About Nordic Swan Ecolabelled

# Dishwasher detergents and rinsing agents



**Version 6.9**

**Background to ecolabelling**
**09 March 2021**

Nordic Ecolabelling

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017 Dishwasher detergents and Rinsing agents, version 6.9, 09 March 2021


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

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# Addresses

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


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# 1 Summary

Nordic Ecolabelling has come to the conclusion that the most relevant parameters for dishwasher detergents are that they:

- Contain low levels of substances that are harmful to health and the environment
- Clean effectively even at low temperatures
- Have optimised and well-filled packaging

This version of the criteria contains a number of changes over version 5. The main changes in this version are as follows:

- All performance tests are carried out at 50°C instead of 55°C and a new reference formulation has been introduced
- The fill ratio has been introduced as an obligatory requirement
- The weight-utility ratio requirement has been tightened
- The CDV limit values are now given as CDVchronic instead of CDVacute, with adjusted limits and with data from the DID-list of 2014
- Rinsing agent may be labelled as a separate product
- Tighter requirements concerning fragrances (allergens and environmentally harmful substances)
- The points system has been removed
- The phosphorus requirement has been tightened
- Reformulated requirement regarding environmentally harmful substances

With the help of the above, the environmental gains from version 5 to version 6 can be summed up as: the new requirements are tighter for CDV, phosphorus and packaging, and the temperature for the performance test has been lowered. The fragrance substances have been further limited through restrictions on more allergens (over and above those that have previously been subject to restrictions) and tighter requirements concerning environmentally harmful fragrances, which means that fragrance levels must be kept at low levels.

# 2 Basic facts about the criteria

### Products that can be labelled

This document covers dishwasher detergents and rinsing agents for household machines. Previously, rinsing agents could only be labelled in combination with dishwasher detergents, but this version now contains limits for rinsing agents to allow such agents to be labelled separately from dishwasher detergents. A major benefit of this is that the rinsing agent can then be used in combination with several different dishwasher detergents and that producers who only manufacture liquid products can obtain a specific licence for their rinsing agent.

This version of the criteria makes it clear that dishwashing detergent for professional use is not covered by these criteria, and is instead covered by a separate criteria document.

Cleaning agents for dishwashers are also not covered by these criteria, since such products have a different composition to that of dishwasher detergent and rinsing agent, which is what the criteria are designed for. Dishwasher detergents are products that clean the contents placed in the machine, not the actual machine itself, and rinsing agent acts as an aid in that cleaning process, while the main task of a cleaning agent for dishwashers is to clean the machine. Cleaning agents for dishwashers are not included in any of the Nordic Ecolabelling criteria documents.

The product group definition in the criteria:

*The document relates to dishwasher detergents and rinsing agents for household machines. The rinsing agent may be integrated into the product or it may be a separate product.*

*Dishwasher detergents for professional use cannot be labelled under these criteria. See the requirements for dishwasher detergents for professional use instead. Cleaning agents for dishwashers cannot be labelled under these criteria.*

## Justification for Nordic Ecolabelling

To achieve environmental gains, each individual requirement must be relevant to the inherent environmental problems of the product group. There must also be a proven potential to differentiate between the environmentally better products and others (there must be a difference and it has to be large enough that it "pays" to set the requirement). There must also be scope to steer the environmental problem in question via ecolabellling requirements.

These three parameters are to be seen together and as such are referred to as Relevance-Potential-Steerability, RPS. Choosing the requirements that together have the greatest relevance, potential and steerability in terms of the product's life cycle achieves the greatest environmental gain.

Nordic Ecolabelling believes that there are many different products and players in the dishwasher detergent industry and that they differ in various ways, which means that Nordic Ecolabelling can separate out the best products in environmental terms.

A MECO analysis, which looks at the combined impact of materials, energy, chemicals and other (such as waste, distribution and so on), conducted in conjunction with the evaluation of the criteria for dishwasher detergents (2011) shows that energy during the usage phase is the most significant parameter for dishwasher detergent, see appendix 1. MECO might be described as a "light version" of an LCA (Life Cycle Analysis) – since no full LCA for dishwasher detergents is available – that weighs up the various parameters. It is important to note that there is no numerical factor for the environmental or health impact of the ingredients in the MECO. The inherent properties of the ingredients do however remain an important target for requirements, since they end up in the wastewater system. The majority of the models used (LCAs and so on) focus on air pollutants etc, but do not focus on other environmental aspects or health aspects, which makes the Nordic Swan Ecolabel important in this respect.

## Relevance

**Relevance** is assessed based on which environment problems the product group causes and how extensive those problems are.

**Volume and dosing**
Dishwasher detergent is a large product group with a high turnover in terms of both volume and money (over EUR 80 million[1]) across the Nordic region, making it relevant to set requirements for such products.

Overdosing increases consumption of products and leads to extra emissions of chemicals, and it is thus relevant to reduce this as far as possible.

**Ecotoxicity and degradability**
The environmental impact of dishwasher detergents is important, as the products are released into the wastewater system after use. Products that contain toxic ingredients and/or non-readily degradable substances cause more damage in the environment than those that have low toxicity and are readily degradable.

Surfactants are used primarily in rinsing agents and these substances are restricted in Nordic Swan Ecolabelled dishwasher detergents, since they affect the environment on their release. Surfactants that are aerobically and anaerobically degradable do not accumulate in the same way as surfactants that do not degrade. There are thus differences between different surfactants.

Preservatives and fragrances are groups that can be environmentally problematic, and they are therefore also subject to specific requirements.

**Health**
Dishwasher detergents are handled by consumers, who pick up the tablets/powder to dose their dishwashers, which means that the products come into contact with the skin and can cause allergy-related problems. It is therefore also of interest to examine the content of the products from a health perspective. Substances that may cause sensitisation include fragrances and preservatives.

**Packaging**
Packaging can vary in both quantity and material between different manufacturers and products, which affects the amount of transport needed for distribution and so also $CO_2$ emissions.

The fill level in the packs also varies considerably from product to product, with those that are better filled generating less need for transport.

**Energy and efficiency**
Energy consumption during the actual dishwashing relates primarily to the heating of the water, so it is relevant to reward products that clean well at low temperatures. Consumers will only reduce their dishwashing temperature if the products they use work at low temperatures and on short wash programmes.

**Raw material extraction/production**
The inherent problem with raw material extraction is both the large amount of energy consumed and the consumption of finite resources. A number of raw materials are used

[1] Estimate from sales in the various markets combined with no. of inhabitants in the Nordic countries (Sweden, Norway, Denmark, Finland and Iceland).

as ingredients in dishwasher detergents, including complexing agents, preservatives, colouring agents and possibly fragrances.

## Potential

**Potential** is assessed based on the potential environmental gains within the specific product group and for each area in the criteria where requirements are set.

### Volume and dosing

Lower and more correct dosing would enable the quantities of dishwasher detergent to be reduced, as long as the dishwashing result continued to be good. Nordic Swan Ecolabelling ensures good performance by requiring a performance test at the stated dose.

Clear dosing instructions on the products, which help the consumer to dose correctly, can help to reduce overdosing and thus cut emissions of dishwasher detergent. The Nordic Ecolabelling requirement that clear dosing instructions must be printed on the labels helps make it easier for consumers to know how they should use the product correctly.

### Ecotoxicity and degradability

Constituent substances with a lower toxicity and good degradability have less of an impact on the environment than those that are toxic and not readily degradable. The substances used in the products and their quantities vary, so it is possible to see a difference between the products and separate out those with a better environmental profile.

### Health

The constituent substances can also vary in how they are classified in health terms. A limit on ingredients that are allergenic reduces the risk of causing new allergies.

### Packaging

The MECO analysis (Appendix 1) shows that packaging material (0.03-0.06 MJ) does not have as great an impact as distribution of the products (0.6 MJ). This makes optimising the packaging important in reducing the amount of transport necessary and thus reducing $CO_2$ emissions from distribution. Different products are packed in different ways and thus use different quantities of packaging materials, plus the fill level also varies. There are boxes that on opening only appear to be barely half full, while others are full up to the brim, so in this area there are major differences that can be influenced.

### Energy in the usage phase

We can clearly see from the MECO analysis that energy consumption is by far the greatest during the usage phase (9 MJ[2]) compared with raw material production (1.2 MJ), product manufacture (assumed to be very low in the MECO analysis), distribution and packaging production. A lower dishwashing temperature could save a great deal of energy from heating the water, making this an area with major potential.

[2] It lies at around 1 kWh per dishwashing cycle which, after being multiplied by 2.5 to cover the primary production of the energy and conversion to MJ, comes out at 9 MJ.

Different products have various claims on their packaging about how they work at low temperatures and/or on shorter programmes, which is positive from an energy perspective and also an indication that the industry is steering towards such products.

**Raw material extraction/production**
Energy consumption during raw material production is a distinct parameter within the MECO analysis (which gives a figure of 1.2 MJ). Access to renewable ingredients for dishwasher detergents is judged to be fairly limited. The surfactants used appear primarily in the rinsing agents, but also in a number of multifunctional products, although not to as great an extent as in products such as laundry detergent.

## Steerability

The steerability is assessed based on the scope to set requirements concerning the relevant environmental parameters with potential for improvement.

**Volume and dosing**
Full steerability of the way consumers dose and use a dishwasher detergent is extremely difficult to achieve. Nordic Ecolabelling does, however, require the inclusion of clear dosing instructions to make it easier for consumers to dose correctly.

Nordic Ecolabelling also sets a requirement regarding performance at the stated dose. This reduces the risk that consumers overdose the product because it is ineffective, compared with a product that has not been performance tested. The performance test is measurable, which makes it steerable for Nordic Ecolabelling.

**Ecotoxicity, degradability and health**
The manufacturers have considerable influence over which ingredients are used in the products and know the environmental and health impact of each constituent substance. There are thus excellent opportunities to set fully steerable requirements concerning ecotoxicity, degradability and health issues such as sensitising substances.

**Packaging**
The amount of packaging material in relation to content can be steered by the requirement concerning the WUR (weight-utility ratio), where low material weight and many doses per pack is desirable. The packaging is also steered towards optimum packing via the requirement regarding fill ratio, which in this version is an obligatory requirement.

**Energy**
It is difficult to steer the dishwashing temperature, but if the products are effective already at 50°C instead of 55°C, this will save a great deal of energy in households. Consumers want good cleaning results, and it is more likely that they will lower the temperature of the dishwasher if the products have proven performance at lower temperatures. Introducing a performance test at a lower temperature offers good steerability, since such tests are conducted at test laboratories following standardised methods.

**Raw material extraction/production**
Steerability is difficult when it comes to raw material production, since licence applicants (usually the dishwasher detergent manufacturers) do not own the raw material producers and thus cannot influence the production.

A discussion on the possibility of setting future requirements for renewable raw materials, raw material production and so on will be taken up in Nordic Ecolabelling's planned multidisciplinary project on raw materials.

## Version and validity of the criteria

The first version of the criteria document was adopted by the Nordic Ecolabelling Board on 3 September 1993. The criteria have focused on three areas: chemicals, packaging and function. The criteria have previously been revised four times.

**Version 1, 3 September 1993**
This version set requirements concerning harm to health and the environment. The criteria also included requirements on surfactants, other chemical substances, packaging, dosing and cleaning performance with function test.

**Version 2, 6 February 1997**
The most significant change in this version was the addition of a worksheet for points calculation and Nordic Ecolabelling's chemical list.

**Version 3, 17 December 2002**
This version prohibited perborates.

**Version 4, 14 June 2007**
In this version, the product group was extended to include a combination of rinsing agent and dishwasher detergent. The requirement on phosphates was tightened. Also, CDV and a points score system were introduced.

**Version 5, 15 December 2009**
In this version, the requirement on fragrances was tightened to permit a maximum of 0.010% (100 ppm) of each allergen in the end product. Exemptions from the calculation of anaerobically non-biodegradable substances was made for iminodisuccinate (IDS) and cumene sulphonate. The classifications in accordance with CLP were also updated.

**Version 6, March 19 2014**
The key changes in this version compared with version 5 are:

- Lower temperature and new reference formulation for the performance test
- Fill ratio as obligatory requirement instead of points score requirement
- Tougher requirements concerning phosphorus, CDV, WUR and fragrance allergens
- $CDV_{chronic}$ instead of $CDV_{acute}$ and with data from the DID-list of 2014
- Ban on sensitising substances (except fragrances and enzymes)
- Removal of points score requirements
- Separate limits for rinsing agents

## The Nordic market

The products on the market primarily come in the form of tablets and powder, but we are also beginning to see growth in products in gel form. The products come both with and without rinsing agent and salt. Rinsing agents are also available as separate products, which come in liquid form.

The market in the different countries offers both private label products and own brands from producers large and small. Many of the products are available in several of the Nordic countries. Products from global companies such as Procter & Gamble and Unilever can also be found in the Nordic market. Products from Reckitt Benckiser are also widespread across the different countries.

The amount of fragranced and fragrance-free products varies between the Nordic countries. Fragrance-free products are found to a greater extent in Sweden and Denmark than in the rest of the Nordic region[3].

## Nordic Swan Ecolabel licences

At the current time (May 2013) there are 16 licences for dishwasher detergents in the Nordic region, with each licence usually covering multiple products. Many of the licences are also registered in several countries. The licences are distributed as shown in Table A below.

**Table A Licences in the Nordic market (May 2013)**

| Country | Valid licences | Registrations |
|---|---|---|
| Sweden | 8 | 4 |
| Norway | 3 | 4 |
| Denmark | 5 | 2 |
| Finland | 0 | 6 |
| Iceland | 0 | 5 |

## Other labels

### EU Ecolabel

The EU Ecolabel has an equivalent ecolabel for dishwasher detergents for household machines that has existed since 1999. The requirements are similar to version 5 of the Nordic Ecolabelling criteria. New criteria were published on 28 April 2011[4]. The EU Ecolabel and the Nordic Swan Ecolabel differ in several respects – for example, the EU Ecolabel permits higher levels of non-anaerobically degradable substances, has a performance test at 55°C, only has requirements concerning packaging amount and not fill ratio, and has a phosphate ban but no other phosphorous limit.

### Good Environmental Choice

The Swedish Society for Nature Conservation has issued Good Environmental Choice criteria for all its chemical products, which include dishwasher detergents for both household machines and professional use. There are currently around 14 licensed products. The society has a document that applies to all chemical products, which was last updated in 2006[5].

### Asthma and Allergy

Chemical products carrying the Asthma and Allergy label must meet the following three criteria: free from allergens, free from fragrance and free from irritant substances to the degree that there are no known, medically reported cases of hypersensitivity. The label can be found on chemical products such as laundry detergents, rinsing agents, dish-

[3] Information from manufacturers and industry associations as requested by Nordic Ecolabelling.
[4] EU Ecolabel: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32011D0263:EN:NOT
[5] Good Environmental Choice: http://www.naturskyddsforeningen.se/bra-miljoval

washing detergents and soaps[6]. The products labelled are those recommended by the Asthma and Allergy Association. The label is not pan-Nordic, so the products that can be labelled may vary from country to country.

**Charter for Sustainable Cleaning**
In 2005, the industry initiated the pan-European "Charter for Sustainable Cleaning" to promote sustainability among companies manufacturing laundry/dishwasher detergents and other cleaning products for household and commercial use. The programme was launched on the initiative of the International Association for Soaps, Detergents and Maintenance Products (A.I.S.E.). The charter applies in all 27 member states of the EU as well as Norway, Iceland and Switzerland and is open to all companies manufacturing or distributing such products in this region[7]. To participate in the programme, a company must annually report key performance indicators to A.I.S.E. (such as chemical safety evaluation, non-readily degradable organic substances, energy and water consumption and packaging), but there are no limit values that have to be met. A.I.S.E. has summarised these in a "sustainability report"[8]. In 2010, A.I.S.E. supplemented its Charter for Sustainable Cleaning with requirements concerning "Advanced Sustainability Profiles (ASPs)" for products such as laundry detergents. These were later updated in April 2012[9]. An ASP is based on a life cycle analysis and covers the following three parameters for dishwashing detergents:

- Environmental safety check (ESC)
- Resource efficiency
- Consumer information

For a product to meet the criteria for the use of A.I.S.E.'s ASP for dishwasher detergents, the producing factory (or 75% of its production) must be covered by CSP (Charter Sustainability Procedures[10]), the product's ingredients must be subject to an ESC and the concentration of the ingredients must lie below the predicted "no effect" level (PNEC) for acute aquatic toxicity. In addition, specific ASP criteria must be met such as maximum dosing, packaging requirements, user and safety information for the consumer and performance testing.

