaning performance beyond the general cleaning requirements of R17 and R18. It must be demonstrated that the cleaning product causes degradation of the following:

- Protein - degradation of solid or liquid medium or equivalent scientifically acknowledged method.
- Starch - degradation of solid or liquid medium or equivalent scientifically acknowledged method.
- Fat and/or vegetable oil - degradation of solid or liquid medium or equivalent scientifically acknowledged method.

Analysis shall be performed by a laboratory fulfilling the requirements of Appendix 2.

✉ Documentation demonstrating that the microorganisms are classified as Risk Group 1.

✉ Documented DNA identification.

✉ Test results demonstrating that the microorganisms are not resistant to antibiotics, do not include the aforementioned pathogenic strains and are not GMO.

✉ Documentation of colony forming units per ml in-use solution.

✉ Performance test demonstrating the ability to dissolve protein, start, fat and oil.

✉ Product label and marketing material showing that that product is designed for professional use as a sanitary cleaner. The label/marketing material must clearly state that the product contains microorganisms.

1.3 Ecotoxicity and biodegradability

R13 Long-term environmental effects

Substances that are classified as environmentally hazardous are permitted in limited quantities in hand dishwashing detergents. Persistent substances may cause environmental problems now or in the future. The impact can be particularly serious if the substance is also acutely toxic. Limits on the use of substances with these undesired properties reduce the risk of environmental damage. The environmental characteristics of the constituent substances in hand dishwashing detergent are particularly important since hand dishwashing detergent is used extensively in locations lacking a connection to a central sewage system. Accordingly, the maximum content of environmentally hazardous substances with the following risk phrases is limited.

- R50/53 (Very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.)
- R51/53 (Toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.)
- R52/53 (Harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment.)

Or

- H410 Hazardous for the aquatic environment. Category: Chronic 1
- H411 Hazardous for the aquatic environment. Category: Chronic 2
- H413 Hazardous for the aquatic environment. Category: Chronic 3

By weighting the parameters, substances classified as R50/53 are restricted the most. The level is in line with the limit for consumer laundry detergent.

The weighting in the formula below is linked to the classification limits for each classification. There was a need to improve the how these different environmental classifications were totalled through the use of a weighting system to better reflect the actual environmental impact. I.e. it is viable to permit more of a less environmentally hazardous substance than of a more hazardous substance. The weighting in the requirement is the same as the Nordic Ecolabel criteria for chemical products.

The relationship between the different classifications is shown in the table below (KIFS 2005:7):

Table 4.1. Simplified summary of the relationship between different environmental classifications.

	Classification of the preparation		
Classification of substance	**N; R50/53**	**N; R51/53**	**N; R52/53**
N; R50/53	Conc. ≥ 25%*	2.5% ≤ Conc. < 25%*	0.25% ≤ Conc. < 2,5%*
N; R51/53		Conc. ≥ 25%	2.5% ≤ Conc. < 25%
N; R52/53			Conc. ≥ 25%

**This is somewhat simplified since KIFS 2005:7 also takes the toxicity of constituent substances into account.*

To make the weighting formula more similar to the classification, the possibility has been discussed to divide the classification R50/53 into several sub-categories depending on the toxicity classification of the substances. But since such information is seldom available and the quantities are small of these substances, which are already tightly restricted, Nordic Ecolabelling has decided following the review to keep the weighting as above. This may be reviewed in the future if better data is available.

The threshold values for each category are based on licence data received by Nordic Ecolabelling. The majority of substances that are classified as dangerous to the environment are found in fragrances but also in preservatives. Since it is not permitted in this version of the criteria for professional products to contain fragrances, the quantity of environmentally hazardous substances in professional products will be considerably lower than in consumer products. The limits for all categories have been tightened in comparison to the previous version since Nordic Ecolabelling wishes to reduce the levels of these substances and since this is also one way to reduce the quantities of fragrances that are used.

The requirements should therefore be designed as follows:

Substances that are classified as environmentally hazardous are only permitted in limited quantities in the product, as specified below.

The inclusion of substances that are toxic to the aquatic environment and that are not readily biodegradable in the aquatic environment, i.e. substances assigned the risk phrases R50/53 (H410), R51/53 (H411) and R52/53 (H412), is limited as follows:

Requirement: $FV = 100 * C_{R50/53} + 10 * C_{R51/53} + C_{R52/53}$ in gram / litre in-use solution

or

Requirement: FV (factor value) $= 100 * C_{H410} + 10 * C_{H411} + C_{H412}$ in gram / litre in-use solution

The threshold value must be within the limit values for each category:

Table 3 Environmentally hazardous substances

Market	Category	Maximum values (g/l in-use solution)
Consumer	Concentrated products	0,020
Consumer	Ready-To-Use -produkter - WC	0,50
Consumer	Ready-To-Use –products – other areas	0,30
Consumer and Professional	Ready-To-Use –products - windows	0,30
Professional	Concentrated products	0,0020
Professional	Ready-To-Use –products, WC	0,10
Professional	Ready-To-Use –products, other areas	0,10

Where:

FV = Factor value

$C_{R50/53 / H410}$ = concentration of substances classified as R50/53 or H410 in gram/litre in-use solution

$C_{R51/53/ H411}$ = concentration of substances classified as R51/53 or H411 in gram/litre in-use solution

$C_{R52/53/ H412}$ = concentration of substances classified as R52/53 or H412 in gram/litre in-use solution

If no details of a substance's environmental properties are available it is considered a "worst case" environmental hazard with classification R50/53 (H410).

