About Nordic Swan Ecolabelled

Hand dishwashing detergents

Version 6.**10** • 14 March 2018 – 31 December 2025

Nordic Ecolabelling

Content

025 Hand dishwashing detergents, version 6.10, 13 August 2024

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

Contact information

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

Denmark
Ecolabelling Denmark
info@ecolabel.dk
www.svanemaerket.dk

Finland
Ecolabelling Finland
joutsen@ecolabel.fi
www.joutsenmerkki.fi

Sweden
Ecolabelling Sweden
info@svanen.se
www.svanen.se

Iceland
Ecolabelling Iceland
svanurinn@ust.is
www.svanurinn.is

Norway
Ecolabelling Norway
info@svanemerket.no
www.svanemerket.no

1 Summary

This background document contains a brief description of the product group and the impact of hand dishwashing detergents on health and the environment, a market overview and background to the requirements set out in the criteria document.

Hand dishwashing detergents for the retail trade and for professional use are eligible for the Nordic Swan Ecolabel. The main function of the product must be as a hand dishwashing detergent.

Nordic Ecolabelling has come to the conclusion that the most relevant environmental parameters for hand dishwashing detergents are:

- emissions of hazardous, non-degradable and/or bioaccumulative substances in the environment, which place a burden on treatment works and/or recipients,
- the amount and type of packaging material,
- extraction of raw materials and
- over-dosing, which contributes to every part of the life cycle.

Setting criteria on the toxicity and degradability of the constituent substances, the amount and design of the packaging and sustainable extraction of raw materials can reduce the burdens on our external environment.

There are, in addition, certain health-related problems such as allergies that are associated with hand dishwashing detergents. The criteria also cover these aspects.

The most significant changes made in this generation of the criteria are:

- New information requirement concerning sustainable and renewable raw materials (O3)
- New requirement for sustainably produced palm oil (O4)
- Ban on sensitising preservatives (O5)
- New requirements for packaging that promotes the circular economy (O14–O15)

For other changes, see table 2 Changes from generation 5 to 6 in section "8 Changes compared with the previous version".

The criteria document and the background document were sent out on public hearing in the time period October 2nd to December 1st 2017. 27 stakeholders responded to the hearing. Most of the responds were detailed comments on the requirement, not the criteria document as a whole. The main part of the comments were concerning the new requirements, ie the ones in the bullet list above. There have been some changes done after the public hearing concerning for example the recycling design (O14), the removal of Challengetest in requirement O8 and a new recycling design requirement for pouches has been added.

The environmental gains from generation 5 to 6 can be summed up as coming in particular from the raw materials phase of the life cycle and the packaging. The sustainable extraction of raw materials is a vital global issue with a major environmental impact, and by setting information and policy requirements, we create awareness of the issue, while the requirement for sustainably produced palm oil helps us contribute to the production of more sustainable raw materials. Tighter and new packaging requirements limit the use of packaging materials, and contribute to a circular economy. New substances on the list of prohibited substances and a total ban on MI and other sensitising preservatives guarantee better hand dishwashing detergents in terms of both health and the environment.

2 Basic facts about the criteria

This chapter is an introduction to the criteria for the Nordic Ecolabelling of hand dishwashing detergents and contains a description of the product group definition, a short explanation of why Nordic Ecolabelling has these criteria and a description of the version history and validity.

Products that can be labelled

The product group includes hand dishwashing detergents for both professionals and consumers. Pre-soaks or products with disinfectant effects or products that are intended to prevent the growth of microorganisms (e.g. bacteria) are excluded from the criteria. Disinfectant products have been excluded since generation 2. The reason for excluding them was that the authorities had very clear opinions about these products[1]. For one thing, they thought that the products were unnecessary and that the marketing led to their unnecessary use. In addition, the authorities believed there was a risk of over-reliance on the products and therefore a risk of ignoring the fact that it is more important to maintain good hygiene. This was coupled with a desire not to increase the risk of resistance.

Generation 5 introduced a clarification that products are judged to be professional products if 80% or more of sales are to the professional market. Clarifying when a product counts as a professional or a consumer product makes it easier for both the administrators and the applicants to know which requirements must be fulfilled. In the case of hand dishwashing detergents, it is requirement O7 regarding fragrances in the professional products that separates consumer from professional, although the performance test requirement also makes it clear that professional products must be tested against other professional products, while consumer products are tested against other consumer products.

Ready-to-use products are not included in the criteria. Such products currently have a limited market share, so their potential is low. RTU products involve extra transport of water, which needs to be justified by environmental gains if the criteria are to be fulfilled for such products. One such environmental gain might be less use of chemicals due to a lower risk of over-dosing.