When comparing with the Nordic Swan Ecolabel, it is rather difficult to gain a good overall picture. However, one difference is that the constituent substances in the products are checked against an Excel list of raw materials that are either given as "HERA documentted" or "non-HERA documented" according to a risk-based approach. The ingredients that are not HERA documented are then totalled up and must meet a particular value.

**Environmental management systems**
The environmental management systems ISO 14001 and EMAS may be seen as key competitors, but ecolabelling can also be a simple way of achieving an objective. With

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[6] Asthma and Allergy Association: www.astmaoallerigiforbundet.se, www.astma-allergi.dk, www.naaf.no, www.allergia.fi
[7] A.I.S.E, 2010: Charter for Sustainable Cleaning 2010, http://www.sustainable-cleaning.com/en.home.orb, (25/10/2011)
[8] http://www.aise.eu/downloads/AISE_AR2011.pdf
[9] A.I.S.E., 2012: Charter update 2010: APS substantiation dossier: Automatic dishwashing (ADW) detergents – final version 23 February 2012
[10] Charter Sustainability Procedures (CSP) are a procedure for maintaining continuous improvements in sustainability, and form the basis for A.I.S.E.'s Charter on Sustainable Development.

more and more companies obtaining ISO certification, the purchase of ecolabelled dishwashing detergents could be a step on the road to improved environmental work.

**Other less well-known labels** also exist. They are not necessarily ecolabels, but are often seen as such by consumers. These include Finnish label "Avainlippu" and the Swedish label "Gröna Kvisten".

**Save energy and water**
This is a voluntary industry initiative (via A.I.S.E.) to encourage consumers to get as much from their dishwasher detergents as possible while also minimising their environmental impact. Consumers are urged to use the 50°C/55°C/Auto programmes to save electricity and water[11].

**Our Home Our Planet**
Reckitt Benckiser's own label, whose core aim is to reduce the carbon footprint of its products by 20% by 2020[12].

# 3 About the criteria revision

### Goals of the criteria revision

The aim of the revision was to draw up version 6 of the criteria for dishwasher detergents with a focus on the following points, which were identified in the evaluation of 2011 as the most relevant points on which to work further:

- Energy – low temperature, short programme
- Amending the performance test to better match today's products
- Fill ratio as obligatory requirement
- Fragrances: tightening of fragrance requirements
- Points score system: revision/review of points score system

### About this criteria revision

The project has been run as a Nordic project. At the start of the project, all the countries provided national submissions that included licence information, industry and market information and input from manufacturers and stakeholders in each country.

During the course of the project, manufacturers, industry associations and other stakeholders in the various countries have been contacted in order to tap into the knowledge, experience and interests of the industry. The criteria and background documents were also sent out for external consultation to manufacturers, licence holders, public bodies, industry organisations and stakeholders during the period 2013-09-17 to 2013-11-15.

During the revision, the following parameters also required a review:

- Adjustment from $CDV_{acute}$ to $CDV_{chronic}$
- Reformulation and review of the requirement concerning environmentally harmful substances

[11] www.saveenergyandwater.com
[12]http://www.varthem-varplanet.se

- Clarification of requirement texts, particularly regarding the performance test and how rinsing agents are handled in each requirement
- Limit values for WUR
- Comparison with the EU Ecolabel's requirements/levels for e.g. CDV, reporting of function claims and a phosphate ban, plus comparison with A.I.S.E.'s "Advanced Sustainability Profile" criteria for dishwasher detergents, so that we understand how the industry is thinking and can perhaps gain some input into our criteria
- Updating of the background document
- Overview of surfactants and possible requirements concerning the degradability of surfactants
- Assessment of a ban/limit on the content in fragranced tape strips
- An assessment regarding the introduction of the Challenge test for preservatives
- The handling of fragrances in accordance with IFRA must also apply at the dishwasher detergent factory
- Update of Appendix 8 concerning the performance test
- Assessment of the points matrix

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# 4 Justification of the requirements

## 4.1 General requirements

The definition of constituent substances is included to explain what is meant by constituent substances and impurities. All substances that are added intentionally are considered constituent substances irrespective of level. See the definition below.

The text on constituent substances has been updated since previous versions with the addition that impurities of over 1.0% concentration in the raw material are regarded as constituent substances. Substances known to be degradation products of the constituent substances are also themselves considered to be constituent substances. These stipulations can be found in several other chemical product groups and encourage the manufacturer to choose ingredients of high quality that contain very small quantities of trace elements from the raw material production. The level has been chosen in consideration of the working environment and the classification of the raw material.

This version of the criteria makes it possible to Nordic Swan Ecolabel rinsing agents as a separate product, as this makes the system a little more flexible since the rinsing agent no longer has to be linked solely to one dishwashing detergent. This received positive response during the public consultation period. The requirement levels have been aligned with or more strict than the requirements that the EU Ecolabel has for rinsing agents in its criteria for dishwasher detergents[13] and are calculated on the basis of a 3 ml dose (which is the same as for the EU Ecolabel). The limits have also been checked against the licence data that Nordic Ecolabelling has on rinsing agents.

The text in the criteria has also been updated to include any foil around the tablets in the formulation, and this is counted in calculations of CDV, environmentally harmful substances and degradability. The foil has also previously been counted in the formulation, so the new text is primarily intended to clarify this.

The text in the criteria on constituent substances and information on how calculations are made for rinsing agents in the criteria:

*The term constituent substance refers to all substances in the product, including additives in the ingredients (such as preservatives and stabilisers) but does not include impurities from primary production. Impurity refers to residues from primary production which may be found in the finished product at concentrations below 0.010% (100 ppm), but not substances that have been added to a raw material actively and for a particular purpose. Impurities of over 1.0% concentration in the raw material are, however, regarded as constituent substances. Substances known to be liberated by the constituent substances are also themselves considered to be constituent substances.*

*The criteria for dishwasher detergents allow licence applications for dishwasher detergent and/or rinsing agent. In applications for rinsing agents, an amount of 3 ml is to be used for calculations.*

*Dishwasher detergents in which rinse aid and/or salt are included are considered to be multifunctional products. Dishwasher detergents where salt and/or rinse aid is added as a separate product are considered to be singel function products.*

*Foil that is not removed before use of the product is counted as part of the formulation/ingredients.*

The points matrix has been deleted from this version of the criteria, since this new version of the requirements does not contain very many parameters where the points matrix would give added flexibility, which is the main idea with a points matrix.

### O1 Formulation/composition

A description of the product and its areas of use is required, along with information to enable identification of the manufacturer, in order to assess whether the product falls within the product group definition or not.

Nordic Ecolabelling needs to know the complete composition, with all constituent substances. This is necessary in order to check the individual requirements below and make the calculations necessary in respect of each requirement.

The safety data sheets must be updated in line with European legislation, which at the time of writing the criteria (May 2013) means compliance with Appendix II of REACH (Regulation (EC) No 1907/2006).

The requirement is unchanged except for the addition that the declaration of composition must state whether the product is a multifunction product (i.e. where rinsing agent

[13] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32011D0263:EN:NOT

and salt are included in the product) or a single function product (where rinsing agent and salt are added separately) or whether it is solely a rinsing agent. The objective of this is to clarify which category each product belongs to, as the requirements for dosing (O15) and performance (O22) depend on this.

**Requirement:**

The applicant must provide detailed information on the composition of the dishwasher detergent, and enclose a safety data sheet for each ingredient. The information on the composition must include:

- Trade name
- Chemical name
- Constituent amounts of each ingredient (also applies to any fragrances in the packaging)
- CAS number
- DID number for each ingredient
- The function of each ingredient must be stated
- Recommended dose in grams or millilitres

Description of the product type (multifunction or single function product or rinsing agent) and product form (powder, liquid or tablet).

The DID number is the number an ingredient has on the DID list, which is to be used when calculating chemical requirements. The DID list can be obtained from Nordic Ecolabelling, see addresses on page 2. See Appendix 2 for more details on the DID list.

✉ A complete declaration of the composition of the product with information as set out in the requirement.

✉ Safety data sheets for each ingredient in line with prevailing European legislation.

## O2 Classification of the product

Nordic Ecolabelling sets requirements concerning environmental and health classification of products, to ensure that products that are toxic and/or harmful to the environment and health cannot be ecolabelled.

The classification of very toxic has been included so as to close the door on products with such a classification. Nordic Ecolabelling does not believe that there is any great risk of products classified as very toxic entering the market, but has still opted to retain the requirement.

**Requirement:**

Products must not have a classification as listed in Table 1 below, following the regulations in the Nordic countries or the EU's Dangerous Substances Directive 67/548/EEC as amended and/or CLP Regulation (EC) No 1272/2008 as amended. For a transitional period, i.e. until the products are classified under the CLP Regulation (no later than 1 June 2015), classification under the Dangerous Substances Directive or the CLP Regulation may be used. After the transitional period, only classification under the CLP Regulation applies (see Table 1 below):

**Table 1. Classification of the product**

| Classification | Hazard class, hazard category and hazard phrase/ Hazard symbols and risk phrases | |
|---|---|---|
| | **CLP Regulation 1272/2008** | **EU's Dangerous Substances Directive 67/548/EEC** |
| Toxic to the environment | Toxic to aquatic organisms:<br>H400 – acute hazard, category: acute 1<br>H410 – risk of damaging long-term effects, category: chronic 1<br>H411 – risk of damaging long-term effects, category: chronic 2<br>H412 – risk of damaging long-term effects, category: chronic 3<br>H413 – risk of damaging long-term effects, category: chronic 4 | N with R50, R50/53 or R51/53.<br>R52, R53 or R52/53 without N |
| Very toxic | H300 – Acute oral toxicity, hazard category 1 and 2<br>H310 – Acute dermal toxicity, hazard category 1 and 2<br>H330 – Acute inhalation toxicity, hazard category 1 and 2<br>H370 – Specific target organ toxicity – single exposure, hazard category 1 | Tx (T+ in Norway) with R26, R27, R28 and/or R39 |
| Toxic | H301 – Acute oral toxicity, hazard category 3<br>H311 – Acute dermal toxicity, hazard category 3<br>H330 – Acute inhalation toxicity, hazard category 2<br>H331 – Acute inhalation toxicity, hazard category 3<br>H372 – Specific target organ toxicity – repeated exposure, hazard category 1 | T with R23, R24, R25, R39 and/or R48 |
| Carcinogenic | H350 – Carcinogenic, hazard category 1A and 1B<br>H351 – Carcinogenic, hazard category 2 | Carc with R40, R45 and/or R49 |
| Mutagenic | H340 – May cause genetic defects, hazard category 1A and 1B<br>H341 – May cause genetic defects, hazard category 2 | Mut with R46 and/or R68 |
| Toxic for reproduction | H360 – Toxic for reproduction, hazard category 1A and 1B<br>H361 – Toxic for reproduction, hazard category 2<br>H362 – Toxic for reproduction – effects on or through breastfeeding (supplementary category) | Repr with R60, R61, R62, R63 and/or R64 |
| Harmful to health | H304 – Aspiration hazard, hazard category 1<br>H312 – Acute dermal toxicity, hazard category 4<br>H332 – Acute inhalation toxicity, hazard category 4<br>H371 – Specific target organ toxicity – single exposure, hazard category 2<br>H373 – Specific target organ toxicity – repeated exposure, hazard category 2 | Xn with R20, R21, R48, R65 and/or R68 |
| Skin or respiratory sensitisation | H317 – Skin sensitisation, hazard category 1/1A/1B<br>H334 – Respiratory sensitisation, hazard category 1/1A/1B | Xi with R43<br>Xn with R42 |
| Corrosive | H314 – Skin corrosion/irritation, hazard category 1A/1B/1C | C with R34 or R35 |

Note that responsibility for classification lies with whoever places the product on the market.

✉ Safety data sheet/product sheet in line with prevailing European legislation.

## O3 Substances that are carcinogenic, mutagenic or toxic for reproduction (CMR)

By including requirements stating that substances categorised by specific inherent properties must not be used in ecolabelled products, the ecolabelling can meet concerns regarding safe use of specific chemicals and thus highlight environmental and/or consumer issues and concerns.

The exclusion of CMR substances and restrictions on environmentally harmful substances are part of Nordic Ecolabelling's strategic policy on environmental toxins. Excluding CMR substances has a high signal value, but is not considered to have a great impact on the formulation of dishwasher detergent in practice. In health terms, CMR substances are not desirable in dishwasher detergents, since they are to a large extent handled by consumers in the home.

In this context, constituent substances are considered to be both the substances that make up the raw ingredients, and known degradation products such as formaldehyde.

Nordic Ecolabelling has not received any indications that CMR substances are likely to be contained in packaging for dishwasher detergents and has therefore chosen only to set this requirement regarding constituent substances in the product. CMR substances sometimes occur in for example fragrances and if such substances are included in fragranced products, these are excluded from use in this requirement. Fragrance substances are further limited by requirement O9 (fragrances). This means that fragrance substances that are CMR classified are not permitted even if they also occur in O9.

### Lilial, NTA and perborates

Lilial, NTA and perborates were previously included in the list of substances that must not appear in Nordic Swan Ecolabelled products (O8), but since these have now been formally classified, they are excluded from use on the grounds of their classification and are therefore no longer included in O8.

**Lilial** (CAS 80-54-6) is a constituent of many different fragrances. Lilial has been self-classified as Rep3 with H361 and is therefore excluded from use under this requirement. Since fragrances are added intentionally and have a function, the minimal limit for fragrances does not apply and Lilial can therefore not be added to the product under this CMR requirement.

**NTA** (nitrilotriacetate) is a complexing agent used in products such as dishwasher detergent. NTA has been classified as carcinogenic cat.3 with H351. NTA is thus prohibited on the grounds of its classification.

Complexing agents that replace NTA (e.g. GLDA[14] and MGDA[15]) contain small quantities of NTA as residues from raw material production (as attested in various safety data sheets for the raw materials). Nordic Ecolabelling's review of licensed products shows that there is still a certain need for complexing agents with small levels of NTA, and so an exception is made that complexing agents of the type MGDA and GLDA may contain a maximum of 1.0% NTA as an impurity in the raw material as long as the level in the end product is lower than 0.1%. This stipulation is included in the requirement for

[14] GLDA is glutamate diacetate and its salts (complexing agent)
[15] MGDA is methylglycine diacetate, DID no. 204 (complexing agent)

clarification. It is also made clear in the section on what counts as a constituent substance and an impurity under section 4.1 above.

**Perborates**
Perborates are classified as toxic for reproduction – Repr. 1B, H360 (under the CLP Regulation) and are therefore excluded from use under this requirement (they have thus been removed from the list of substances excluded from use under O8). Borated substances are also physiotoxic (toxic to plants), which is an important consideration for dishwasher detergents, as they end up in the wastewater system and eventually in the aquatic environment.

Since the CLP Regulation has not entered into force for blends of substances, the classifications under the Dangerous Substances Directive (67/548/EEC) remain in the requirements as an alternative to the CLP in this version.

**Titanium dioxide**

Titanium dioxide; [in powder form containing 1 % or more of particles with aerodynamic diameter ≤ 10 μm] is classified as carcinogen category 2 by inhalation by the 14.ATP of CLP. In addition, the mandatory warning EUH212 is required on the packaging of solid mixtures containing 1 % or more of titanium dioxide. The mandatory EUH212 applies regardless of titanium dioxide particle size, implying that particles with aerodynamic diameter ≤ 10 μm may be released from any solid mixture containing titanium dioxide when used. These particles, "known to be released from ingoing substances" are counted as ingoing substances according to Nordic Ecolabelling's definition (cf. "General requirements" in the criteria document). Accordingly, all titanium dioxide occurring in solid mixtures (regardless of size) is prohibited.

**Requirement:**

Substances in the product or in the raw materials that make up the product must not be classified as shown in Table 2 below under applicable regulations in the Nordic countries. They must also not be classified as shown in Table 2 under CLP Regulation No 1272/2008 or the EU's Dangerous Substances Directive 67/548/EEC:

**Table 2 Classification of constituent substances**

| Classification | Hazard class, hazard category and hazard phrase | Hazard symbols and risk phrases |
|---|---|---|
| | **CLP Regulation 1272/2008** | **EU's Dangerous Substances Directive 67/548/EEC** |
| Carcinogenic | H350 – Carcinogenic, hazard category 1A and 1B<br>H351* – Carcinogenic, hazard category 2 | Carc with R40, R45 and/or R49 |
| Mutagenic | H340 – May cause genetic defects, hazard category 1A and 1B<br>H341 – May cause genetic defects, hazard category 2 | Mut with R46 and/or R68 |
| Toxic for reproduction | H360 – Toxic for reproduction, hazard category 1A/1B<br>H361 – Toxic for reproduction, hazard category 2<br>H362 – Toxic for reproduction – effects on or through breastfeeding (supplementary category) | Repr with R60, R61, R62, R63 and/or R64 |

** Complexing agents of the type MGDA and GLDA may, however, contain a maximum of 1.0% NTA in the raw material as long as the level in the end product is lower than 0.1%.*

Exemption: Trimethylol propane (CAS 77-99-6), that is classified with H361, may be used in water soluble foil until 2021-10-31.