☒ Summary of the product's content in percentage by weight of substances classified as R50/53 (H410), R51/53 (H411) and R52/53 (H412). Appendix 3 for the product and Appendix 4 for ingredients, or equivalent, can be used to document the content of the specified substances.

☒ Calculations according to the specified formula demonstrating the fulfilment of the requirement.

☒ Safety data sheet for each constituent ingredient specifying its environmental hazard (acute aquatic toxicity, biodegradability and/or bioaccumulating characteristics) as for R2.

K14 The critical dilution volume (CDV)

CDV is a theoretical value that takes into regard each substance's toxicity and biodegradability. This method has been developed together with EU Ecolabelling. A maximum limit on CDV ensures that Nordic Ecolabelled products have minimal impact on the recipient.

The critical dilution volume (CDV) shall be calculated for all chemicals contained in the cleaning product. This includes all actively added substances and impurities in ingredients if these constitute more than 1% of the ingredient, i.e. shall be included in the CDV calculation.
If the product contains microorganisms, these shall be counted as enzymes, i.e. as DID no. 141.

The CDV limit is only specified with chronic values. Pervious versions of the Nordic Ecolabel criteria allowed applicants to chose between acute and chronic data. In general, the use of chronic data is preferred since the long-term values are considered more accurate and give a more precise/reliable estimate of the potential environmental effects than acute toxicity data.
In future criteria for chemical products, Nordic Ecolabelling will shift towards stipulating requirements on $CDV_{chronic}$ alone. The DID list is being updated concurrently with the revision of the criteria for cleaning products. It is hoped that more chronic data will be included in the new version. Nordic Ecolabelling has therefore chosen only to set threshold values for chronic data in this version of the criteria.

The new CDV limits are based on licence data that Nordic Ecolabelling has collected. The CDV requirement has been tightened for all categories in comparison to version 4 of the criteria. The product categories are slightly different than in version 4 to make the document simpler and so that the categories are the same under each requirement.

The requirements should therefore be designed as follows:
The critical dilution volume (CDVchronic) shall be calculated for all chemicals contained in the hand dishwashing agent. CDV is a theoretical value that takes into regard each substance's toxicity and biodegradability.

The product's critical dilution volume is calculated at the recommended dosage that is stated on the packaging.

The product's CDV must not exceed the following limit values for $CDV_{chronic}$:

Table 4: Threshold values CDVchromnic.

Category	CDVchronic
Concentatrated, consumer	10500
RTU WC, consumer*	600000
RTU other, consumer	700000
RTU fönster, consumer and professional	75000
Concentrated professional	9500
RTU WC, professional*	700000
RTU, professional	450000

*The water in the toilet is not included as a part of the in-use solution.

CDV is calculated using the formulas shown below. CDV must be calculated for all substances in the product:

$CDV_{acute} = \sum CDVi = \sum (dosei \times DFi \times 1000 / TF_{acute})$, or

$CDV_{chronic} = \sum CDVi = \sum (dosei \times DFi \times 1000 / TF_{chronic})$

dosei = the ingoing quantity of the individual substance i (gram / liter in-use solution)

DFi = degradation factor for substance i as shown on the DID-list

TF_{acute} = acute toxicity factor as shown in the DID-list

$TF_{chronic}$ = chronic toxicity factor as shown in the DID-list

☒ Calculation of $CDV_{chronic}$ for the product.

☒ Reference to the DID-list, dated 2007 or later. If the substance is not contained in the DID-list, the parameters must be calculated using the guidelines contained in part B of the DID-list and the associated documentation must be enclosed.

K15 Content of aerobic and/or anaerobic non-biodegradable organic material

A general requirement on aerobic non-biodegradable and anaerobic non-biodegradable substances reduces the levels of non-biodegradable substances to a minimum for cleaning products. The requirement on the biodegradability of organic substances means that ecolabelled products overall offer a good biodegradability profile and reduce the accumulation of persistent substances in sewage sludge and other environments.

Sludge is sometimes used as a fertilizer making it vital that the content of persistent substances is minimised.

Examples of substances often used in cleaning products that are aerobic non-biodegradable (aNBO): fragrances, phosphonates, EDTA, some thickeners, polymers and colouring agents.

Examples of substances often used in cleaning products that are anaerobic non-biodegradable (anNBO): some surfactants (e.g. sulphonated anion surfactants), phosphonates, fragrances and colouring agents.

Organic substances offering poor biodegradability remain in the environment for longer, thus increasing the risk of harm to the environment. Ready biodegradability is therefore desired under aerobic and anaerobic conditions.

A combination of requirements on the quantity of aerobic non-biodegradable organic substances, anaerobic non-biodegradable organic substances and CDV ensures that the total quantity of non-biodegradable substances and/or toxic substances is limited but nonetheless offering flexibility with regard to the formulation of the product.

The requirement limits for aNBO and anNBO have been tightened compared to version 4 of the criteria. The categories under both requirements are now the same and the requirements have been merged.

The new threshold values are based on data that Nordic Ecolabelling has on previously licensed products.

The requirements should therefore be designed as follows:
The product's total content of aerobic (aNBO) and/or anaerobic (anNBO) non-biodegradable organic materials must not exceed the limits stated below per litre of in-use solution.

aNBO and anNBO values are calculated for all organic substances in the detergent.