[1] Undgå rengøringsprodukter og kosmetiske produkter med bakteriedræbende stoffer, pressemeddelelse på nettet (www.mst.dk/nyheder) fra Sundhedsstyrelsen, Statens Seruminstitut, Forbrugerinformationen og Miljøstyrelsen, 25 October 2000.

In November 2021 Nordic Ecolabelling decided to expand the product group to also include hand dishwashing tablets that are diluted at least 10 times by the user to form the finished product. This product type is concentrated and excludes transport of water, as well as plastic packaging is reduced, as more tablets are usually sold along with a single spray bottle.

Justification for Nordic Ecolabelling

Nordic Ecolabelling sets requirements within the parts of the product's life cycle where there is relevance, potential and steerability (RPS). Nordic Ecolabelling also has a further focus on setting requirements in the following environmentally strategic areas: biodiversity, climate and energy, chemicals and resource use/resource efficiency.

The important parameters according to the MECO and life cycle analyses[2] are the extraction and production of raw materials (choice of surfactants), packaging, the use phase (water temperature, quantity), emission of chemicals in the use and waste phases (ecotoxicity and biodegradability) and transport. Dosing and performance affect all these parts of the life cycle.

There is relevance, potential and steerability in all these areas, with the exception of controlling water temperature and quantity, which is an area over which Nordic Ecolabelling has no steerability. Nordic Ecolabelling is able to influence the sustainable extraction of raw materials via an information and policy requirement. Packaging has a major environmental impact and the fact that the manufacturers choose their own packaging ensures steerability in the requirements. Our packaging requirements contribute to a circular economy. Requirements concerning biodegradability, bioaccumulation and toxicity for aquatic organisms encourage fewer emissions in the use and waste phases. Transport is a more difficult area when it comes to steerability, but we can influence it indirectly by promoting concentrated products, which leads to less transporting of water.

By setting requirements for dosing instructions and performance testing, we indirectly influence every part of the life cycle and steer consumers towards more sustainable products.

See also section 5 Environmental impact of hand dishwashing detergents for more background on the requirements for this product group.

Nordic Swan Ecolabelled hand dishwashing detergents:

- Meet strict requirements concerning environmentally hazardous chemicals, including requirements on ecotoxicity and biodegradability
- Meet strict requirements concerning chemicals that are harmful to health, including a ban on the preservative MI and other sensitising substances
- Are used sparingly to conserve the planet's resources.

[2] Laura Golsteijn, Rimousky Menkveld, Henry King, Christine Schneider, Diederik Schowanek and Sascha Nissen, A compilation of life cycle studies for six household detergent product categories in Europe: the basis for product-specific A.I.S.E. Charter Advanced Sustainability Profiles, Environmental Sciences Europe – Bridging Science and Regulation at the Regional and European Level 2015 27:23, http://enveurope.springeropen.com/articles/10.1186/s12302-015-0055-4, 5 October 2015 and Unilever, Machine Dishwash developments steps towards a more sustainable future, 2001, https://www.unilever.com/Images/dishwash_tcm244-409719_en.pdf (visited Aug 2016)

- Packaging requirements contribute to a circular economy, for example by addressing packaging design and material choices.

Version and validity of the criteria

The first generation of the criteria for hand dishwashing detergents was adopted in February 1996 and was to remain valid until August 2002. The criteria have since been revised several times.

Generation 2 was adopted in August 2001 and was valid until 1 August 2005.

The main changes at this point were:

- The old performance test was replaced with a new one.
- The requirements were related to recommended dosing instead of functional dose.
- Antibacterial products were excluded from the criteria.
- The requirement on classification of the products was updated in line with the Dangerous Preparations Directive.
- A change to the dose-related environmental points, referred to as the environmental matrix (based on environmental parameters such as ecotoxicity and biodegradability).
- A requirement concerning packaging design was introduced.
- Health requirements (regarding allergens, for example) were introduced for fragrances.
- A requirement that all surfactants must also be anaerobically biodegradable was introduced.

In version 2.3, the validity period for the criteria was extended until November 2006.

Generation 3 was adopted in October 2005 and was valid until 31 October 2009. The key changes compared with generation 2 were:

- The new DID list for chemicals were introduced.
- Tightening of the CDV requirement (formerly ecotoxicity and biodegradability points).
- Tightening of the requirement concerning allergenic fragrances.
- Amendment to the packaging requirement to introduce the weight-utility ratio (WUR).
- A new requirement for substances of very high concern (environment and health) was introduced.
- A new requirement concerning substances that may have a long-term effect on the environment was introduced.
- A new requirement restricting preservative levels was introduced.
- Tightening of the requirement concerning the highest recommended dose.