*Note that titanium dioxide in solid mixtures (e.g. in enzymes) is prohibited by this requirement, in effect from 2021-10-01. Note: a transition period until 2022-12-31 applies.*

✉ Duly completed and signed declaration that the requirement has been fulfilled, Appendices 3 (completed by the producer of the dishwasher detergent) and 4 (completed by the producer of the raw material) may be used.

### O4 Sensitising substances

Nordic Ecolabelling wishes to limit the amount of sensitising substances in order to reduce the risk of more people becoming hypersensitive or allergic. The direct contact with the detergent does not last as long when using a dishwasher as it does when washing up by hand, but the consumer often picks up the tablet by hand and so does come into contact with the product. The requirement has been changed from having a limit of 0.1% substances classified as H334/R42 and/or H317/R43 to not permitting substances with this classification, with the exception of fragrances and enzymes.

Enzymes are exempted from this requirement because they are considered necessary for the products' performance and because all enzymes are classified as sensitising. There is thus no alternative to the classified options. Fragrances are similarly exempted from this requirement, see the specific requirement for fragrances under O9.

In many other chemical technical documents there are exemptions for preservatives from this type of requirement. But since there are not very many products within this category that are preserved there is no exemption for preservatives included in this requirement.

When the CLP enters into force for products in June 2015, if a substance has the classification resp sens 1A, H334 or skin sens 1A, H317 and appears in the product at a concentration of at least 0.01% (100 ppm), the CLP requires the following warning to be printed on the packaging:

"Contains (name of sensitising substance). May cause an allergic reaction."

For categories 1 and 1B for both resp sens and skin sens, the trigger value for the warning is 0.1% (1000 ppm). In addition to classification as sensitising, Nordic Ecolabelling also excludes this labelling on the packaging if it is there for other reasons than the enzyme content. Enzymes are considered nessecary to receive a good performance of the products and since enzymes are reclassified Nordic Ecolabelling can see the need of allowing the risk phrase on the packages due to enzymes. If the risk phrase is based on the content of perfume the product can not be labelled with the Nordic Swan Ecolabel. Nordic Ecolabelling does not see a very big risk for the consumer due to this exemption, since the enzymes are added to the product as liquids or non-dusting granulates. The exemption for enzymes has been inserted in the same way as in "laundry detergents and stainremovers" where stabilizers and preservatives in the enzymatic raw material are exempted frpn the classification requirement regarding senisitising substances. These adjustments have made after the public consultation period since there were a lot of comments regarding enzymes and their new classifications.

**Adjustment 21 October 2016:**

An exemption for stabilizers and preservatives in colourant raw materials has been included since it is nessecary for some products to preservave waterborne colourtants to avoid microbiological growth in non-sterile production. These stabilizers and preservatives are included in the colourants in small amounts resulting in very little amounts in the final dishwashing detergent.

**Requirement:**

The product must not contain substances that are classified as sensitising – H334 (R42) and/or H317 (R43). The following substances are exempted from the requirement:

- Enzymes (including stabilizers and preservatives in the enzyme raw material)
- Stabilizers and preservatives in colourant raw material
- Fragrances (see O10)

Fragrances containing substances classified with H334 and/or H317 can not occur at levels* that trigger the following warning on the end product's packaging: "Contains (name of sensitising substance). May cause an allergic reaction."

** CLP enters into force for products in June 2015, for substances which then have the classification resp sens 1A, H334 or skin sens 1A, H317 and appears in the product at a concentration of at least 0.01% (100 ppm), the CLP requires this warning to be printed on the packaging. For categories 1 and 1B for both resp sens and skin sens, the trigger value for the warning is 0.1% (1000 ppm).*

✉ Duly completed and signed declaration from the manufacturer of the dishwashing detergent (Appendix 3), declaration from the raw material manufacturer/supplier (Appendix 4) and safety data sheets for each constituent substance (see O1) in accordance with European legislation.

## O5 Enzymes

Enzymes are used in dishwasher detergents to break down proteins and starch-based soil on the items to be cleaned.

In order to reduce dust during their addition, the enzymes used should be in capsule or liquid form. The requirement is set in order to reduce the occurrence of work environment problems with enzymes during manufacture of the dishwashing detergent, since enzymes are classified as sensitizing with H334 (R42). Established suppliers already meet this requirement. Enzymes do not appear as residues after dishwashing, since the enzymes are broken down during cleaning.

**Requirement:**

Enzymes must be liquid or in the form of non-dust producing granules.

✉ Declaration from the enzyme manufacturer or information on safety data sheet/product data sheet.

## O6 Environmentally harmful substances

Substances classified with hazard phrases H410, H411 and/or H412 must only appear in small quantities in ecolabelled products. Substances classified as H410 (R50/53) are the most serious and they are therefore are therefore limited the most from use in dishwasher detergent. Fragrances have previously been judged as a mixture, but in this version fragrance substances are now also judged individually. This means that fragrances containing substances classified as H410 can only be included in very small amounts in

the products. A review of ecolabelled dishwasher detergents showed a fairly low proportion of fragrances containing H410-classified substances, which offers an opportunity to limit these fragrance substances , see more on fragrances under O9.

In the majority of other chemical criteria, Nordic Ecolabelling has implemented a weighting formula for environmentally harmful substances, and this has been carried over into this version of the criteria for dishwasher detergents. The formula places the heaviest weighting, factor of 100, on the most environmentally harmful classification (H410). The weighting for the next classification (H411) is a factor of 10 and H412 has a factor of 1. After the public consultation H410 has been included in the formula below. When this now has been included the formula is the same as in other chemichal technical documents.

$$\text{Dose (g/wash)} \bullet (100 \bullet {}_{\text{conc}}\text{H410} + 10 \bullet {}_{\text{conc}}\text{H411} + {}_{\text{conc}}\text{H412}) \leq 0.10 \text{ g/wash}$$

Or

$$\text{Dose (g/wash)} \bullet (100 \bullet {}_{\text{conc}}\text{R50/53} + 10 \bullet {}_{\text{conc}}\text{R51/53} + {}_{\text{conc}}\text{R52/53}) \leq 0.10 \text{ g/wash}$$

The limit is set at 0.10 g/wash based on Nordic Ecolabelling's experiences in administering version 5 of the criteria. The previous limit was 0.1 g/wash in total of R51/53 and R52/53. The new limit is thus a tightening compared with version 5, but is still considered an achievable level on the basis of licence data that Nordic Ecolabelling has examined. The adjustment made after the public consultation when H410 was included in the formula only allows very small amounts (maximum 2.5ppm) of substances labelled with H410 in the final products.

In the second change to adapt to the technical and scientific development of the CLP, the underlying data for environmental hazard classification was changed. Before the change, a substance was only classified as environmentally harmful with long-term effects on the environment (R50/53, R51/53 and R52/53) if it was also non-readily degradable. After the aforementioned change, this was amended such that substances could be classified in the categories "long-term effects in an aquatic environment" (H410, H411 and H412) solely based on the substance's chronic toxicity (assuming that chronic data is available) even if the substance is readily degradable. This primarily affects surfactants, since they often have relatively high chronic toxicity but are readily degradable.

An audit of surfactants in ecolabelled products shows that the change affects the majority of the products, i.e. many of the surfactants used have been or will be classified as H412 and H411[16]. There are also surfactants that have not been classified despite the fact that they are similar to those that have been classified, which may be due to a lack of chronic data on them. For this reason, Nordic Ecolabelling makes an exception for surfactants that are classified as H412 on condition that they are readily degradable (aerobic) and anaerobic degradeable (see O12).

Fragrance substances in packaging is not included in this requirement eventhough there is a slight risk that they may end up in aquatic environments. The main amounts of packaging material goes to material recyling or inciniration. The levels of fragrance

[16] A.I.S.E., 2010: Note to European Ecolabel – Annex II. Example: Implications of the new classification rules on surfactants in the DID-list (based on available toxicity data currently in the list), 04.10.2011

substances in packaging materials are very low and are not expected to have very large environmental impact when occassionally released to aquatic environments during recycling.

**Exemption for protease**

Protease (Subtilisin, EINECS 232-752-2, CAS 9014-01-1) is an efficient enzyme used mainly in laundry detergents and automatic dishwashing detergernts to degradehydrolyze protein based stains. Protease cannot be replaced by other enzymes. Chronical long term tests have been done on protease which has lead to a classification as Aquatic Chronic 2 (H411), eventhough protease is readily biodegradeable. The Nordic Ecolabelling exempts protease from the requirement regarding environmentally hazardous substances to be able to continue the ecolabelling of laundry detergents and automatic dishwashing detergents that perform well.

**Requirement:**

This requirement applies to substances that are in the product or that are intentionally released during the use of the product. In fragrance mixtures, all the fragrance substances are to be included in the calculation of environmentally harmful substances.

Substances classified as environmentally harmful are limited as follows:

Substances classified as H410 (R50/53), H411 (R51/53) and/or H412 (R52/53) are restricted under the following formula:

$$\text{Dose (g/wash)} \bullet (100 \bullet {}_{conc}\text{H410} + 10 \bullet {}_{conc}\text{H411} + {}_{conc}\text{H412}) \leq 0.10 \text{ g/wash}$$

Or

$$\text{Dose (g/wash)} \bullet (100 \bullet {}_{conc}\text{R50/53} + 10 \bullet {}_{conc}\text{R51/53} + {}_{conc}\text{R52/53}) \leq 0.10 \text{ g/wash}$$

Surfactants classified as H412 are exempted from the requirement, on condition that they are readily degradable* and anaerobically degradable** (see also O12).

Proteases/Subtilisins classified with Aquatic Chronic 2 (H411) areis exempted from the requirement, see requirement O5 concerning how to handle enzymes. Beware that all products need to fulfill requirement O2 regarding classification of the product.

** In accordance with the DID list. If the substance is not on the DID list, the substance is documented in line with test method no. 301 A-F or no. 310 in the OECD guidelines for testing chemicals or other equivalent test methods.*

*** In accordance with the DID list. If the DID list lacks the relevant data for surfactants, data may be taken from the safety data sheet on condition that the data is reliable and that the test methods are in agreement with Appendix 2. Section B of the DID list shows how to make the calculations of the various factors. It is also permitted to refer to analogous observations, as long as they are carried out by a competent third party, and refer to relevant data from literature that has been subjected to scientific scrutiny.*

✉ Report on surfactants that are to be exempted from the requirement (quantity, classification, degradability).

✉ Duly completed and signed declaration that the requirement has been fulfilled (Appendices 3 completed by the producer of the dishwasher detergent and 4 completed by the producer of the raw material may be used). Also attach a report on the total quantity of H410 (R50/53), H411 (R51/53) and H412 (R50/53). If data is not available, the substance is assessed according to a worst case scenario.

## 4.2 Requirements for particular substances

### O7 Phosphorus

Phosphorus is a source of eutrophication. Phosphates from agriculture are one of the greatest causes of phosphates in the aquatic environment[17].

Phosphates contribute to eutrophication, which is chiefly caused by the nutrients nitrogen and phosphorus. One consequence of eutrophication of lakes, seas and watercourses is oxygen deficiency, which in turn causes dead zones. A surplus of phosphorus also contributes to abnormally high occurrences of cyanobacteria, for example, during the summer. In addition, phosphorus is a finite resource due to the high rate of mining and insufficient degree of recovery, plus phosphates can contain heavy metals as impurities.

Phosphates from dishwasher detergents play only a minor role, particularly where phosphates are effectively removed from the wastewater. In general terms, emissions of phosphates from point sources such as wastewater have fallen over the past 30 years. This is primarily due to improved cleaning of wastewater in Northern and Western Europe, following implementation of the EU's Urban Waste Water Treatment Directive (1991/271/EEC, EEA 2005). Although the Nordic region's wastewater treatment system is well developed, a significant proportion of household wastewater systems are not connected to a municipal treatment facility and it is in such cases that phosphorus risks making its way into the aquatic environment. Nordic Ecolabelling therefore also sets the requirement for a clear information text stating that the product contains phosphorus and that it should not be used if the wastewater system is not connected to mains drainage (se O17).

The Detergent Regulation (648/2004/EC) has recently been amended with regard to phosphorus.

This amendment has been published in Regulation (EU) No 259/2012, which contains regulations on the level of phosphorus in laundry detergents and dishwasher detergents for household use. The limit is set at 0.3 g P/wash for dishwasher detergents, but the change does not enter into force until 1 January 2017. Nordic Ecolabelling wishes to lead the way and is therefore setting requirements before the legislation comes into force.

Norway has a national legal requirement[18] concerning phosphorus in chemical products, including dishwasher detergents, which limits phosphorus to 3.8% by weight. Sweden has a new regulation on phosphates that came into force[19] on 1 July 2011 and manufacturers have therefore been forced to remove phosphates from dishwasher detergents. The Nordic Ecolabelling is not an official authority and therefore not a controlling organ that makes sure that national legislation is fulfilled, this is the responsibility of the applicant. In the requirement text below it has been made clear that there is national legislation regarding phosphor in the Noridic countries and that needs to be fuldilled, see more information regarding this below.

[17] EEA Report No 7/2005, Source apportionment of nitrogen and phosphorus inputs into the aquatic environment, 07.12.2005
[18] Norwegian Regulation No. 922 on restrictions in using environmentally hazardous chemicals and other products (Product Regulations) (01.06.2004).
[19] http://www.regeringen.se/sb/d/11615/a/121432

It has also become clear in recent years that phosphorus reserves have shrunk and phosphorus may become a limited resource in the future. Nordic Ecolabelling wants its criteria to restrict the use of finite resources.

### Phosphates and phosphonates

Phosphates (DID no. 2504) and phosphonates (DID no. 2512) are used in dishwasher detergents as complexing agents.

Phosphates (DID no. 2504) are quite strong complexing agents[20]. Phosphates have good environmental properties in that they are not harmful to aquatic organisms and as they are inorganic there is no great point in considering degradability. However, phosphates are nutrients and contribute to eutrophication of the aquatic environment. Phosphates are therefore not problem-free. Phosphates are also regulated separately in several countries in order to reduce emissions of phosphates into vulnerable aquatic environments.

Phosphonates (DID no. 2512) are a range of phosphorus compounds that are good complexing agents[21]. Phosphonates are not harmful to aquatic organisms, but they are persistent and not anaerobically degradable. Phosphonates contain phosphorus and are therefore a nutrient that can lead to eutrophication. Phosphonates are used as complexing agents to a lesser extent than phosphates, since phosphates are much stronger complexing agents.

Denmark has hard water, and phosphates are much better than other complexing agents in hard water. Phosphates also allow a reduction in dosing compared with other complexing agents such as citrates. Higher dosing requires more chemicals, which leads to increased emissions of chemicals into the aquatic environment. Within Nordic Ecolabelling, we promote low dosing, as this leads to both reduced chemical use and reduced distribution.

The alternative to phosphates in dishwasher detergents is currently citrates or complexing agents of the types MGDA and GLDA, and these appear to work well.

An examination of licence data shows major differences in the quantities of phosphorus and phosphonates used in the ecolabelled products. However, the vast majority have moved away from phosphates as the main complexing agent which, in some countries, is due to legislation prohibiting/restricting phosphorus and phosphates in dishwasher detergents.

The EU Ecolabel's criteria for dishwashing detergents[22] entirely prohibit phosphates. Nordic Ecolabelling has instead chosen to restrict the quantity of phosphorus in the products. The new limit of 0.20 g/wash means that phosphates cannot be used as the main complexing agent, as much more phosphate is required for that than the limit permits. The limit of 0.20 g/wash means that a maximum dose (see O15) of 20 g/wash may contain around 0.79 g phosphate (of the type STPP)/wash or approx. 0.96 g phosphonate/wash (or combinations of the two). The limit of 0.20 g/wash is tougher than the limit of 0.30 g/wash that will come into force under the Detergent Regulation,

[20] Lindquist, *Information om kompleksbindingspotentialer*, 2002 (Information on complexing potential)
[21] Lindquist, Information om kompleksbindingspotentialer, 2002
[22] EU Ecolabel criteria for dishwasher detergents, Commission Decision of 28 April 2011

but is in line with the data that Nordic Ecolabelling has gathered from dishwasher detergent licences.