Note that all surfactants must degrade either aerobically or anaerobically in accordance with R16.

Table 5. Threshold values for aNBO and anNBO

	aNBO (g/litre in-use solution)	anNBO (g/liter in-use solution)
Concentrated, consumer	0,100	0,100
RTU WC, consumer*	2,10	6,00
RTU other, consumer	2,00	2,00
RTU window, consumer and professional	2,00	2,00
Concentrated professional	0,045	0,250
RTU WC, professional*	2,25	30,0
RTU, professional	0,70	0,70

Note that the following exceptions apply:

- Cumensulphonate (DID 139) – the data on the DID list does not agree with that published under the HERA project. The following data on cumensulphonates can be used for application: aNBO = R and DF = 0.05. Since BCF = 1.41 and logKow = -2.7, cumensulphonates can in accordance with Appendix 2 be exempted from the calculation of anNBO.
- Iminodisuccinate (DID 148) can be excluded from the calculation of anNBO.

✉ Calculation of aNBO and anNBO for the product.

✉ Reference to the DID-list, dated 2007 or later. If the substance is not contained in the DID-list, the parameters must be calculated using the guidelines contained in part B of the DID-list and the associated documentation must be enclosed.

R16 Surfactants – aerobic and anaerobic biodegradability

Surfactants are widely used in hand dishwashing detergents. Since hand dishwashing detergents are used both in areas that are and that are not connected to a district sewage system, it is relevant to set requirements as to the biodegradability of surfactants.

Persistent substances accumulate in the environment. These may present a present and future risk if they are acutely toxic. Knowledge regarding the long-term effects of persistent substances is often lacking. Ready biodegradability under aerobic and anaerobic conditions is therefore of great environmental significance. Surfactants are considered central in this context since they represent a group of organic compounds that are found in relatively large quantities. Also, many surfactants are toxic to aquatic organisms. The Detergents Regulation stipulates that surfactants must be aerobically biodegradable. That a product is available on the market does not necessarily mean it complies with legislation. There are also exemptions from this legislation for professional products. Article 4, item 2 in the Detergents Regulation states the following: "*If a detergent contains surfactants for which the level of ultimate aerobic biodegradation is lower than that stipulated in Annex III, manufacturers of industrial or institutional detergents containing surfactants, and/or of surfactants for industrial or institutional detergents, may ask for derogation. Requests for derogation shall be made and decided in accordance with Articles 5, 6 and 9.*"
Nordic Ecolabelling considers that there is still relevance in requiring that the surfactants in a hand dishwashing detergent are biodegradable under both aerobic and anaerobic conditions.
All surfactants (irrespective of function) must be readily biodegradable and anaerobically biodegradable.

In the most recent version of the EU Ecolabel criteria for hand dishwashing detergent, the requirement that all surfactants must be biodegradable under anaerobic conditions has been removed. Instead, there is a limit on the total quantity of organic substances that are not biodegradable under anaerobic conditions. Nordic Ecolabelling does not that consider the environmental benefits justify removing this requirement on anaerobic biodegradability but has chosen to retain this requirement.

Anaerobic non-biodegradable surfactants can accumulate in sewage sludge, which in some countries is used in agriculture. This is undesirable.

All surfactants (irrespective of function) must be readily biodegradable and anaerobically biodegradable. Surfactants that do not have a cleaning effect, such as foam inhibitors, are uncommon in this product group.

Linear alkylbenzene sulphonates (LAS) Linear alkylbenzene sulphonates (LAS) are toxic to aquatic organisms and are not degradable in an anaerobic environment. LAS is a surfactant and prohibited by the requirement on non-anaerobic biodegradable surfactants (R16). Nordic Ecolabelling has removed LAS from the list of undesirable substance. LAS is already prohibited since it is anaerobic non-biodegradable.

APEO and APDAlkylphenolethoxylates (**APEO**) or alkylphenol derivatives (**APD**) are agroup of persistent surfactants that have displayed endocrine disruptive characteristics. The substances are being phased out from the majority of products through legislation. These are explicitly prohibited by requirement R6.

EU Ecolabel
In the most recent version of the EU Ecolabel criteria for cleaning products, the requirement that all surfactants must be biodegradable under anaerobic conditions has been removed. Instead, there is a limit on the total quantity of surfactant substances that are not biodegradable under anaerobic conditions. Nordic Ecolabelling does not that consider the environmental benefits justify removing this requirement on anaerobic biodegradability but has chosen to retain this requirement.

The requirement should therefore be designed as follows:

a) All surfactants must be readily aerobically biodegradable.

b) All surfactants must be anaerobically biodegradable

- ✉ Reference to the DID list dated 2007 or later.
- ✉ If the DID list does not contain relevant data, data can be taken from the material safety data sheets provided that the data are reliable and that test methods comply with Appendix 2. Section B of the DID list shows how the various factors are calculated. It is also permitted to refer to analogous arguments as long as these are carried out by a competent third party. It is also permitted to refer to relevant literature that has been scientifically evaluated.

R17 Performance test – Laboratory test
R18 Performance test – User test (professional products only)

The performance test is primarily a quality requirement to ensure a satisfactory result of cleaning at the specified dosage of the ecolabelled product. A product that is effective at the dosage recommended on the label reduces the risk of overdosing since

the user experiences that the product is effective and does not need to use more than recommended.

This requirement stipulates that the product must equal or better the performance of a reference product. Professional products can be tested using a laboratory test (R17) or user test (R18). Consumer products must be tested by a laboratory. One reason is since Nordic Ecolabelling has not seen any significant demand for the use of the user test in connection with consumer products and since professional users have more experience as they use such products daily. I.e. a test performed by a professional user provides more information than that performed by a consumer.

The test instructions for both the laboratory and user test have been updated in this revision of the criteria. They are now clearer and require that the effectiveness of the product is documented more clearly. This update has been performed with input from the trade.

The laboratory test means that the test product (the product that is the subject of the licence application) is tested under laboratory conditions against a reference product. The reference product shall be in the same product category and have the same area of use as the test product. For example, a concentrated floor cleaning product for consumer use shall be tested against a concentrated consumer floor cleaning product and not a kitchen spray. The reference product shall be well established/known on the market. Nordic Ecolabelling does not have a specific list of reference products since there is such a wide range of cleaning products. Such a list would be very long and very difficult to maintain.

The test product must be equally or more effective than the reference product and more effective than water in order to pass the performance test. I.e. the tested cleaning product must clean better than water alone.

The appendices associated with the laboratory test have been updated for clarity. The appendix now also specifies that the product must clean better than water alone.

Requirements regarding the laboratory itself are described in Appendix 2 of the criteria. The laboratory must fulfil the general requirements of standard EN ISO 17025 or be an official GLP approved laboratory.

The applicant's own analysis laboratory/test procedure may be approved for the performance test if:

- The manufacturer has a quality management system encompassing sampling and analysis and has been certified to ISO 9000.
- The test method for performance test is part of the quality system.
- Nordic Ecolabelling shall have access to all raw data from performance testing.

The user test means that the product is distributed along with a questionnaire (Appendix 5a-c of the criteria) to a selection of test individuals/companies. The product is tested at least five times at each location. The tester compares the performance of the test product with that of the product they normally use (test product). The reference product shall belong to the same product category and be intended for the same area of use. The tester shall then evaluated effectiveness based on the following parameters:

- Ability to remove soil.
- Gentleness to the surface being cleaned.
- Performance

For a positive test result, 80% of the test individuals must respond that the product is equally or more effective than the reference product.

The appendices regarding the user test have been clarified and a new appendix has been added for window and glass cleaning products. The appendices also state that only professional products are eligible for the user test. Professional users have more experienced through their profession of cleaning making such testing more relevant. During the revision, it was proposed to industry stakeholders that professional users could also test consumer products. This was however not seen as suitable.

The test stipulated by the EU Ecolabel for all-purpose cleaner and sanitary cleaner products was updated during 2010/2011 and new criteria were published 28 June 2011. Version 4 of the Nordic Ecolabel criteria approved the previous version of the EU Ecolabels performance test. This version of the Nordic Ecolabel criteria approves tests performed according to the EU Ecolabel test instructions of 28 June 2011.

The requirement texts of both tests (laboratory and user test) have been clarified.

The requirement should therefore be designed as follows:

R17 Performance test – Laboratory test

a) The product must through laboratory testing demonstrate equal or superior cleaning performance to a reference product within the same product category. The product must also clean better than water alone.

   If the product is marketed for both professional and consumer use it shall be tested against a professional product.

   The test shall demonstrate the ability to remove soil in accordance with the method described in Appendix 6.
   The test shall be performed by a laboratory complying with Appendix 2 (item 1B).

b) If the product is tested in accordance with the EU Ecolabel's test for all-purpose cleaners and sanitary cleaners (Commission decision of 28 June 2011 or later version), this laboratory test can be used.

✉ Alternative a: Test report containing data on dosage, selection of reference product, description of the test method, description of the soil and soil preparation, selection of surfaces, calculation of EFF (performance index) in accordance with Appendix 6. The report shall demonstrate that the product is equal to or better than the reference product and better than water.

✉ Alternative a: Documentation on the test laboratory demonstrating compliance with Appendix 2 (item 1B).

✉ Alternative b: Description of how the EU Ecolabel test has been performed and complete results from the test.

R18 Performance test – User test (professional products only)

a) The product must demonstrate cleaning performance that is equal to or better than a reference product within the same product category in 80% of tests.

The performance of the product shall be judged in three areas:

- Ability to remove soil in comparison to the reference product.
- Abrasion to the cleaned surface in comparison to the reference product.
- Effectiveness in comparison to the reference product.

The tests shall be performed by at least five users. All users/testers shall complete Appendix 5 (a, b or c, depending on the product category). The applicant shall collate the results according to Appendix 5d.

b) If the product is tested in accordance with the EU Ecolabel's test for all-purpose cleaners and sanitary cleaners (Commission decision of 28 June 2011 or later version), this user test can be used.

✉ Description of how the test is performed.

✉ All fully completed questionnaires (Appendix 5a, b or c) and a summary of responses (Appendix 5d).

✉ Description of how the EU Ecolabel test has been performed and complete results from the test.