National legislation
Note that national legislation takes precedence over this requirement[23]. Swedish legislation prohibiting phosphates in dishwasher detergents permits 0.5% phosphorus in the products, which equates to around 0.10 g P/wash at the maximum dose of 20 g/wash and is thus tougher than this requirement. Norwegian legislation has a limit for phosphorus of 3.8% by weight per product[24], making the Nordic Ecolabelling requirements tougher than Norwegian legislation on the question of phosphorus. This means that where the legislation is stricter than the Noridic Ecolabelling's requirement the legislation is what needs to be fulfilled for the product. In the cases where the national legislation is not as strict as the limit in this requirement this requirement needs to be fulfilled. Ie the strictest limit for the product in the country where it is sold/ marketed has to be fulfilled. Nordic Ecolabelling is not an authority and therefore not a controlling organ to check if legislation is fulfilled, this is the applicants responsibility.

Since rinsing agents have been added as a separate product in this version of the criteria, a limit for rinsing agents has also been added. The limit has been changed after the public consultation and the new limit refers to approximately 1% of phosphorous in the final product (based on a 3ml dosage of about 3 grams). The limit of phosphorous is set to 0.03 g P/dish. This limit is considered reasonable based on the formulation of rinsing agents.

In version 5 of the criteria, the limit for phosphorus was 2.0 g/wash with a supplementary requirement of max 0.05 g phosphonate/wash, making the new requirement tougher than the one in version 5. The separate requirement regarding phosphates has been deleted, since the requirement concerning total levels of phosphorus has been tightened and phosphates have also been restricted in the requirements regarding degradability.

**Requirement:**

The total level of phosphorus must not exceed the following:

Dishwasher detergents ≤ 0.20 g P/wash.

Rinsing agents ≤ 0.030 g P/wash

*"Note the national legislations concerning phosphorous in the Nordic countries. In Norway phosphorus is regulated in «Forskrift om begrensning i bruk av helse- og miljøfarlige kjemikalier og andre produkter (produktforskriften)», §2- 12 and § 2-14. In Sweden phosphorus is regulated in Regulation 1998:944.*

✉ The amount of phosphorous has to be made clear in the formulation plus a calculation of the total quantity of phosphorus.

## O8 Substances that must not be included in the end product or exist as actively added substances in the ingredients

### APEO and APD

Alkylphenol ethoxylates (APEO) and/or alkylphenol derivatives (APD) are a group of non-readily degradable surfactants that are proven endocrine disruptors. The substances

[23] Swedish legislation prohibiting phosphates in dishwasher detergents permits 0.5% phosphorus in the products, which equates to around 0.10 g P/wash at the maximum dose of 20 g/wash and is thus tougher than this requirement.
[24] Norwegian Regulation No. 922 on restrictions in using environmentally hazardous chemicals and other products (Product Regulations) (01.06.2004).

have been phased out of most products through legislation. These are prohibited on the grounds of their poor degradability under the requirement concerning the degradability of surfactants. However, Nordic Ecolabelling still wishes to explicitly prohibit these compounds in the requirement on prohibited substances.

**Perborates**
Perborates are classified as toxic for reproduction – Repr. 1B, H360 (under the CLP Regulation) and are thus prohibited under requirement 3. They are therefore not included on this list.

**Organochlorides and reactive chlorine**
Reactive chlorine compounds such as sodium hypochlorite or organochlorides such as triclosan are used as disinfecting/antibacterial substances. They can be, or can lead to the formation of, toxic and non-readily degradable or bioaccumulative substances. They can also lead to bacterial resistance against bactericides and antibiotics. Sodium hypochlorite is such an undesirable substance, since sodium hypochlorite can constitute an environmental risk due to the risk of forming organochlorides.

**EDTA** is not readily degradable and the EU's risk assessment states that under the conditions at municipal water treatment plants EDTA is either not broken down or only breaks down to a slight degree[25]. Today there are environmentally better alternatives that are degradable and that can replace EDTA. One example is MGDA (methylglycine diacetate). EU is also actively working to limit EDTA in the paper industry[26].

**DTPA** (diethylenetriamine pentaacetate) has the same properties as EDTA, and DTPA can be seen as an expanded version of EDTA. DTPA is constructed in the same way as EDTA but with one extra ethylene, one extra amine and one extra acetate group[27]. DTPA has also been classified as toxic for reproduction cat. 2 H361 (Repr. cat. 3, R63) and is therefore also excluded from use through requirement O4 CMR substances. The classification is not yet harmonised under the CLP Regulation and DTPA that is not classified can be found on the market. It therefore needs to be unequivocally excluded from use.

LAS (linear alkylbenzene sulphonate) is toxic to aquatic organisms and not degradable in anaerobic environments. LAS is excluded by this requirement since there is no requirement in this document that all surfactants need be anaerobically degradeable.

**Nitro musk**
Nitro musks and polycyclic musks generally have undesirable properties regarding both health and the environment. Some such compounds are already excluded from use via the requirement concerning CMR substances. Communication with fragrance manufacturers has confirmed that many European companies continue to use polycyclic musks in consumer products. The use of nitro musks is extremely limited, but manufacturers outside Europe still produce substances such as Musk ambrette that are prohibited

[25] CEFIC report EUROPEAN RISK ASSESSMENT ON EDTA, 2003, http://www.cefic.org/Documents/Other/B013.pdf (14.06.2013)
[26] 2006/C 90/04, Commission Communication on the results of the risk evaluation and the risk reduction strategies for the substances: Dibutylphthalate; 3,4-Dichloroaniline; Di-'isodecyl' phthalate; 1,2-Benzenedicarboxylic acid, di-C9-11-branched alkyl esters, C10-rich; Di-'isononyl' phthalate; 1,2-Benzenedicarboxylic acid, di-C8-10-branched alkyl esters, C9-rich; Ethylenediaminetetraacetate; Methyl acetate; Monochloroacetic acid; n-Pentane; Tetrasodium ethylenediaminetetraacetate, Official Journal of the European Union, 13.04.2006
[27] www.wikipedia.com (14.06.2013)

under IFRA. Excluding nitro and polycyclic musks therefore remains relevant as a preventive measure. The following substances are counted as nitro musks and polycyclic musks and are listed in table B.

**Table B Musk compounds**

| Musk compound | CAS no. |
|---|---|
| Musk xylene* | 81-15-2 |
| Musk ambrette | 83-66-9 |
| Musk moskene | 116-66-5 |
| Musk tibetine | 145-39-1 |
| Musk ketone | 81-14-1 |
| HHCB | 114109-62-5, 114109-63-6, 1222-05-5, 78448-48-3 and 78448-49-4 |
| AHTN | 1506-02-1 and 21145-77-7 |

** Note that Musk xylene is on the Candidate List and is therefore excluded from use under the requirement regarding Substances of Very High Concern.*

### Substances of Very High Concern and the Candidate List

Substances of Very High Concern (SVHC): SVHCs are, as the name suggests, substances that require great caution due to their inherent properties.

They meet the criteria in Article 57 of the REACH Regulation: Substances that are CMR (category 1 and 2 under the Dangerous Substances Directive 67/548/EEC or category 1A and 1B under the CLP Regulation), PBT substances, vPvB substances (see section below) and substances that have endocrine disruptive properties or are environmentally harmful without meeting the criteria for PBT or vPvB. SVHCs may be included on the Candidate List with a view to them being inscribed on the Authorisation List, which means that the substance becomes regulated (ban, phasing out or other form of restriction). Since these substances face being phased out or banned, it is only logical for Nordic Ecolabelling not to permit this type of substance in ecolabelled products.

A substance may meet the criteria for SVHC without being included on the Candidate List, so there is no direct equivalence between SVHC and the Candidate List.

To avoid cross-references between PBT, vPvB, CMR and endocrine disruptors, instead of excluding SVHC (which does cover some CMR, PBT, vPvB, etc) Nordic Ecolabelling chooses to exclude from use the substances on the Candidate List and to separately exclude PBT, vPvB and endocrine disruptors. This should still cover all SVHC substances.

There is a general legal requirement that the supplier must inform customers of any SVHC substances in the goods, including the packaging. Nordic Ecolabelling has not received any indications that SVHC substances are likely to be contained in packaging for dishwasher detergents and therefore only sets SVHC requirements regarding constituent substances in the product.

### PBT (Persistent, bioaccumulative and toxic) and vPvB (very persistent and very bioaccumulative)

PBT (Persistent, bioaccumulative and toxic) and vPvB (very persistent and very bioaccumulative) http://esis.jrc.ec.europa.eu/index.php?PGM=pbt) and vPvB (very persistent and very bioaccumulative) are organic compounds defined in Annex XIII of

REACH (Regulation (EC) No 1907/2006)[28]. Such substances are generally undesirable in the view of Nordic Ecolabelling.

Most PBT/vPvB substances are automatically excluded from dishwasher detergents due to the restrictions on environmentally harmful substances (see O6). Since some substances, particularly vPvB, might not be excluded under O6, Nordic Ecolabelling prohibits these under this requirement.

Nordic Ecolabelling has not received any indications that PBT and/or vPvB substances are likely to be contained in packaging for dishwasher detergents and has therefore chosen only to set this requirement regarding constituent substances in the product.

**Potential endocrine disruptors**
Potential endocrine disruptors are substances that may affect the hormone balance in humans and animals. Hormones control a number of vital processes in the body and are particularly important for development and growth in humans, animals and plants. Changes in the hormone balance can have unwanted effects and here there is an extra focus on hormones that affect sexual development and reproduction. Several studies have shown effects on animals that have been traced to changes in hormone balance. Emissions to the aquatic environment are one of the greatest sources for the spread of endocrine disruptors[29]. Nordic Ecolabelling bans the use of substances that are considered to be potential endocrine disruptors, category 1 (there is evidence of a change in endocrine activity in at least one animal species) or category 2 (there is evidence of biological activity related to changes in hormone balance), in line with the EU's original report on "Endocrine disruptors"[30] or later studies[31].

**NTA and LAS**
The following substances/groups are no longer explicitly excluded in this requirement, since they are already excluded by other requirements.

**NTA** is excluded from use by requirement O4, as it is classified as carcinogenic.

**Nanoparticles/nanomaterials** are currently not considered to be common in automatic dishwashing detergents and the Nordic Ecolabelling has in the version of the criteria not included a requirement to exclude nanoparticles/nanomaterials. This will however be considered in the next version of the criteria document.

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[28] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:136:0003:0280:en:PDF
[29] Miljøstatus i Norge (2008): Hormonforstyrrende Stoffer. http://www.miljostatus.no/Tema/Kjemikalier/Noen-farlige-kjemikalier/Hormonforstyrrende-stoffer/#D (dated 26 February 2009)
[30] Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption. FINAL REPORT. European Commission DG ENV / BKH Consulting Engineers with TNO Nutrition and Food Research. 21 June 2000. http://ec.europa.eu/environment/archives/docum/pdf/bkh_main.pdf
[31] EU (2002a): Study on the scientific evaluation of 12 substances in the context of endocrine disruptor priority list of actions. European Commission DG ENV / WRc-NSF. November 2002
http://ec.europa.eu/environment/endocrine/documents/wrc_report.pdf
EU (2002b): Study on gathering information on 435 substances with insufficient data. FINAL REPORT. European Commission DG ENV / BKH Consulting Engineers. 15 November 2002
http://ec.europa.eu/environment/endocrine/documents/bkh_report.pdf#page=1

**Requirement:**

The following substances must not be included in the end product or exist as actively added substances in the ingredients:

- EDTA
- DTPA
- Reactive chlorine compounds
- Alkylphenol ethoxylates (APEO)
- Alkylphenol derivatives (APD)
- LAS
- Nitro musks and polycyclic musk compounds
- Substances considered to be potential endocrine disruptors in category 1 or 2 on the EU's priority list of substances that are to be investigated further for endocrine disruptive effects. The list can be read in its entirety at http://ec.europa.eu/environment/endocrine/documents/final_report_2007.pdf (Appendix L, page 238 onwards)
- Substances that have been judged in the EU to be PBT (persistent, bioaccumulative and toxic) or vPvB (very persistent and very bioaccumulative), in accordance with the criteria in Annex XIII of REACH. See e.g. http://esis.jrc.ec.europa.eu/index.php?PGM=pbt
- Substances on the Candidate List*.

** The Candidate List can be found on the ECHA website at: http://echa.europa.eu/candidate-list-table*

☒ Duly completed and signed declaration that the requirement has been fulfilled (Appendices 3 and 4 may be used).

## 4.2.1 Fragrances, colourants and preservatives

### O9 Fragrances

Fragrances are used in dishwasher detergents to give the products a pleasant scent. Fragrances often contain substances that are both sensitising and environmentally harmful, and Nordic Ecolabelling therefore wishes to limit the use of these substances.

The need for fragrances in dishwasher detergents arises from the fact that many customers in the Nordic market continue to demand fragrances.

**IFRA**

IFRA, which stands for the "International FRagrance Association", represents the fragrance industry. The association conducts safety assessments of individual fragrances and blends, and has public standards/guidelines for the use of fragrances. The requirement for compliance with IFRA's guidelines[32] ensures that the manufacture, handling and use of fragrances in the products meets specific standards in terms of prohibited substances, restricted use and purity. IFRA's guidelines support the industry in offering products that are safe for consumers and for the environment. The guidelines apply to the manufacture and handling of all fragrance materials for all applications and contain the complete IFRA standards.

[32] http://www.ifraorg.org/

**SCCS opinion and sensitising substances, the 26 fragrance substances encompassed with labelling according to the Detergent legislation and substances classified as sensibilising**

The aim of the requirement concerning sensitising fragrances in Nordic Swan Ecolabelled products is to provide as much protection against new allergies as possible. Nordic Ecolabelling has decided that it is appropriate to go further than the legislation in terms of both limiting sensitising substances and declaring them.

In June 2012, a new opinion was issued by the EU's Scientific Committee on Consumer Safety (SCCS) proposing that 127 substances should be declared on products instead of the previous 26 substances.

The 26 substances are included in the 127. The complete list of these 127 substances is contained in the report "Scientific Committee on Consumer Safety SCCS OPINION on Fragrance allergens in cosmetic products (SCCS/1459/11)"[33].

In the draft version of this criteria document sent on public consultation there was a requirement that all 127 fragrance substances in the SCCS opinion were to be limited to 100ppm per substance. During the public consultation Nordic Ecolabelling has been in dialoge with SCCS and IDEA (International Dialogue for the Evaluation of Allergens )[34] regarding the 127 allergenes. In the SCCS opinion there is no limit set for when they recommend the allergenes to be labelled on the packages. In the dialouges with SCCS and IDEA Nordic Ecolabelling was told that work is being done to set what test methods that should be used to quantify the 127 fragrance substances. The Nordic Ecolabelling has therefore chosen to only add the 7 fragrance substances with most risk of being sensitising in this version of the criteria for Automatic dishwasher detergents.

The fragrance producer can avoid these substances if they have difficulties to analyze them. Nordic Ecolabelling sees this as a first step toward a stricter approach to fragrances allergenes.

As in the previous version of the criteria (version 5) the 26 fragrance substances encompassed by the declaration requirements in the Detergents regularion (648/2004/EEC) and its subsequent amendments are limited to 100ppm per substance ub tgus version. The requirement also covers other fragrances that have a sensitising classification of H317/R43 and/or H334/R42, limiting their use to no more than 100 ppm, which is the same as in version 5.

**Fragranced packaging**

Fragrances that are used in the packaging, i.e. not as part of the dishwasher detergent, must meet the requirement concerning handling in line with IFRA's guidelines. This is because Nordic Ecolabelling wishes to ensure that all fragrances in the products are handled in a safe manner.

Fragrances in the packaging must not contain substances classified as carcinogenic, mutagenic or toxic for reproduction. This is a new requirement in this version of the criteria aimed at ensuring that Nordic Swan Ecolabelled products and their packaging do

[33] http://ec.europa.eu/health/scientific_committees/consumer_safety/docs/sccs_o_073.pdf
[34] IDEA: http://www.ideaproject.info/

not contain CMR substances. In order to gather the fragrance requirements in one place, this CMR requirement is inserted here for perfumed products.

The level of sensitising substances in fragrances used in packaging is judged to be extremely small in relation to the fragrances added to tablets/powders/gels. Nordic Ecolabelling has therefore chosen not to restrict the allergens in such fragrances, since the limits below are far higher than the amounts of fragrance substances that may occur in the packaging.