3 Packaging

R19 Packaging - plastic

PVC is sometimes used in labels and packaging. PVC is prohibited from use in ecolabelled products since it has adverse environmental effects in the waste disposal phase and contains substances with undesirable health effects. When incinerated waste includes PVC, the level of chlorine increases. Chlorine is one condition for the formation of very toxic dioxins in the flue gasses. There are several other sources of chlorine other than PVC. The incineration of PVC does not necessarily increase the quantity of dioxins since chlorine is not the limiting factor for the formation of dioxins at incinerations plants (Hjelmar, 2002), (Erichsen & Hauschild, 2000). The additional PVC will however increase the quantity of acidic flue gasses and increase the need for purification, thus increasing the waste formed by flue gas purification. The combustion of 1 kg PVC can create up to 1.7 kg salts from flue gas purification (Hjelmar, 2002). This figure is however not particularly relevant in this context since the use of cadmium in PVC is no longer permitted (Hjelmar, 2002) and due to the requirements we place on products produced following this ban. Lead compounds are often used as stabilisers in PVC (MST, 2000) and this can also be considered a potential problem for heath and the environment.

In Denmark, waste contain PVC must be sorted into a separate fraction.

Requirement text:

Plastic packaging and labels containing PVC or plastic based on other types of chlorinated materials must not be used.

✉ Data sheet or declaration specifying the plastics that are used. Appendix 3 or equivalent declaration may be used.

R20 DIN labelling

Plastic materials shall be labelled according to DIN 6120 part 2, ISO 11469:2000 or equivalent to facilitate sorting in connection with the recycling of plastics at the end of the product's service life. In addition, this labelling can demonstrate that the product does not contain PVC. This sends a message tot he customer and provides Nordic Ecolabelling increased control.

Requirement text:

To facilitate identification for recycling, plastic bottles that are used as packaging must be marked in accordance with DIN 6120, section 2, ISO 11469:2000 or equivalent standard. Stoppers, bottle caps and pumps are exempt from this requirement.

✉ Documentation of primary packaging demonstrating that marking complies with DIN 6120 or equivalent marking regulations. Images of the product marking or data sheet specifying the marking. Marking may also be specified on the submitted label.

R21Weight-utility ratio (WUR)

Wight-utility ratio (WUR) is a parameter that aims to reduce the amount of packaging and promote the use of recycled materials. WUR is a measure of the amount of packaging that is used to deliver a quantity of the product with a predetermined benefit. This limitation promotes concentrated products by relating the quantity of packaging to the number of doses.

Nordic Ecolabelling has chosen to not to set requirements related to the primary packaging for two reasons: Controllability over transport packaging is limited and it penalises producers with small production volumes unnecessarily hard.

Further, it is by optimising the primary packaging that the most significant environmental benefits can be gained for products such as cleaning products.

Primary packaging includes the weight of the packaging that contains the hand dishwashing detergent. This includes the label, bottle top/cap and possible dispenser.

The requirement limit is based on Nordic Ecolabelling's experience of licensing both professional and consumer products.

Nordic Ecolabelling aims for the WUR requirement to disqualify extravagant bottle designs without prohibiting small bottles for concentrated products.

In previous criteria versions, plastic has been given the value t=20 in the WBR calculation. In this version, the figure has been changed in the same way as the EU Ecolabel, i.e. t=1 if there is documented evidence that the packaging is reused. This can be demonstrated with sales figures for refills in comparison to the original packaging.

It is difficult to influence consumers on the Nordic market to buy refills, particularly for spray products. Many grocery stores are unwilling to give shelf space to refills. In the previous version of the criteria, the applicant estimated how many refills were sold per original packaging to demonstrate fulfilment of the WBR requirement. However, since few stores stock refills for all products, this estimation seldom reflected real life. Nordic Ecolabelling has in this version therefore changed the limit value for RTU products, such as sprays, so that the requirement can be met without requiring refills so long as the packaging is not heavy or bulky. The new limit value for RTU products is now 200 g of packaging per litre of in-use solution.

Manufacturers that can demonstrate that refills are sold can of course include these. Nordic Ecolabelling wishes in that case for documentation/market statistics that support this.

The following requirement is therefore proposed:

WUR is a measure of the amount of packaging that is used to deliver a quantity of the product with a predetermined benefit.

The weight utility ratio (gram packaging/litre solution) of the primary packaging is as follows:

$WUR_{RTU} = \sum ((Wi + Ui) / (Di * t)) \leq 200{,}0$ gram packaging / litre in-use solution

$WUR_{CONCENTRATED} = \sum ((Wi + Ui) / (Di * t)) \leq 1{,}20$ gram packaging / litre in-use solution

W_i = Weight of the primary packaging component (i) in grams including cap, dispenser or similar.

N_i = weight (g) of non-recycled (virgin) material in packaging component (i) in gram.

If the proportion of recycled material in the packaging component is 0%, $N_i = W_i$.

> *Packaging is considered postconsumer recycled if the raw materials are recovered from distribution and/or following use by consumers. If the raw material is industrial waste from the material or packaging manufacturer's own production, the material is not considered postconsumer recycled.*

Di = Number of doses in the primary packaging component (i), For ready to use products, Di = product volume (in litres).

ti = Reuse factor. I.e. the number of times that the packaging component (i) is reused.

t = 1 if the packaging is not reused for the same function (disposable packaging).

t > 1 may only be used if supported by documentation demonstrating that the packaging is reused for the same function.

> *The limit value applies to the total of the original packaging and any refill packaging.*

- ✉ Declaration/documentation from the packaging manufacturer regarding material type and mass of packaging components (e.g. lid, spray nozzle, bottle and label).
- ✉ Calculation of the weight-to-benefit ratio (WBR) and documentation regarding reuse of the packaging, if applicable.
- ✉ Declaration from the packaging manufacture regarding the content of recycled materials (if recycled materials are used).
- ✉ If t > 1 : documentation demonstrating how many times the packaging is reused for the same function (sales statistics or equal documentation).

R22 Take-back system

The take back of packaging is an important phase in the material cycle. Some Nordic countries have well-managed recycling systems for used packaging. Nordic Ecolabelling wishes to support such to increase the recycling of packaging.

The following requirement is therefore proposed:
Pertinent national regulations, legislation and/or agreements within the sector regarding the recycling systems for products and packaging shall be met in the Nordic countries in which the company markets its hand dishwashing detergent (such as PYR, REPA, Grön Punkt).

- ✉ Copies of agreements from the applicant demonstrating adherence to existing recycling/take-back agreements for each Nordic country where the product is to be sold. Appendix 3 or equivalent declaration may be used.

R23 Information text and use instruction

The dosage of cleaning products is an important parameter to prevent overdosing. Overdosing produces significant environmental impact through the unnecessary emission of chemicals.

The requirement means that the product must provide clear usage instructions. Products that are diluted prior to use must clearly state on the label and/or product sheet how they are to be diluted.

Products sold in Norway must also fulfil the national requirement on phosphorous and stat “Uten fosfat” (phosphate free) on the label according to requirement R11.

The requirement on packaging designed to prevent contact with professional products that are classified as R20, R21 and/or R22 is now incorporated under requirement R3. Similarly, requirement R1 stipulates that the product category and are of use of the product must be stated.

The following requirement is therefore proposed:

- The information text on the packaging must comply with the regulation 648/2004/EC and 907/2006/EC on detergents.
- Clear user instruction as to use of the product.
- Clear instruction regarding area of application

- If the product requires dilution before use, the recommended dose at a normal level of soiling/normal use must be stated clearly on the packaging.
- In the case of consumer products, for example, the dose may be shown as x number of ml equivalent to y capsful per z number litres of water.
- In the case of products intended for use by professional users, the dose may be specified as, for example, x number of ml equivalent to y strokes of the pump or number of lines on the dosing equipment per z litres of water.
- For products to be sold in Norway, documentation must also be submitted to demonstrate that "Uten fosfat" (phosphate free) is displayed on the label.

✉ Label, draft of the label or copy of the information (information text and user instructions) on the primary packaging and/or technical product data sheet. The information on the label and/or product data sheet shall be provided in the local language.

4 Quality and regulatory requirements

To ensure that the product fulfils Nordic Ecolabel criteria throughout the validity period of the licence, Nordic Ecolabelling stipulates requirements on the quality procedures of the licensee and possible suppliers. To ensure that the Nordic Ecolabel is only awarded to operations that observe pertinent legislation, it is also required that the licensee is not in dispute with the authorities.

R24 Laws and regulations

This requirement ensures that the holder of an ecolabelling licence is responsible for following safety, working environment and labour legislation as well as the terms and concessions applying at the production facility during production of the ecolabelled product.

These requirements are included to ensure that the requirements of the ecolabelling criteria are upheld during the period of the licence.

The following requirement is therefore proposed:
The licence holder must ensure that the applicable provisions governing safety, the working environment, environmental legislation and plant-specific conditions/licences are observed at all plants producing the Nordic Ecolabelled products and for all Nordic Ecolabelled products.

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

R25 Responsibility for the Nordic Ecolabel requirements

Applicants must provide a clear description (such as an organisational chart) that shows who is responsible for the observance of Nordic Ecolabel requirements and who is the contact person with Nordic Ecolabelling. This is to ensure that Nordic Ecolabelling is informed of changes and problems.

Requirement text:

The company shall appoint a contact person responsible for ensuring the fulfilment of Nordic Ecolabel requirements.

✉ A chart of the company's organizational structure detailing the responsible contacts.

R26 Documentation

The licence applicant must save a copy of the submitted documentation for reference and so that the documentation is available to personnel during the licence period. This documentation must be made available to Nordic Ecolabelling on inspection visits.

Requirement text:

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).

On-site inspection.

R27 Quality of the cleaning product

The quality of cleaning product is important. The licensee must have procedures in place that assure that Nordic Ecolabelled cleaning product maintains the quality it had at the time of application throughout the licence period.
Procedures controlling how claims are registered and handled are important tools in maintaining the quality of the product.

Requirement text:

The licensee must guarantee the quality during production of the Nordic Ecolabelled cleaning product for the validity period of the licence.

✉ Procedures for collating and, where necessary, dealing with claims and complaints regarding the quality of the Nordic Ecolabelled hand dishwashing detergent.

R28 Planned changed and unplanned non-conformities

A Nordic Ecolabelled cleaning product is ecolabelled provided that the formulation is approved by Nordic Ecolabelling. All changes must therefore be reviewed and evaluated by Nordic Ecolabelling before they are introduced in the product. The licensee must have procedures in place that ensure that Nordic Ecolabelling is informed of planned changes that have a bearing on the requirements.

Unplanned nonconformities that influence the Nordic Ecolabelled product must be reported to Nordic Ecolabelling. Procedures to ensure this must be implemented at the production plant.

Requirement text:

Written notice must be given to Nordic Ecolabelling of planned changes and unforeseen nonconformities that have a bearing on Swan requirements.

✉ Procedures detailing how planned changes and unplanned non-conformities are handled and how Nordic Ecolabelling will be informed.