## Requirement

The constituent substances added to the end product as fragrance substances must fulfill the following:

- The fragrance substances must be produced and handled in line with the guidelines of the International Fragrance Association (IFRA). The manufacturer (of the fragrance and the dishwasher detergent) must comply with the stated requirements in the IFRA standard concerning prohibition, restricted use and specified purity criteria for materials.
- The 26 fragrance substances encompassed by the declaration requirement in the Detergents Regulation 648/2004/EEC and its subsequent amendments must not be included in the product at levels > 100 ppm (>0.010%) per substance.
- The fragrances classified as H317 (R43) and/or H334 (R42) must not be included in the product at levels > 100 ppm (> 0.010%) per substance.
- The following fragrance substances must not be included in the product at levels > 100 ppm (> 0.010%) per substance:

**Table 3. Limited fragrance substances**

| INCI name (or, if none exists, perfuming name according to CosIng) | CAS number |
|---|---|
| Cananga Odorata and Ylang-ylang oil | 83863-30-3; 8006-81-3 |
| Eugenia Caryophyllus Leaf / Flower oil | 8000-34-8 |
| Jasminum Grandiflorum / Officinale | 84776-64-7; 90045-94-6; 8022-96-6 |
| Myroxylon Pereirae | 8007-00-9; |
| Santalum Album | 84787-70-2; 8006-87-9 |
| Turpentine oil | 8006-64-2; 9005-90-7; 8052-14-0 |
| Verbena absolute | 8024-12-02 |

- Fragrance substances added to the packaging as a fragrance must comply with the following:
  - The fragrances used to fragrance the packaging must not contain CMR substances.
  - The fragrance in the packaging must be produced and handled in line with the guidelines of the International Fragrance Association (IFRA). The manufacturer (of the fragrance and the dishwasher detergent) must comply with the stated requirements in the IFRA standard concerning prohibition, restricted use and specified purity criteria for materials.

- ☒ Duly completed and signed declaration from the dishwasher detergent /rinsing agent manufacturer and the fragrance manufacturer showing that the fragrance has been handled and/or manufactured in line with IFRA's guidelines. Appendices 3 completed by the producer of the dishwasher detergent and 4 completed by the producer of the raw material can be used.
- ☒ Duly completed and signed declaration from the fragrance manufacturer on the content of the relevant fragrance substances in the fragrance (e.g. analysis certificate for the 26 allergens encompassed by declaration requirements in the Detergents Regulation 648/2004 EEC and its subsequent amendments) plus information on substances classified as H334 and H317 and the above mentioned 7 fragrance substances. Appendix 4 (completed by the fragrance producers) or equivalent documentation can be used.
- ☒ Calculation of the quantity of the 26 allergens encompassed by declaration requirements in the Detergents Regulation 648/2004 EEC and its subsequent amendments, the substances classified as H317 (R43) and H334 (R42) and the above mentioned 7 fragrance substances in the end product.
- ☒ Duly completed and signed declaration that the fragrances used in the packaging do not contain CMR substances, and have been handled in line with IFRA's guidelines, covering questions O3 and O9 in appendix 4 (completed by the fragrance producer).

### O10 Approved colourants

Colourants are primarily added to the products for aesthetic reasons, but some raw materials may also be coloured. Colourants are added in extremely small quantities and are not considered one of the major environmental concerns in a dishwasher detergent. Colourants are also regulated by the CDV requirement.

The requirement states that colourants must be permitted in the EU's directives on foodstuffs or they must not be bioaccumulative. Colourants that are approved for use in foods are considered not to be environmentally harmful. Colourants that are not bioaccumulative do not enter the food chain and their harmfulness to the environment is therefore limited.

Bioaccumulative substances collect in the fat tissue of living organisms and can cause long-lasting damage to the environment.

Unless otherwise proven, substances are considered to be bioaccumulative if logKow ≥ 4.0 under the OECD's guidelines 107 or 117 or equivalent. Such a substance may be tested on fish in line with the OECD's testing instructions 305 A-E. If the substance has a biological concentration factor (BCF) ≥ 500 the substance is considered to be bioaccumulative, and if the BCF < 500 the substance is considered not to be bioaccumulative. If there is a measured BCF value, it is always the highest measured BCF that is used in assessing a substance's bioaccumulative potential.

The requirement has been changed in line with GHS/CLP, and now uses the figures logKow < 4 (previously 3) and BCF < 500 (previously 100).

The requirement has been updated after the public consultation to be in line with other checmical technical product groups (such as cleaning products and handdishwashing detergents) within the Nordic Ecolabelling. An addition to the requirement has been done to include all colourants regardless of function due to the fact thar some colourants are added to products with other functions.

**Requirement**

Colourants, in the final product or in constituent substances regardless of function, can not be bioaccumulative or must be approved for use in food with an E-number. Colourants are not considered to be bioaccumulative if having a logKow < 4.0 or a BCF < 500. If information is availabler on both BCF and logKow, the information on BCF must be used.

☒ Duly completed and signed declaration that the requirement has been fulfilled (Appendices 3 completed by the producer of the dishwasher detergent and 4 completed by the producer of the raw material may be used).

☒ Statement of the E-number (number allocated as part of approval for use in food), or logKow value (octanol/water partition coefficient) or BCF value (bioconcentration factor).

## O11 Preservatives

Preservatives are added to liquid products (e.g. rinsing agents) or raw materials to prevent bacterial growth in the products. The composition of the product may also affect the need for preservatives. Some ingredients such as surfactants in combination with ethanol can have a preserving effect[35]. Fragrances can also have a preserving effect as they contain various solvents, and have a harmful effect on the environment.

Preservatives are generally toxic to aquatic organisms and can cause hypersensitivity and allergies, which Nordic Ecolabelling wants to limit. Preservatives may be used in end products and in constituent substances only if they are not bioaccumulative. Bioaccumulative substances collect in the fat tissue of living organisms and can cause long-lasting damage to the environment.

Unless otherwise proven, substances are considered to be bioaccumulative if:

- logKow ≥ 4.0, in line with the OECD's guidelines 107 or 117 or equivalent. Such a substance may be tested on fish in line with the OECD's testing instructions 305 A-E.
- the substance has a biological concentration factor (BCF) ≥ 500 the substance is considered to be bioaccumulative.

If there is a measured BCF value, it is always the highest measured BCF that is used in assessing a substance's bioaccumulative potential.

Requirements that limit preservatives must permit the use of preservatives and give the manufacturers sufficient options, since too restrictive a range of options forces manufacturers to use just a few preservatives and possibly in higher concentrations. In the longer term, a limit could lead to a greater risk of allergies from the substances used, since exposure to individual substances will be higher. Another long-term risk is the develop-

[35] Miljøprojekt 1048, 2005: "Substitution af kritiske råvarer og udvikling af miljøvenlige produkter". Miljøindsats for indutrielle og institutionsanvendte rengøringsmidler. A. Kamper and T. T. Andersen, DHI Institut for Vand og Miljø. D. Nylén, Danish Toxicology Centre. Danish Environmental Protection Agency, 2005.

ment of resistance to preservatives if the trend is to increase the use of just a small number of preservatives.

Requirements for a Challenge test have been discussed but have not been introduced for dishwasher detergents, since Nordic Ecolabelling judges that preservatives are not very common in either dishwasher detergents or rinsing agents. They are used more in preserving the constituent substances.

**Requirement:**

Preservatives that are used in the end product or one of the constituent substances must not be bioaccumulative. Preservatives are judged not to be bioaccumulative if BCF < 500 or logKow < 4. If both values are available, the values for the highest measured BCF are to be used.

✉ Documentation of BCF or logKow (e.g. safety data sheet, see O1).

## 4.3 Degradability and CDV

### O12 Surfactants

Surfactants can be found in both dishwasher detergents and rinsing agents, but they are in much higher concentrations in rinsing agents. Nordic Ecolabelling has previously only had requirements for aerobically degradable surfactants in dishwasher detergents, but since rinsing agents are now included in more and more multicomponent products, there are grounds to introduce a requirement for this product group that surfactants classified as environmentally harmful with H410, H411, H412 or H413 must be degradable both aerobically and anaerobically. Surfactants that are not environmentally harmful only need to show that they degrade aerobically. In the draft criteria sent out on public consultation it was required that all surfactants had to degrade both aerobically and anaerobically. This has been adjusted after the public consultation so that only the surfactants classified as environmentally hazardous have to be anaerobically degradeable. The reason for that is that the surfactants used in automatic dishwashing detergents are not the same types as in other application partly because it is not good with foamin surfactants in the dishwasher. The choice between different surfactants is therefore more limited for this type of products and Nordic Ecolabelling has decided to make it possible to use small amounts of non anaerobically degradable surfactants as long as they are not classified as environmentally harmful and that the final product fulfills the requirement in O13 (anaerobic degradation).

Substances that accumulate in the environment can pose a risk both now and in the future if they are acutely toxic. Knowledge of the long-term effects of non-readily degradable substances is often in short supply. Ready degradability under oxygen-rich (aerobic) and oxygen-poor (anaerobic) conditions is therefore of major environmental importance. Surfactants are considered important in this context, since they are a group of organic substances that appear in the products (primarily in rinsing agents) and since many surfactants are toxic to aquatic organisms. The Detergent Regulation requires surfactants to be aerobically degradability.

The latest version of the EU Ecolabel criteria for dishwasher detergents[36] has dropped the requirement that all surfactants must be anaerobically degradable. Instead there is a limit for the total quantity of anaerobically degradable organic substances. Nordic

[36] http://ec.europa.eu/environment/ecolabel/products-groups-and-criteria.html

Ecolabelling, however, believes there are still grounds to set a requirement that surfactants must be both aerobically and anaerobically degradable.

**Requirement:**

- All surfactants must be readily degradable (aerobically).
- All surfactants classified as environmentally hazardous* must also be anaerobically degradable.

**Classified as environmentally hazardous with H410, H411, H412, H413.*

☒ Reference to the DID list dated 2014. If the DID list lacks the relevant data for surfactants, data may be taken from the safety data sheet on condition that the data is reliable and that the test methods are in agreement with Appendix 2. Section B of the DID list shows how to make the calculations of the various factors. It is also permitted to refer to analogous observations, as long as they are carried out by a competent third party, and refer to relevant data from literature that has been subjected to scientific scrutiny.

☒ The classification of the surfactant should be stated in accordance with the MSDS or appendix 4 (completed by the raw material producer).

### O13 Anaerobic degradability

A general requirement on the permitted amount of non-anaerobically degradable substances reduces the use of non-biodegradable substances to a minimal level. The requirement concerning the degradability of organic substances gives ecolabelled products as a whole a good degradability profile and reduces the potential accumulation of non-readily degradable substances in waste sludge and in other relevant (anaerobic) pockets in the environment. In some places, sludge is used as a soil improver and in this case it is important that the sludge contains as low a level of non-readily degradable substances as possible.

Examples of substances commonly used in dishwasher detergents that are not anaerobically degradable (anNBO[37]) include: certain surfactants (e.g. sulphonated anionic surfactants), phosphonates, fragrances and colourants. Organic substances with poor degradability remain in the environment for longer times, which increases the risk of them damaging nature. Rapid degradability is therefore desirable.

A combination of requirements concerning the amount of non-anaerobically degradable substances and CDV ensures that the total quantity of non-degradable substances and/or toxic substances is limited, but still provides a certain amount of flexibility in the formulation of the products.

The requirement limit for non-anaerobically degradable substances remains unchanged from version 5 and is judged to remain an appropriate limit. The requirement therefore continues to set a limit on non-anaerobically degradable substances of 1.2 g/wash. The limit for rinsing agents is new for this version, and has been set at 0.30 g/wash. This limit is more strict than the EU Ecolabel limit, calculated using a 3 ml dose. The limit was adjusted to 0.30g/wash after the public consultation due to comments that the 0.50g/wash (in the draft version during the consultation period) was percentwise a lot higher than for automatic dishwasher detergents. License data hasalso been checked and most products seem to have very low amounts of substances that do not degrade anaerobically.

[37] Anaerobic degradability means degrading without the aid of oxygen.

**Exceptions: IDS and cumene sulphonates**
IDS (iminodisuccinate, DID 2555) and cumene sulphonates are exempted from the requirement regarding anaerobic degradability.

Cumene sulphonates (DID 2540) have updated data on the DID list (dated 2014) regarding degradation, DF=0,05. This in combination with cumene sulphonates not being bioaccumulable since BCF = 1.41 and logKow = -2.7, cumene sulphonates can, in line with Appendix 2 to the criteria, be exempted from the calculation of anNBO.

IDS, iminodisuccinate, is exempted from the requirement concerning non-anaerobically degradable substances (decided by the Nordic Ecolabelling Board in December 2009), in this version of the criteria, as there is a need for alternatives to NTA and phosphates and IDS is judged to be a more desireable complexing agent than many others. Since NTA has now formally been classified as Carc3, demand for alternatives is set to increase. During a transitional period, when the possibility of using alternatives to NTA and phosphates is limited, there is therefore good reason to permit the use of IDS.

IDS is readily degradable, has DF=0,05 on the DID-list and is "non-toxic" to aquatic organisms[38]. In addition, logKow < 3, which means the substance is not potentially bioaccumulative.

The DID list has a pass/fail limit for anaerobic degradation of 60% after 56 or 60 days. IDS has a documented 39% anaerobic degradation after 56 days, which means that it counts as non-anaerobically degradable on the DID list.

Even with the new list the above exemptions are relevant.

**Requirement:**

The content of organic non-anaerobically degradable substances in the dishwasher detergent (multifunction and singefunction products) and rinsing agent must not exceed:

Dishwasher detergent ≤ 1.2 g/wash

Rinsing agent ≤ 0.30 g/wash

The calculation for rinsing agent uses a dose of 3 ml.

Iminodisuccinate (DID 2555) and cumene sulphonates (DID 2540) can be omitted from the calculation of anDEG.

☒ Documentation referring in the first instance to the DID list dated January 2007. For substances not covered by the list, other documentation such as test reports or copies of references in literature may be used. For test methods, see Appendix 2.

## O14 CDV (Critical Dilution Volume)

The critical dilution volume (CDV) is to be calculated for all the chemicals included in the dishwasher detergent or the rinsing agent. CDV is a theoretical value that takes account of each substance's toxicity and degradability in the environment. The method was developed together with the EU Ecolabel.

In this version of the criteria, the CDV limit can only be documented with chronic data. The use of chronic data is generally preferable, since long-term toxicity data is considered

[38] According to the DID list, IDS has an LC50/EC50 of 81 mg/l (= acute) and an NOEC of 17 mg/l (= chronic)

of higher quality and gives more precise/reliable estimates of potential environmental effects compared with acute toxicity data. The DID (detergent ingredient database) list has recently been revised with focus on gathering more substances to the list and to update existing data (including chronic data). After the publci consultation the DID-list (2014) has been finalized and new limits for CDV have been caluclated for automatic dishwashing detergents, ie the values in this final version of criteier for automatic dishwasher detergents are not the same as in the draft version on public

In the previous version of the criteria for dishwasher detergents, only acute data was used in calculating CDV. To determine a limit in chronic data, acute data from the licensing has been used and converted into chronic data. The limit in version 5 was as follows:

Single function products $CDV_{acute}$ < 70,000 litres/wash

Multifunction products $CDV_{acute}$ < 80,000 litres/wash

Plus point score requirements as follows:

1 point for $CDV_{acute}$ < 65,000 litres/wash

2 points for $CDV_{acute}$ < 50,000 litres/wash

3 points for $CDV_{acute}$ < 25,000 litres/wash

In this version (version 6), the new limit for multifunctional products was $CDV_{chronic} \leq$ 35,000 litres/wash and for singlefunctional products $CDV_{chronic} \leq$ 25,000 litres/wash in the public consultation draft. This tougher limit has been introduced based of licence data showing that the majority of the ecolabelled multifunctional products come in below

$CDV_{chronic}$ 35,000 litres/wash, when calculated into chronic data with the DID-list from 2007, and have therefore in version 5 also received 1-2 points (for the equivalent CDV in acute data). The limit for single function products have been set to 25,000 litres in the same way.

In version 6, the points score requirements have been removed and CDV is now simply an obligatory requirement. In order for the products to remain more or less at the same level as before, the limit has been set where the majority of the products are already, plus this also brings the limit more in line with the limit in the EU Ecolabel criteria for dishwasher detergents[39].