R29 Traceability

Procedures regarding traceability are important when processing claims related to the Nordic Ecolabelled product. It shall be possible to trace from the finished product back to the constituent ingredients. In case of production problems, a traceability system shall ensure that all raw materials in the Nordic Ecolabelled product are the same as at the time of application and included in the correct quantities.

Requirement text:

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

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

5 Marketing

The Nordic Ecolabel is a very well-known and well-reputed trademark in the Nordic region. A Nordic Ecolabelled cleaning product may be marketed using the Nordic Ecolabel as long as the associated licence is valid.

The label must be positioned so that there is no doubt as to what the label refers to and so that it is clear that the cleaning product is ecolabelled.
More information on marketing can be found in "Regulations for Nordic Ecolabelling" of 22 June 2011 or later version.

The following requirements are therefore proposed:

R30 Marketing

Nordic Ecolabelled cleaning products must be marked in accordance with the ”Rules on the Nordic Ecolabelling”, version 22 June 2011 or later. Products may not be marked for other areas of use then covered by the criteria document when applying.

✉ Completed and signed Appendix 1.

Appendices
The appendices contain the following additional text:

This declaration is based on best knowledge at the time of application. With reservations for developments and new scientific findings. If such new knowledge should be made available, the undersigned is required to submit an updated declaration to Nordic Ecolabelling.

This text has been included so that, for example, chemical manufacturers can sign the appendix based on best knowledge.

5 Changes compared to previous versions

The most important changes compared to version 4:

- Changed limit values for CDV (R15) and biodegradability (R14). The sole use of chronic data for CDV calculations.
- New limit value for weight-to-benefit ratio (WBR) for ready-to-use products.
- Prohibition on phosphorous (R11).
- Prohibition on fragrances in professional products (R9). We wish for specific and well-founded comments regarding possible subgroups where a small quantity of fragrance should be permitted.
- New limit values for substances that are not readily aerobic or anaerobic biodegradable (R15).
- Changed calculations and changed limits for environmentally hazardous substances (R13).

Table 6.1. Summary of major changes from version 4 to 5.

Requirement	Version 4	Version 5
Definition of the product group		Clarification and grouping in sub categories
Classification (product and constituent substances)	Dangerous Substances Directive 67/548/EEC	Dangerous Substances Directive 67/548/EEC and CLP Regulation 1272/2008
Allergenic substances		Requirements for sprays tightened: Spray products: Fragrances in the final product, see requirement R10 on fragrances. The product must not contain any sensitising preservatives.
Prohibited substances		Links updated and addition of: Substances of very high concern Nitromusks (previously a separate requirement) vPvB and PBT substances
Preservatives		Additional requirement regarding challenge test or similar to ensure optimised concentrations.
Fragrances in professional products	Permitted	Prohibited
Phosphorous	Permitted	Prohibited
Microorganisms	Not included in the product group	Included with limitations
CDV	Option between acute and chronic values	Only chronic values. New grouping of categories and new threshold values.
aNBO, anNBO		New grouping of categories and new threshold values.
Environmentally hazardous substances	Requirement on R50/53 in g/l in-use solution, and R51/53 and R52 in g/l in-use solution	Weighted formula: FV = 100 *A R50/53 + 10* A R51/53 + A R52/53 in g/l in-use solution
Performance test: Lab test and user test	Performance test: Lab test and user test	Clarification of the tests. User test permitted for professional products only.
WBR (Return number)	Return number t=20 for plastic packaging	t = 1 if the packaging is not reused for the same function (disposable packaging). t > 1 may only be used if supported by documentation demonstrating that the packaging is reused for the same function.
WBR (recycled plastic)	-	*Packaging is considered postconsumer recycled if the raw materials are recovered from distribution and/or following use by consumers. If the raw material is industrial waste from the material or packaging manufacturer's*

		own production, the material is not considered postconsumer recycled.

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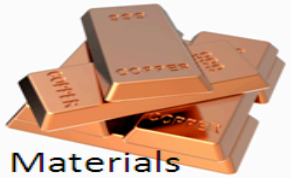
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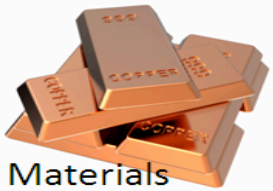
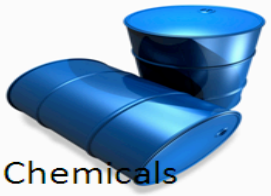
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Bilaga 1a-MEKA för koncentrerade rengöringsmedel