After the public consultation of this criteria document the new DID-list had been finalized and new CDV limits have therefore been calculated based on DID-list values from 2014. The new limits are a bit higher than the ones in the public consultation due to the adjustments made in the new DID-list and to maintain the same level of differentiation between products as in the public hearing. The limits are as follows:

$CDV_{chronic}$ multifunctional products ≤ 38,000 litres

$CDV_{chronic}$ singlefunctional products ≤ 28,000 litres

$CDV_{chronic}$ rinsing agents ≤10,000 litres

[39] EU Ecolabel criteria for dishwasher detergents, Commission Decision of 28 April 2011 (www.ecolabel.eu)

The aim of this revision has not been to make the largest environmental gains by strengthening the CDV-limit and the limits have therefore been chosen to maintain the most part of the products labelled when it comes to the CDV requirement. This version of the criteria has focused on the requirements on packaging (WUR and fill ratio) where the requirements have been tightened the most in combination with less use of energy (by lowering the test temperature for the performance test). The EU Ecolabel requirement is:

$CDV_{chronic}$ must not exceed the following limits:

Single function 25,000 l/wash

Multifunction 30,000 l/wash

Rinsing agent 10,000 l/wash

In this version, rinsing agents have been given a separate limit in order to allow rinsing agents to be used in combination with many different products, but also since in certain cases there may be different manufacturers of rinsing agents and dishwasher detergents, which increases the need to label the rinsing agent. The CDV limit for rinsing agents has been set at 10,000 litres/wash, which is the same limit as in the EU Ecolabel, but is also in line with the licence data that Nordic Ecolabelling has on rinsing agents. Rinsing agent is calculated at a dose of 3 ml.

**Requirement:**

The critical dilution volume (CDV) is to be calculated for all the chemicals included in the dishwasher detergent or rinsing agent. CDV is a theoretical value that takes account of each substance's toxicity and degradability in the environment.

The critical dilution volume, $CDV_{chronic}$, must not exceed the following:

**Table 4. CDV limits**

| | **$CDV_{chronic}$** |
|---|---|
| Dishwasher detergents (multifunction) | 38,000 litres/wash |
| Dishwasher detergents (single function) | 28,000 litres/wash |
| Rinsing agents | 10,000 litres/wash |

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

where

$dose_i$ = dose of component i, expressed in g/wash

$DF_i$ = degradation factor for substance i

$TF_{chronic}$ = chronic toxicity factor

When calculating $CDV_{chronic}$ for rinsing agents, a dose of 3 ml is used.

✉ Calculations of $CDV_{chronic}$ for the dishwasher detergent and/or rinsing agent showing that the requirement has been fulfilled. Documentation of each substance shall refer to the DID list dated January 2014 or later. Part B of the DID list is to be used for calculating substances not on the DID-list.

# 4.4 Dosing, packaging and consumer information

## O15 Dosing

Dosing instructions are important in avoiding overdosing or incorrect dosing. Overdosing leads to unnecessary emissions of chemicals into the wastewater. For dishwasher detergents, overdosing is to a certain extent self-regulating due to the limited space in the detergent compartment in the dishwasher. However, Nordic Ecolabelling believes it is still important to set a maximum level for how much a dose may weigh in order to encourage lower doses. Dishwasher detergents must also meet the performance requirement (see O22) at the given dose, which in itself stops the products being "ineffective".

The dosing requirements remain from version 5, but with the difference that the points score requirements have now been removed. The levels have been kept as they were, see the requirement below. The dosing requirement has been made into one requirement instead of two to make it clearer what applies for multifunction and single function products.

The EU Ecolabel does not have a direct requirement concerning maximum dose per wash, instead having a requirement concerning "Total Chemicals", which is the dose excluding water. The limit has been set at 20 g/wash and 22 g/wash for single and multifunction products respectively.

**Exemptions**

Rinsing agent is exempted from this requirement since rinsing agent is not dosed in the same way as dishwasher detergent. It is instead poured into the dishwasher's reservoir. The dishwasher then controls the dose for each wash.

**Requirement:**

The maximum dose per wash must not exceed the following limit values in Table 4.

**Table 5. Limit values for dosing**

| Dishwasher detergents | dose g/wash |
|---|---|
| Singlefunction products | 18 |
| Multifunctional products | 20 |

Rinsing agent is exempted from this requirement.

✉ Dose must be specified in the formulation (in line with O1).

## O16 Consumer information

The dose calculated for soft water must be clearly stated on the packaging and that dose is also the one used in the performance test (O22). The risk of overdosing is reduced when the instructions are clear and when they correlate with the dose at which the product is effective. Nordic Ecolabelling has earlier set requirements for dosing only in soft water in combination with a recommendation of the use of salt, to avoid misunderstandings and overdosing. The recommendation of dosage for soft water is due to the fact that most parts of the Nordic countries have soft water and that a use of salt works when the water is a bit harder.

When dishwashing in hard water, the water shall be softened with salt instead of increasing the dose of the dishwashing detergent, and this information shall also be included on the packaging.

An amendment of the detergents regulation have been published, EU 259/2012. It gives the following instructions:

"the standard dosage expressed in grams or ml or number of tablets for the main washing cycle for normally soiled tableware in a fully loaded 12 place settings dishwasher, making provisions, where relevant, for soft, medium, and hard water hardness."

In the EU text it is said that the dosage is to be split up into water hardness where there is need for such, ie there is a possibility for the license holders to only write the dosage to soft water on the packaging. Nordic Ecolabelling has discussed this with Norwgian Environment Agency and they said it would be a possible way to interpret the legislation.

But since many of the producers of autmatic dishwasher detergents also sell their products outside the Nordic countries it is very likely that applicants will send in labels according to the legislation. Nordic Ecolabelling has therefore rephrased the requirement after the public consultation period. The new requirement text requires that it has to be clear on the label what dosage that is intended for soft water and that salt can be used when harder water. The encouragement of using salt as a softner instead of increasing the dosage is to encourage the consumer not to overdose.

The requirement has also been updated with a requirement of stating that the product is performing well from 50ºC, to make that clear to the consumer. Nordic Ecolabelling includes this to make the environmental gains larger by telling the consumer that it works at lower temperatures. This can be stated with texts like: "now efficient at 50ºC", "efficient already at 50ºC", "performance tested at 50ºC" or similar.

Version 5 contained a requirement concerning the declaration of contents on the packaging in line with the Detergent Regulation (648/2004/EC and 907/2006/EC), which requires certain constituent substances to be declared. Since this is a legal obligation, the requirement has been deleted from this version of the criteria.

**Requirement:**

The following should clearly be stated on the label:

- The recommended dosage* for soft water (0-6º dH) and a recommendation is to be given to use salt to soften the water in the dishwasher.
- Information stating that the product is efficient at /from 50ºC (or lower if tested at a lower temperature).

** Recommended dosage for soft water is to be the same as the one used in the performance test.*

Exceptions:

- If multifunction products meet the performance requirement without added salt in the machine, the recommendation about salt does not need to be given.
- The text on water softener is not required in Norway.

The requirement does not apply to rinsing agents.

✉ Sample label.

## O17 Information on phosphates

Since the Nordic region still has many households that are not connected to a municipal wastewater treatment system, Nordic Ecolabelling considers it important that products containing phosphates (which are restricted under O7) carry an information text for consumers about this. This will make it easier for consumers with their own wastewater

system to choose a product that is free from phosphates. Read more about phosphorus and phosphates in O7.

There are national legislation regarding phosphorous in the Nordic countries (see O7) which includes labelling of products containg phosphates. There is a prohibition against phosphates in Sweden, ie products with phosphates can not be sold in Sweden. This means that products for the Swedish market fulfilling legislation will not be labelled as the requirement below.

Norway has its own requirements for labelling products when they contain phosphorus (FOR 2004-06-01).

In Norway, dishwasher detergents must be labelled as follows (see also the phosphorus requirement in O7 for the Norwegian law concerning phosphorus content):

a) "MED FOSFAT" if the product's content of phosphate or other phosphorus compound gives more than 0.2% phosphorus by weight.

b) "UTEN FOSFAT" if the product's content of phosphate or other phosphorus compound gives 0.2% phosphorus or less by weight.

This labelling will most likely disappear when the EU legislation, EU 259/2012 regrarding phosphorous and phosphates, enters into force and then also includes Norway. A draft has been sent out on public consultation[40], but the change has not yet been finalized when this document is written. The exemption for Norway is therefore only valid as long as the Norwegian requirement regarding phosphate labelling is valid.

**Requirement:**

If the product contains phosphates, the product must display the following or equivalent text:

"Products that contain phosphates should only be used by households that are connected to mains drainage."

*Note the national legislations concerning phosphorous in Sweden and Norway (for Norway see FOR-2004-06-01-922).*

✉ Sample label.

## O18 WUR (weight-utility ratio)

The purpose of the weight-utility ratio (WUR) is to reduce the amount of packaging and promote the use of recycled materials, thus helping to ensure a reduction in the unnecessary transport of packaging and air, and so lower $CO_2$ emissions. WUR is a measure of the amount of packaging used to deliver an amount of product with a certain benefit. This limit promotes the use of concentrated products by relating the amount of packaging to the dose and so favouring, for example, small concentrated dishwasher tablets over large tablets, fewer of which will fit in a pack.

Nordic Ecolabelling has chosen to set a requirement for primary packaging in the dishwasher detergent criteria for two reasons: There is little steerability of distribution packaging and it punishes small-scale manufacturers unnecessarily harshly. In addition, it

[40] Remiss av "Forslag om endring av krav til innhold og merkning av fosfor i vaskemidler (2013/232) http://www.miljodirektoratet.no/no/Horinger/Forslag-om-endring-av-krav-til-innhold-og-merking-av-fosfor-i-vaskemidler-2013232/

is through optimising primary packaging that the greatest environmental gains can be made for products such as dishwasher detergents.

The weight of the primary packaging is calculated as the weight of the packaging in which the dishwasher detergent/rinsing agent is packaged. It also includes labels and any lids.

The level in the requirement has been set based on Nordic Ecolabelling's licensing work for dishwasher detergents. A review of current licences showed that a limit of 2.75 g/wash is reasonable, since the majority of the products have a WUR of around 2.5 - 2.75 g/wash or less. In version 5 the limit was 4.0 g/wash, making this version tougher than version 5. The limit was adjusted to 2,75 g/wash after the public consulation due to comments that came in, where many comments stated that a limit of 3 g/wash would be better. 2.75 g/wash has however been found to be a reasonable level according to dta from licensing  that the Nordic Ecolabelling has used to evaluate this limit.

When calculating the WUR, the weight of the primary packaging is used, along with the weight of the packaging material that is not recycled. The calculation is done according to the following formula:

$WUR = \Sigma [(Wi + Ni)/(Di * ti)]$, where

Wi = weight (g) of packaging component (i) including label.

Ni = weight (g) of non-recycled (virgin) material in packaging component (i). If the proportion of recycled material in the packaging component is 0%, Ni = Wi.

Di = number of standard recommended dosages that packaging (i) contains.

ti = the number of times packaging component (i) is used for the same purpose through a return or refill system (r=1 if the packaging is not reused for the same purpose).

In the EU Ecolabel's calculation, the non-recycled material (which in the formula above is N) is not included in the formula, ie it is a calculation only on primary packagaging per dosage. The limit value for the EU Ecolabel is 2.0 g/wash but with a supplementary requirement that at least 80% of the packaging must be recycled. In a comparison with the Nordic Ecolabelling calculation, the requirement level is somewhat higher.

This version makes it possible to ecolabel rinsing agents as a separate product, which also means that there is a separate WUR limit for rinsing agents. The limit for rinsing agents has been set based on the data that Nordic Ecolabelling has on rinsing agents. The limit has therefore been set at 1.5 g/wash. This limit has been calculated based on a dose of 3 ml rinsing agent.

The aim of this requirement is to minimise the amount of packaging in relation to the amount of dishwashing detergent transported in the packaging. Less packaging means less use of transport, and that reduces emissions of $CO_2$. The requirement is steerable in that the dishwasher detergent manufacturer is able to influence the choice of packaging with regard to size and material.

**Requirement:**

The product's weight-utility ratio (WUR) must not exceed

**Table 6. Limit values for WUR**

| | **WUR** |
|---|---|
| Dishwasher detergents (multifunctional and singlefunctional) | 2.75 g/wash |
| Rinsing agents | 1.5 g/wash* |

** Rinsing agent is calculated at a dose of 3 ml.*

To calculate the product's weight-utility ratio (WUR) see Appendix 2.

☒ Calculation of WUR for the product.

☒ Declaration of how much recycled material the packaging contains.

### O19 Fill ratio

A MECO analysis (see section 4.1) of the environmental impact of dishwasher detergents highlights distribution of the products as one key parameter. This is thus relevant to the requirements on WUR and fill ratio. In a comparison of different products (both eco-labelled and non-ecolabelled) Nordic Ecolabelling has noticed that different packs are filled to different levels (i.e. contain different amounts of product in relation to the volume of the packaging). In the comparison, we found a difference between the products with a fill ratio (number of doses per litre of packaging) over and those under 22 doses/litre. Many of the non-ecolabelled products had a fill ratio of less than 22 doses/litre and the ecolabelled products tended to be above that level. Since this is the first time that a fill ratio has been introduced as an obligatory requirement for dishwasher detergents, Nordic Ecolabelling considers a limit of over 22 doses per litre to be reasonable.

In version 5 the fill ratio was a points score requirement, not an obligatory requirement. The points score requirement meant that manufacturers who optimised their packaging were rewarded with points.

The levels in the previous points score requirements were as follows:

2 points if fill ratio > 30 doses/litre

1 point if fill ratio > 25 doses/litre

The aim of this requirement is to ensure that packs are optimally filled in order to reduce unnecessary use of transport. The manufacturers decide for themselves what packaging is used and can thus steer how each product is packaged. One addition to the requirement in this version is that all sizes of packaging must meet the requirement. In the points score requirement in the previous version, it was sufficient for the average value for the different packs to meet the requirement.

The fill ratio requirement also applies to liquid dishwasher detergents (e.g. gels) since these have a set dose and the fill ratio can be calculated in the same way as for powders and tablets.

Since rinsing agents are sold as liquid products in full plastic bottles and do not contain a specific number of doses, this requirement is not deemed relevant for rinsing agents, and rinsing agents are thus exempted from this requirement.

**Requirement:**

The fill ratio is the ratio between the number of doses and the volume of the packaging in litres. It is to be calculated for all sizes of packaging for the same product variant (dishwasher detergents).

Fill ratio ≥ 22 doses/litre

*Rinsing agent is exempted from this requirement.*

✉ Calculation of the fill ratio.

## O20 Packaging

Plastic materials are to be marked in line with DIN 6120, section 2 or equivalent. The aim of the requirement is to make sorting and recycling of plastic materials simpler after use.

See also the comments concerning SVHC and PBT in packaging under requirement O8 plus CMR substances under requirement O3.

**PVC and chlorinated plastics**

PVC and other chlorinated plastics must not be used for packaging or labels. This requirement prevents the use of plastic materials that can be problematic in their incineration or disposal.

PVC is sometimes used in labels and packaging. The majority of bottles used for packaging chemical products are made from polypropylene (PP) or polyethylene (PE), although internet searches show that PVC packaging is marketed and sold for certain types of packaging. These may be of relevance to cosmetic products at least (see e.g. http://www.arcabox.it/en/pvc-pet-plastic-packaging.html). A Finnish label manufacturer, Auraprint, which supplies labels to Finnish chemical producers with a Nordic Swan Ecolabel licence, states that the materials commonly used for labels are PP, PE, PET and paper[41]. Auraprint has ceased to use PVC in labels and reports that many other suppliers have done likewise. Internet searches do, however, show that PVC is still used to a certain degree for various types of label outside the Nordic region. This indicates that a ban on PVC remains relevant, even though the use of PVC packaging is limited.

PVC and other halogenated plastics are excluded from Nordic Swan Ecolabelled products, since they have adverse effects on the environment during disposal and contain substances with adverse health effects. Putting PVC in with combustible waste introduces additional chlorine to the waste flow. Chlorine is a prerequisite for the formation of highly toxic dioxins in flue gas, but as there are several chlorine sources other than PVC, increased incineration of PVC does not necessarily result in an increased quantity of dioxin as chlorine is not the limiting factor for the formation of dioxin in the incineration plant[42,43]. The added quantity of PVC would, however, increase the

[41] Ääritalo, 2012: Personal communication between Terhi Uusitalo, Nordic Ecolabelling, and Juha Ääritalo, Auraprint, 08.11.2012.
[42] Hjelmar, 2002: Forbrænding af PVC: Påvirkning af massestrømmene gennem et forbrændingsanlæg. DHI – Institut for Vand og Miljø.
[43] Erichsen & Hauschild, 2000: Technical data for waste incineration – background for modelling of product specific emissions in a life cycle assessment context. Department of Manufacturing Engineering, Technical University of Denmark, 2000.

formation of acid flue gases and the need for cleaning of flue gases, resulting in waste from the flue gas cleaning process.

**DIN marking**

Plastic materials are to be marked in line with DIN 6120 section 2, ISO 11469:2000 or equivalent in order to ensure easier sorting and recycling of plastics once the product has been consumed. The marking can also show that the product does not contain PVC, thus sending a signal to the customer and increasing Nordic Ecolabelling's chances of control/steerability.

In Norway[44] and Sweden[45] there are now new symbols for marking packaging. These symbols have been evaluated as clear for the consumers and Nordic Ecolabelling has included them as an alternative to DIN-marking in the requirement below.

Marking packaging materials other than plastic is also relevant for recycling. A lot of packaging material for dishwasherdetergents are made of card board, ie it is relevant to include sorting instructions for card board as well. The name of the requirement has therefore changed from "plastic packaging" to "packaging".

**Requirement:**

- PVC and other chlorinated plastics must not be used for packaging.
- To ease the sorting of packaging materials for recycling all packages need to have information on what they are made of and how they should be sorted in the relevant user stage. The packaging can be marked according to European standards (for example DIN 6120, section 2) recommendations from national recycling systems (such as for example Grønt Punkt's or FTiAB's recommendations) or equivalent.

☒ Duly completed and signed declaration that the requirement is fulfilled. Appendix 3 (completed by the producer of the dishwasher detergent) can be used.

☒ Documentation showing labelling and/or instructions on how to sort the packaging material on the primary packaging or on the label.

## O21 Take-back system

There has previously been a voluntary industry agreement on packaging operations in Norway, which has led Nordic Ecolabelling to have a requirement to ensure that licensees for a number of (45) product groups comply with this regulation.

Requirements for return systems have now been incorporated into the Norwegian Waste Regulations, which means that the Nordic Ecolabelling requirement for membership in a return company will be out of date and therefore no longer need to be managed by Nordic Ecolabelling in a separate requirement.

**Requirement:**

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

[44] Grønt Punkt: www.grontpunkt.no (2013-12-05)
[45] FTiAB, Förpacknings och Tidningsinsamlingen: www.ftiab.se (2013-12-05)

## 4.5 Performance

### O22 Dishwasher detergent performance

The requirement for a function test is a quality and energy related requirement guaranteeing a good wash result at 50˚C with a normal dose of the ecolabelled product. Under the requirements, the dishwasher detergent must be as good as or better than the reference detergent in the different function tests.

**Temperature and test method**

Energy consumption accounts for much of the environmental impact of dishwashing. In this version, the wording has therefore been amended to state that the test must be conducted at 50˚C instead of 55˚C, in order to ensure that the products are effective even at the lower temperature. Washing at 50˚C was contained in version 5, but only as a points score requirement under which a number of licensees earned points. This suggests that it is possible to conduct the test at 50˚C. Nordic Ecolabelling has also been in contact with manufacturers of dishwasher detergents, who find a requirement for dishwashing at 50˚C perfectly reasonable. Discussions with manufacturers of dishwasher detergents indicate that lowering the temperature further would be more difficult while also maintaining good dishwashing results.

The easiest way to make a quick comparison of how much energy is saved by washing at 50˚C instead of 55˚C is to consider the energy used to heat up the water. Assuming all parameters are the same apart from the temperature during washing and the dishwasher is connected to cold water at 12˚C, it takes around 0.50 kWh to heat 10 litres of water to 55˚C and around 0.44kWh to heat it to 50˚C. A family using their dishwasher daily would therefore save around 18 kWh per year. If one assumes that half of all households in the Nordic region[46] have a dishwasher, this means that approximately 450,000 MWh would be saved each year if everyone lowered the temperature with 5 ºC on their dishwasher. The test used to show performance is IKW's (Association of German Detergent Manufactures e V /Industrieverband Körperpflege und Waschmittel e.V.) "Method for Ascertaining the Cleaning Performance of Dishwasher Detergents" (Part B, updated 2005)[47], which is also one of the methods used in the EU Ecolabel criteria for dishwashing detergents. This method will also continue to be the method required by Nordic Ecolabelling. The EU Ecolabel criteria and version 5 of the Nordic Ecolabelling criteria for dishwasher detergents also include another method, namely EN 50242. The method is not included in this version, since it is primarily a test of dishwashers rather than detergents. The IKW method is the method generally used for licensing. However, a test carried out during licensing for the EU Ecolabel is not entirely the same as the Nordic Ecolabelling test unless the IKW test has been conducted specifically at the lower temperature.

Dishwashing using short programmes has been discussed over the course of the project. However, following contact with a number of dishwasher detergent manufacturers, it has become clear that the best way to save energy is to lower the water temperature, even if this means using a longer programme. There is therefore no requirement for a performance test for dishwashing on short programmes, except that any claims regarding performance on short programmes must be supported by test results.

[46] Based on a population of 25 million people, http://sv.wikipedia.org/wiki/Norden
[47] http://www.ikw.org/fileadmin/content/downloads/Haushaltspflege/HP_DishwasherA_B_e.pdf

**Reference detergent**
The reference detergent previously used in the test, IEC reference detergent B (IEC-B), has been complemented by IEC reference detergent D (IEC-D)[48] in this version. The first contains perborates, which Nordic Ecolabelling excludes from use on the grounds of their classification as toxic for reproduction. IEC-D does not contain perborates, but is otherwise judged to perform well and be more in line with the products currently used in the Nordic market.

In discussions with manufacturers of dishwasher detergents and the manufacturer of the reference detergent, Wfk Testgewebe[49], it was mentioned that a number of tests have been conducted comparing the old and new reference formulations. Nordic Ecolabelling has collected information regarding performance of the new reference detergent (IEC-D) compared to the old reference during the public consultatin period. During the consultation period Nordic Ecolabelling has also found out that there is an ongoing revision of the IKW standard test method. The timeplan for the revision of the IKW standard is that is should be finalized by fall 2014. The Nordic Ecolabelling will be following this revision and evaluate the new standard to see if it can be implemented as an alternative test. This has also been stated in the requirement.

Nordic Ecolabelling has after the public consultation period decided to give the option between testing detergents against either the old (IEC-B) reference or the new (IEC-D) reference. All tests are to be performed at 50° C for the tested product and 55° C for the reference detergent. The reason for keeping IEC-B as an option in this version is that the amounts of IEC-D still is in limited amounts at WFK but also to give the licenseholders who already passed the test at 50° C a possibility to use the same test results as long as the formulations haven't changed.

The temperature for the reference detergents is kept at 55° C to keep that at a solid level of performance. Nordic Ecolabelling has received results from tests with both reference detergents both at 50° C and 55° C and have seen some differences in the results. Some stains are less cleaned at the lower temperature for the reference detergents. The lowering of temperature to 50° C is seen as a way of making the requirement more stringent, since temperature effects the results. The differences are however not so large that it would be impossible for the producers to fulfill the requirement. Nordic Ecolabelling choses to maintain the reference detergent at 55° C to ensure that the level of performance stays the same as in the previous version and not being lowered.

In this version, the test has also been clarified by specifying a water hardness of 6º dH. In the IKW test, the suggested hardness is 8-10 dH, which is higher than the water hardness commonly found in the Nordic region. Generally speaking it is easier to clean at a lower water hardness than at a higher, which there were comments stating that were sent in during the public consultation. The requirement of doing the test at 6º dH is kept since it means that all tests of the products and references will be done at the same water and will thereby be easier to compare.

**Results and soil categories**
The IKW test applies four different categories of food soil, within which there are various types of soil. The results are evaluated in line with the IKW standard, i.e. some

[48] Wfk, IEC-D: http://www.testgewebe.de/index.php?page=gsm-d
[49] Wfk: http://www.testgewebe.de/

results are based on visual inspection and others on calculations of soil amounts. In this revision of the criteria it has been made clear that there are two ways of evaluating the results:

1. The tested product performs as well as or better than the reference formula in alla 4 soil categories (bleachable stains, burnt-on soils, amylase specific soils and protease specific soils).
2. The average value of all 8 soil types is better for the test product than for the reference.

A 95% confidence interval is to be used for the evaluation of the results in alternative 2.

The test product compared to the reference needs to be tested in at least 3 dish cycles according to the IKW method, which means that the calculation of avarage values (alternative 2 above) includes all 24 test results.

The four soil categories and the 8 soil types are set out in table C below:

**Table C Soil categories, soil types in the IKW test and how results are evaluated**

| Soil category | Soil type | Evaluation of the result |
|---|---|---|
| Bleachable stains | Tea | Visual |
| Stubborn, burnt-on soil | Minced meat on glass dishes | Visual |
| | Milk in the microwave | Visual |
| Amylase-specific soils | Starch mix | Calculation |
| | Porridge | Visual |
| Protease-specific soils | Egg yolk | Calculation |
| | Minced meat on porcelain plates | Visual |
| | Egg/milk | Calculation |

Since some results are to be evaluated by visual inspection with grades from 1-10 according to the IKW standard and other in % all values need to be recalculated to the same index scale to then calculate a total average value.

### Rinsing agents

In this version of the criteria, rinsing agents may be ecolabelled as a separate product. Rinsing agent is used primarily to avoid watermarks on the dishwasher load and to stop food residues re-adhering during rinsing. Since there are no standarized performance tests for rinsing agents Nordic Ecolabelling has, in this version, chosen to focus on strict limitations of ingoing substances in the rinsing agents. In previous versions of the criteria, when rinsing agents could be labelled if they were in combination with a detergent, there was no performance requirements for rinsing agents. In the EU Ecolabel there are no performance test required for rinsing agents either.

In the draft criteria sent out for public consultation a proposal for performance testing of rinsing aids was included, but the evaluation of the results are difficult which was also statated in the comments received. The test is not to evaluate the effect of rinsing agents, but rather to test dishwasher detergents in combination with rinsing agents.

### Claims

If the dishwasher detergent packaging carries any claims about functions other than cleaning at 50°C as tested, such claims must also be supported by test results according to relevant test methods for each function. Such claims might include a statement that the

product cleans at 40˚C (or other temperatures <50˚C) or on short programmes. There may also be claims that the product is specifically designed for stains that are not included in the test above.

**Adjustment 22 April 2015:**
After version 6.0 was adopted the following issue occurred:

- Difficult to obtain dishwashers washing both at 50 and 55°C
- The few dishwashers that wash both at 50 and 55°C, have different length of the washingprograms

In other words, it is hard to create identical test conditions for the product at 50°C and the reference at 55°C.

Therefore another option was given: the reference with the best performance at 50°C (IEC-D), may be used at 50°C (instead of 55°C). This reference is almost as efficient at 50°C as the old reference (IEC-B) at 55°C.

**Adjustment 13 April 2016:**

The IKW test instruction has been updated in 2015 and the Nordic Ecolabelling has decided to include the updated version of the standard test as an alternative to the test instruction from 2005. The main differences in the updated test compared to the version from 2005 is that the soil types have been changed, see the added column in table C2 below.

**Table C2. Updated soil types included in the IKW standard updated in 2015**

| Soil category | Soil type | Soil type (version från 2015) |
|---|---|---|
| Bleachable stains | Tea | Tea |
| Stubborn, burnt-on soil | Minced meat on glass dishes | Milk skin |
| | Milk in the microwave | Milk in the microwave |
| Amylase specific soils | Starch mix | Starch mix |
| | Porridge | Pasta |
| Protease-specific soils | Egg yolk | Egg yolk |
| | Minced meat on porcelain plates | Minced meat on porcelain plates |
| | Egg/milk | Crème brûlée |

Besides the updated soil types the standard has been updated on other points as well such as:

- ”Loading”, ie how the dishwasher should be loaded with dishes has been updated. Pictures in the updated standard will show how to load the machine.
- Starch (mix) – the recipe for the starch mix has been updated and the amounts applied on the plates have increased.
- Egg yolk – the amounts applied on the plates have increased.

- Crem brûlee and pasta are new soil types, ie the methods connected to them are new.
- The specifications regarding dishwaher programs has been made clearer.

A text has been added in the appendix with the test instruction saying that soil types from the two different versions of the standard can not be combined, ie the test is to be performed according to one of the versions of the test instructions.

The text in the requirement saying:

*The IKW standard test is currently under revision and is expected to be finished after summer 2014. Nordic Ecolabelling will evaluate the test when it is finished and may include it as an alternative test.*

has been replaced by:

*The applicant can choose to perform the performance test according to IKW's standard test from 1995 with updates done in 2005 or the test updated in 2015.*

**Requirement:**

- At the recommended dose, the dishwasher detergent must perform as well as or better than the reference detergent (IEC-D or IEC-B), with an average for each soil categories (of minimum 3 cylcles) in all four soil categories (bleachable, burnt-on, amylase-specific, protease-specific). Alternatively the product is considered as good as the reference if the average value for all 8 soil types (at a minimum of 3 dish cycles) is better than the reference detergent. A 95% confidential interval is to be used when evaluating the results.
- Cleaning performance is to be tested in accordance with the standard test* for dishwasher detergents developed by IKW (Association of German Detergent Manufactures e V /Industrieverband Körperpflege und Waschmittel e.V.), with the following amendments:
  - Wash temperature 50˚C for the test product and 55˚C for the reference (IEC-D or IEC-B)
  - Water hardness 6 ˚dH
  - Reference detergent IEC-D or IEC-B (depending on temperature) is to be used at a dose of 20 g
  - Reference rinsing agent (formula III)** at dose setting of between 2 and 3.
  - The same machine and the same type of program will be used
- Other claims concerning the product's performance must also be tested (with relevant test methods) and proven (short programmes, lower temperatures, specific stains and so on).

**The IKW standard test is currently under revision and is expected to be finished after summer 2014. Nordic Ecolabelling will evaluate the test when it is finished and may include it as an alternative test.*

*** The reference rinsing agent is "formula III" as specified in Appendix D of the standard EN 50242:2008.*

✉ Complete test report (results are to be reported in line with Appendix 5) including test results, conclusions and a description of the test.

✉ Test proving any functional claims made on the packaging.

## 4.6 Quality and regulatory requirements

To ensure that the product meets the criteria for the Nordic Ecolabel throughout the time that the licence remains valid, Nordic Ecolabelling sets requirements concerning quality procedures for licensees and any subcontractors. To ensure that the Nordic Swan Ecolabel is only awarded to businesses that comply with the relevant legislation, there is also a requirement that the licensee is not in dispute with any authorities.

### O23 Laws and regulations

The requirement ensures that the holder of the Nordic Swan Ecolabel licence takes responsibility for safety, the working environment and environmental legislation, as well as enforcing compliance with terms and conditions/conventions at the production facilities during the production of the ecolabelled products.

**Requirement:**

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

✉ Duly signed application form.

### O24 Licence administrators

A clear description must be submitted (in the form of an organisational chart, for example) to show who is responsible for ensuring that the Nordic Ecolabelling criteria are fulfilled and who the Nordic Ecolabelling contact is, in order to ensure that Nordic Ecolabelling is informed of any changes or problems.

**Requirement:**

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

🕮 Organisational chart showing the responsible contacts.

### O25 Documentation

The licence applicant must save a copy of the submitted documentation in order to be able to refer back to it at a later date, and so that it is available to personnel during the period of validity of the licence. On an inspection visit, the documentation must be available to Nordic Ecolabelling.

**Requirement:**

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

🔑 On-site inspection.

### O26 Changes and nonconformities

A Nordic Swan Ecolabelled dishwasher detergent is ecolabelled on the understanding that the formulation is exactly as approved by Nordic Ecolabelling. Any changes must therefore be reviewed and assessed by Nordic Ecolabelling before they are incorporated into the production. The licensee must have procedures in place to ensure that Nordic

Ecolabelling is informed of any planned product and marketing changes that have a bearing on the requirements.

Unforeseen nonconformities that affect the Nordic Swan Ecolabelled product must be reported to Nordic Ecolabelling and procedures for this must be in place at the factory.

**Requirement:**

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

🕮 Procedures detailing how product and marketing changes and unforeseen nonconformities are handled.

### O27 Traceability

Procedures for traceability of the Nordic Swan Ecolabelled product are important in ensuring that, in the event of a complaint, the factory can trace back from the end product to the ingredients that went into it. In the case of problems in production, a traceability system can help ensure that all ingredients in the Nordic Swan Ecolabelled product are the same and in the same quantities as at the time of application.