MECO/MEKA: **Cleaning agents products for consumer and professional use.** **Functional unit:** **1 wash = 10 liter of water**					
 Materials	Extraction and refining and synthesis from petrochemical raw materials (oil/gas) Growing, harvesting and refining of biobased raw materials (palm kernel oil, forestry (cardboard), etc) Use of land area and petrochemical reserves.	Production and manufacturing of plastics and plastic components. Additives, softeners and other chemical treatment. Surface treatment included. Production of machinery and other equipments.	Diesel oil for distribution	Water consumption ~ 10 l/wash It is ≈ 17 wash per kg cleaning agents Use consumer: 6 g/liter water = 60 g/ wash Use professional: 2,5 g/liter water = 25 g/wash Raw materials for electricity production	
 Energy	Use of energy for extraction/growing, refining and manufacturing of raw materials & packaging. Inherent energy in feedstock and packaging materials. Total energy for raw materials: ~ 0,4 MJ/wash consumer ≈ professional	Production and manufacturing of final products including packaging. Packaging per wash: Materials include PE and PP ~ 0,33 MJ/wash consumer ~ 0,14 MJ/wash professional	Energy for distribution of products (and raw materials etc.) Assumed 5,000 km in a truck. ~ 1,6 MJ primary energy/wash cons ~ 0,7 MJ primary energy/wash prof Energy consumption at retailer < 0,01MJ/wash	Electricity for heating of 10 l water: 0,5 kWh/wash ~ 4,5 MJ primary energy/wash Energy for water supply: ~ 0,04MJ	Energy for wastewater treatment (10 l) ~ 0,1MJ. Potential energy recovery from sludge is negligible. Recycling (with avoided production of virgin materials) or energy recovery from packaging materials. Here calculated as incineration with energy recovery (75% loss in incinerator): Bottle consumer: ~ -0,1 MJ/wash Bottle prof: ~ -0,04 MJ/wash
 Chemicals	Potential emissions from extraction and manufacturing of raw materials.	Handling of chemicals in production – risk of exposure in the working environment. Potential emissions from production (cleaning of tanks and risk of unintented spills). Probably of minor importance in a life cycle perspective for the total consumption of cleaning agents.		Risk of expusure to chemical substances in handeling of products and substances left on cleaned plates etc. E.g. sensitizing substances.	Emmisions of chemical substances after wastewater treatment – and in a few cases without wastewater treatment. E.g. AOX (if chlorine in products) and not degraded chemicals from the detergent and rinsing agents.
 Other	Labour and workplace conditions at plantation? Impacts on nature from changes in land area – risk of net emissions of carbon from deforrestation.		Particulate matter and other emissions from distribution vehicles.		

Bilaga 1b – MEKA-diagram för RTU-rengöringsmedel

MECO (MEKA): **RTU (Ready To Use) Cleaning Agents.** **Functional unit: 1 liter RTU**					
 Materials	Extraction and refining and synthesis from petrochemical raw materials (oil/gas) Growing, harvesting and refining of biobased raw materials (palm kernel oil, forestry (cardboard), etc) Use of land area and petrochemical reserves.	Production and manufacturing of plastics and plastic components. Additives, softeners and other chemical treatment. Surface treatment included. Production of machinery and other equipments.	Diesel oil for distribution	Bottles and refills: All calculations assume 1 liter of product.	
 Energy	Use of energy for extraction/growing, refining and manufacturing of raw materials & packaging. Inherent energy in feedstock and packaging materials. Total energy for raw materials: ~ 8,1 KJ/liter RTU	Production and manufacturing of final products including packaging. Packaging per wash: Materials include PET+PP or PE-HD+PP ~ 12,8 MJ/1 RTU Bottle ~ 6,0 MJ/1 RTU Refill	Energy for distribution of products (and raw materials etc.) Assumed 5,000 km in a truck. ~ 28,0 MJ primary energy/1 RTU Bottle ~ 26,4 MJ primary energy/1 RTU Refill	Electricity for heating: Not relevant	Energy for wastewater ~ 0,01MJ. Potential energy recovery from sludge is negligible. Recycling (with avoided production of virgin materials) or energy recovery from packaging materials. Here calculated as incineration with energy recovery (75% loss in incinerator): ~ -3,7 MJ/1 RTU Bottle ~ -1,7 MJ/1 RTU Refill
 Chemicals	Potential emissions from extraction and manufacturing of raw materials.	Handling of chemicals in production – risk of exposure in the working environment. Potential emissions from production (cleaning of tanks and risk of unintented spills). Probably of minor importance in a life cycle perspective for the total consumption of cleaning agents.		Risk of expusure to chemical substances in handeling of products. E.g. sensitizing substances. Risk of allergy and asthma.	Emmisions of chemical substances after wastewater treatment – and in a few cases without wastewater treatment. E.g. AOX (if chlorine in products) and not degraded chemicals from the detergent and rinsing agents.
 Other	Labour and workplace conditions at plantation? Impacts on nature from changes in land area – risk of net emissions of carbon from deforrestation.		Particulate matter and other emissions from distribution vehicles.		

Appendix 1C – Assumption and simplifications in the above MECO diagram

The following applies to both MECO diagrams:
Data on raw materials is taken from Ecoinvent[10], personal communications with producers and articles regarding energy consumption, such as water purification.
Transport distances are estimated as 5000 km.

Waste handling in both cases assumes incineration at 75% efficiency.

Concentrate
Product compositions are based on one all-purpose cleaner for consumers and one for professionals.

Consumer products are calculated based on an average dosage of 6 g/l water and professional products using a dosage of 2.5 g/l water.

The heating of water is based on heating 10 l of water to 45°C.

It is assumed that packaging primarily comprises PE. Calculations are based on one-litre packaging. Packaging sizes for professional products are generally larger, and while packaging provides an energy contribution, this gives a worst-case calculation.

RTU
The RTU composition is based on a pre-diluted consumer all-purpose cleaner in spray bottle.

It is assumed that 1 litre in-use solution has a mass of 1 kg.

No water heating is included.

It is assumed that packaging primarily comprises PET+PP. Calculations are based on one-litre packaging. The calculations include one refill in the packaging values. The refill is assumed to use the same materials as the original bottle but without the spray nozzle.

[10] Database linked to LCA tool.