**Requirement:**

The licensee must have a traceability system for the production of the Nordic Swan Ecolabelled dishwasher detergent/rinsing agent.

✉ Description of/procedures for fulfilment of the requirement.

### O28 Marketing

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

The label must be positioned so that there is no doubt as to what the label refers and so that it is clear that just the dishwasher detergent is ecolabelled.

More information on marketing can be found in "Regulations for the Nordic Ecolabelling of Products" dated 22 June 2011 or later versions.

On 17 November 2014 the Board of Directors decided to remove requirement O28 Marketing from the criteria.

# 5 Changes compared to previous version

The main changes compared with the previous version are:

- Introduction of specific limit values for rinsing agents
- Removal of points score requirements*
- Tougher requirements concerning allergens (including fragrances), phosphorus, CDV and WUR
- Fill ratio as an obligatory requirement

** The points score requirements have been removed because the points matrix is no longer considered relevant, since the requirements have been tightened and rewritten in this version. There were, for example, points score requirements for fragrance*

*free formulations, $CDV_{acute}$ and fill ratio. In this version, $CDV_{acute}$ has been converted to $CDV_{chronic}$ and the scope for points has now diminished. With regard to fragrances, the restriction of environmentally harmful fragrances and the 127 SCCS allergens means that fragrance levels are already highly restricted. Fill ratio and cleaning at 50 degrees have become obligatory requirements.*

Further changes are listed in Table D below.

**Table D Changes from version 5 to 6**

| Requirement | Version 5 | Version 6 | Comments |
|---|---|---|---|
| Product group definition | Rinsing agent alone cannot be labelled. | Rinsing agents can be labelled without being linked to a specific dishwasher detergent. | |
| Points score requirements | A minimum score of 5 points must be achieved. | Only obligatory requirements. | The points matrix has been removed in this version. |
| Rinsing agents | Calculated with a dosage of 6ml | Calculated with a dosage of 3ml | The dosage used for the calculations of rinsing agents has been changed from 6ml to 3ml to be harmonized with EU Ecolabel. |
| O4 Sensitising substances | Substances classified as H334 and/or H317 are limited to ≤ 0.1% by weight. | The product must not contain substances that are classified as sensitising – H334 (R42) and/or H317 (R43). The following substances are exempted from the requirement:<br>Enzymes (including stabilizers and preservatives in the enzyme raw material)<br>Fragrances (see O10)<br>Fragrances containing substances classified with H334 and/or H317 can not occur at levels* that trigger the following warning on the end product's packaging: "Contains (name of sensitising substance). May cause an allergic reaction." | The requirement has been adjusted to only allow enzymes and fragrances labelled as sensitizing. |
| O6<br>Environmentally harmful substances | A fragrance blend is considered one substance, so the classification of the constituent fragrance substances does not need to be stated.<br>No substances classified as R50/53 can be included in the product.<br>Substances with the following risk phrases are limited to 0,10g/wash:<br>R51/53 (H411)<br>R52/53 (H412) | Substances classified as H410 (R50/53), H411 (R51/53) and/or H412 (R52/53) are restricted under the following formula:<br>Dose (g/wash) • (100 • $_{conc}$H410 + 10 • $_{conc}$H411 + $_{conc}$H412) ≤ 0.10 g/wash<br>Or<br>Dose (g/wash) • (100 • $_{conc}$R50/53 + 10 • $_{conc}$R51/53 +$_{conc}$R52/53) ≤ 0.10 g/wash<br>Surfactants classified as H412 are exempted from the requirement, on condition that they are readily degradable* and anaerobically degradable** (see also O12). | The new requirement means that all ingoing substances must meet requirement O6 and that there is a formula inserted in the requirement. |
| O7<br>Phosphorus | The total level of phosphorus must not exceed 2.0 g/wash. The maximum permitted level of phosphonates is 0.05 g/wash. | The total level of phosphorus must not exceed the following:<br>Dishwasher detergents ≤ 0.20 g P/wash.<br>Rinsing agents ≤ 0.030 g P/wash<br>Note the national legislations concerning phosphorrous in the | The new requirement means that there is only one requirement for phosphorus, with no specific phosphonate requirement. |

<table>
<tr><td></td><td>National legislation takes precedence over this requirement.</td><td>Nordic countries. Phosphates are prohibited in Sweden in automatic dishwashing detergents (with a maximum amount of phosphorus of 0.5% by weight).</td><td></td></tr>
<tr><td>O8<br>Prohibited substances</td><td>In the previous version, this was dealt with in O9, O10, O11 and O15.</td><td>Merger of several requirements from version 5 plus addition of substance groups such as:<br>APEO, potential endocrine disruptors, SVHC, PBT, vPvB</td><td>Requirements have been merged and substances added to the list.<br>Perborates have been deleted from the require-ment, since they are already excluded under the classification requirement.</td></tr>
<tr><td>O9<br>Fragrances</td><td>Substances listed below* or other fragrance substances classified as sensitizing with R43 / H317 and/or R42 / H334 may not be present in the product in concentrations above 0,010 wt% (100 ppm).<br>*26 substances excluded from use.</td><td>-The 26 fragrance substances encompassed by the declaration requirement in the Detergents Regulation 648/2004/EEC and its subsequent amendments must not be included in the product at levels > 100 ppm (>0.010%) per substance.<br>-The fragrances classified as H317 (R43) and/or H334 (R42) must not be included in the product at levels > 100 ppm (>0.010%) per substance.<br>-The following fragrance substances must not be included in the product at levels > 100 ppm (>0.010%) per substance:
<table>
<tr><th>INCI name (or, if none exists, perfuming name according to CosIng)</th><th>CAS number</th></tr>
<tr><td>Cananga Odorata and Ylang-ylang oil</td><td>83863-30-3; 8006-81-3</td></tr>
<tr><td>Eugenia Caryophyllus Leaf / Flower oil</td><td>8000-34-8</td></tr>
<tr><td>Jasminum Grandiflorum / Officinale</td><td>84776-64-7; 90045-94-6; 8022-96-6</td></tr>
<tr><td>Myroxylon Pereirae</td><td>8007-00-9;</td></tr>
<tr><td>Santalum Album</td><td>84787-70-2; 8006-87-9</td></tr>
<tr><td>Turpentine oil</td><td>8006-64-2; 9005-90-7; 8052-14-0</td></tr>
<tr><td>Verbena absolute</td><td>8024-12-02</td></tr>
</table>
-Fragrance substances added to the packaging as a fragrances must comply with the following:<br>- The fragrances used to fragrance the packaging must not contain CMR substances.<br>- The fragrance in the packaging must be produced and handled in line with the guidelines of the International Fragrance Association (IFRA). The manufacturer (of the fragrance and the dishwasher detergent) must comply with the stated requirements in the IFRA standard concerning prohibition,</td><td>The requirement has been amended to apply to 7 of the allergenes listed as the most sensibilizing from the SCCS opinion. Fragrances in packaging is limited in this requirement by excluding CMR and that the fragrances need to be handled according to IFRA guidelines.</td></tr>
</table>

| | | | |
|---|---|---|---|
| | | restricted use and specified purity criteria for materials. | |
| O10<br>Colourants | LogKow < 3 or BCF < 100. | Colourants, in the final product or in constituent substances regardless of function, can not be bioaccumulative or must be approved for use in food with an E-number. Colourants are not considered to be bioaccumulative if having a logKow < 4.0 or a BCF < 500. If information is availabler on both BCF and logKow, the information on BCF must be used. | Amended in line with GHS. |
| O12<br>Surfactants | Surfactants must be readily degradable. | -All surfactants must be readily degradable (aerobically).<br>-All surfactants classified as environmentally hazardous* must also be anaerobically degradable.<br>*Classified as environmentally hazardous with H410, H411, H412, H413. | Addition that all surfactants must be anaerobically degradable. |
| O13<br>Degradability | The content of non-organic substances in dishwasher detergents must not exceed<br>1.2 g/wash | The content of organic non-anaerobically degradable substances in the dishwasher detergent and rinsing agent must not exceed:<br>Dishwasher detergent ≤ 1.2 g/wash<br>Rinsing agent ≤ 0.30g/wash | A new limit value has been introduced for rinsing agents. |
| O14<br>CDV | CDVacute<br>Multifunction ≤ 70,000<br>Single function ≤ 80,000<br>Plus points score requirement in 3 stages | CDVchronic<br>Dishwasher detergent (multi) ≤ 38,000<br>Dishwasher detergent (singel) ≤ 28,000<br>Rinsing agent ≤ 10,000 | CDV has switched entirely to chronic values. The limits have been brought more in line with the EU Ecolabel. |
| O16<br>Consumer information | The recommended dosage must only be specified for soft water (0-6 dH). The dosage specified must be the same as that used in performance tests. For hard water, it must be recommended to use the water softener in the dishwasher. An exception is if a multifunction product fulfils performance requirements without the use of salt in the machine. In this case the recommenddation is not necessary. The text regarding water softening is not required in Norway. | The following should clearly be stated on the label:<br>-The recommended dosage* for soft water (0-6º dH) and a recommendation is to be given to use salt to soften the water in the dishwasher.<br>-Information stating that the product is efficient at /from 50ºC (or lower if tested at a lower temperature).<br>*Recommended dosage for soft water is to be the same as the one used in the performance test. | The text regarding recommended dosage has been changed due to the fact that dosage instructions are to be written according to EU 259/2012. An addition to this requirement has been done for the producers to inform the user that the product performs at a lower temperature. |
| O17<br>Information on phosphates | If the product contains phosphates, the product must display the following or equivalent text:<br>”Products that contain phosphates should only be used by households that are connected to a district | If the automatic dishwashing detergent contains phosphates, the product must display the following or equivalent text:<br>“Products that contain phosphates should only be used by households that are connected to mains drainage.”<br>Note the national legislations concerning phosphorous in Sweden | The text regarding the national phosphor legislations has been changed |

| | | | |
|---|---|---|---|
| | wastewater treatment system.”<br>This requirement does not apply to the Norwegian market, which has its own regulations on phosphorous content. | and Norway (for Norway see FOR-2004-06-01-922) | |
| O18<br>WUR | The product’s WUR must not exceed 4.0 g/wash | The product’s WUR must not exceed:<br>Dishwasher detergent ≤ 2.75g/wash<br>Rinsing agent ≤ 1.5g/wash | |
| O19<br>Fill ratio | Only points score requirement (>30 and ≥ 25) | Obligatory requirement, where the fill ratio ≥ 22 doses/litre | The fill ratio requirement is now obligatory. |
| O20<br>Packaging | PVC and other halogenated plastics must not be used for packaging.<br>Plastic packaging must be marked with the polymer type and corresponding symbol according to DIN 6120, section 2, or equivalent. | -PVC and other chlorinated plastics must not be used for packaging.<br>-To ease the sorting of packaging materials for recycling all packages need to have information on what they are made of and how they should be sorted in the relevant user stage. The packaging can be marked according to European standards (for example DIN 6120, section 2) recommendations from national recycling systems (such as for example Grønt Punkt's or FTiAB's recommendations) or equivalent. | The text regarding the marking with the according to Din has been updated with alternative systems. |
| O22<br>Performance | Performance is tested at 55°C and compared against the reference IEC-B. There were two alternative tests and also an alternative way of evaluating the results. | Performance test has been amended to 50°C, with a new reference formulation as alternative to the old reference formulation, plus more detailed test instructions and clearer information on how the results are to be evaluated for both dishwasher detergent and rinsing agent. | The requirement has been updated in terms of both temperature and reference agent. The documentation has also been made clearer. This version has only one method (IKW) for the performance test. |
| O27<br>Traceability | | The licensee must have a traceability system for the production of the Nordic Swan Ecolabelled dishwasher detergent/rinsing agent.<br>Description of/procedures for fulfilment of the requirement. | New requirement that has long featured in many other documents and ensures the traceability of the Nordic Swan Ecolabelled products. |

# 6 New criteria

- Assess the possibility of setting requirements for renewable raw materials.
- Assess test methods at even lower washing temperatures and evaluate the newly revised IKW test method to consider switching to that as performance test.
- Assess the possibility of prohibiting phosphorus.
- Consider further tightening the requirements concerning fill ratio and WUR.
- Consider the relevance of including a requirement to exclude nanoparticles/nanomaterials from the products

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# Appendix 1 MECO analysis

MECO = Materials, Energy, Chemicals and Other

Below is a MECO analysis for dishwasher detergents, which was conducted as part of the evaluation of dishwasher detergents in 2011.

The MECO analysis applied the following simplifications and assumptions:

- Energy per wash = 1 kWh
- Functional unit: gram/wash
- Dose: 17 grams dishwasher detergent/wash
- Packaging in the form of:
- Board approx. 1.6 grams packaging/wash
- Polyamide approx. 0.5 grams packaging/wash
- Polyamide+PE approx. 0.4 grams packaging/wash
- Rinsing agent dose 6 ml*

A reference formulation for a dishwasher detergent and rinsing agent was used in order to achieve values for the raw material phase of the constituent substances.

** 6 ml dose of rinsing agent was used since that is how we calculated rinsing agent in version 5 of the criteria.*

**Conclusions from the MECO:**

Energy in the usage phase stands out as the largest parameter in the MECO analysis. Low-temperature products can considerably reduce energy consumption in the usage phase.

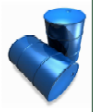
The second-biggest parameter in the MECO analysis is energy from raw material production, which is however a more difficult parameter for Nordic Ecolabelling to influence.

The MECO analysis also shows that the distribution of packaging has a greater energy impact than the energy impact of the packaging itself, which makes it important to optimise packaging for the distribution phase.

The inherent properties of the chemicals are not weighted in the MECO analysis, i.e. there is no weighting for the properties of the constituent substances in terms of energy consumption during use, packaging and so on.

Further discussion of the MECO analysis can be found in the section "Justification for Nordic Ecolabelling" under part 2 "Basic facts about the criteria".

## MEKA analysis

| **Dishwashing detergents - including rinsing agents** |  |  |  |  |  |
|---|---|---|---|---|---|
|  **Materials** | Extraction and refining and synthesis from petrochemical raw materials (oil/gas)<br><br>Growing, harvesting and refining of biobased raw materials (palm kernel oil, forestry (cardboard), etc)<br><br>Use of land area and petrochemical reserves. | | Diesel oil for distribution | Water consumption ~ 12 l/wash<br><br>Raw materials for electricity production. | |
|  **Energy** | Use of energy for extraction/growing, refining and manufacturing of raw materials & packaging.<br><br>Inherent energy in feedstock and packaging materials<br><br>Total energy for raw materials:<br>~ 1,2MJ/wash | Energy consumption expected to be relatively low in this stage at the production site.<br><br>Packaging per wash:<br>1,49g cardboard box ~ 0,06MJ<br>0,40g PE bag ~ 0,04MJ<br>0,32g PE bottle (rinsing agent) ~ 0,03MJ | Energy for distribution of products (and raw materials etc.)<br>Assumed 5,000km in a truck<br>~ 0,6MJ primary energy/wash<br><br>Energy consumption at retailer<br>< 0,01MJ/wash | Electricity for dishwasher:<br>1kWh/wash ~ 9 MJ primary energy/wash<br><br>*Short cycle programme at low temperature can potential more than half the energy consumption in the dishwasher use!*<br><br>Energy for water supply:<br>~ 0,04MJ | Energy for wastewater treatment (12l) ~ 0,1MJ<br><br>Potential energy recovery from sludge is negligible.<br><br>Recycling (with avoided production of virgin materials) or energy recovery from packaging materials. Here calculated as incineration with energy recovery (75% loss in incinerator):<br>Cardboard ~ -0,02MJ<br>PE bag ~ -0,01MJ<br>PE bottle ~ -0,01MJ |
|  **Chemicals** | Potential emissions from extraction and manufacturing of raw materials. | Handling of chemicals in production – risk of exposure in the working environment.<br><br>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 dishwasher detergents. | | Risk of expusure to chemical substances in handeling of products and substances left on cleaned plates etc.<br>E.g. sensitizing substances, corrosive products | 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 conditions at plantation?<br><br>Impacts on nature from changes in land area – risk of net emissions of carbon from deforrestation. | | Particulate matter and other emissions from distribution vehicles. | Noice from dishwasher. However, not coupled to the detergents and therefore not relevant for ecolabel criteria for detergents. Reduction of the time of the washing cycle will, of course, influence the impact from noice, but modern machines in general have a low noice level. | |