Generation 4 was adopted in October 2008 and was valid until 31 December 2012. The difference between generations 3 and 4 was simply an extension of the document and a change to the fragrance requirements, whereby the level of allergens in a fragrance was limited to 100 ppm per substance. There were previously two alternative requirements for this.

Generation 5 was adopted in March 2012 and was to remain valid until 31 March 2016, but it has since been extended until 31 March 2019. The key changes were:

- Calculation of a "fixed dose" for the products that have a recommended dosing ≤ 0.60 g/l.
- Stricter CDV limit.
- Environmentally hazardous substances are calculated based on a weighted formula, where the most hazardous substances are most restricted.
- Max 100 ppm of each allergenic fragrance.
- Ban on APD (alkylphenol derivatives), Substances of Very High Concern, endocrine disruptors, and potential endocrine disruptors, vPvB (very persistent and very bioaccumulative) and PBT (persistent, bioaccumulative and toxic) substances.
- New requirement stating that preservative levels must be optimised, for example via a Challenge test.
- The packaging requirement is stricter with regard to the reuse factor, requiring that the manufacturer demonstrates that the packaging really is reused.

Nordic Swan Ecolabel licences in the Nordic Market

The number of licences for the Nordic Swan Ecolabel has remained quite stable in recent years. There are products in all the Nordic countries.

In May 2017 there were 24 licences for hand dishwashing detergents in the Nordic market, covering > 300 products. These are distributed as shown in table 1 below. The licences cover products for both the consumer market and the professional market.

Table 1 Number of licences in each Nordic country (May 2017)

Country	No. of licences
Denmark	**10**
Finland	**3**
Norway	**4**
Sweden	**7**
Iceland	**0**

3 The Nordic Market

A large proportion of Nordic households have a dishwasher (80% of Norwegian households and 64% of Finnish households had a dishwasher in 2012[3],[4]). Nevertheless, a great deal of dishwashing is still done by hand, particularly for items that are not dishwasher safe.

The Nordic hand dishwashing detergents market comprises products from both large and small manufacturers, including private label products and the manufacturers' own branded products. The products are manufactured both within and outside the Nordic region (in this case mostly in the rest of Europe).

Consumer market

The consumer market looks slightly different in the different Nordic countries. In Finland and Sweden, Procter&Gamble's products (Fairy and Yes) dominate, but there are also other brands on the supermarket shelves. Norway has a clear market leader in Orkla Home&Personal Care's (Lilleborgs) Zalo, but other brands are available in the stores. The situation is different in Denmark, with the market split between several brands, rather than having one clear market leader.

On the consumer front, the main sales channel is the supermarkets. Supermarket chains therefore have considerable influence over the products that appear on the market. In Sweden, a large proportion of the consumer products are currently ecolabelled, in part due to a decision by supermarkets to primarily sell ecolabelled household chemicals.

As of July 2017, Nordic Swan Ecolabelled stores can be found in Sweden (146), Norway (11) and Denmark (15), and all of these sell Nordic Swan Ecolabelled household chemicals. Finland currently has no Nordic Swan Ecolabelled stores.

New product types on the consumer market include hand dishwashing detergents in spray bottles, which can be found on the Finnish and Norwegian markets and are designed for easier use by the consumer, and pre-soaks on the Norwegian market. For further information see section 6.1 Product group definition.

Professional market

The professional market includes consumer products and more specific professional products. The products are manufactured by both large and small companies, such as Ecolab, Diversey, Kiilto, Cleano, Lilleborg and Rekal. Many of the products are sold in several of the Nordic countries.

On the professional market, there is a particular focus on procurement organisations/ partnerships. These exist for hotels, restaurants, catering kitchens and institutions. In addition to professional products, the professional market also uses consumer products.

[3] https://www.ssb.no/befolkning/artikler-og-publikasjoner/_attachment/274437?_ts=1567e828450 (24.02.2017)
[4] http://www.stat.fi/til/ktutk/2012/ktutk_2012_2012-11-05_tau_003_fi.html (24.02.2017)

Environment as a competitive advantage

The demand for ecolabelled products is relatively stable, but an increase can be seen, for example in professional products that are used by Nordic Swan Ecolabelled cleaning services.

4 Other labels

Regulatory requirements

Hand dishwash detergents are regulated primarily via the Detergent Regulation (EC) No. 648/2004. The raw materials are also included in REACH and some of the raw materials may be affected by the Biocides Directive. The products must be labelled in line with the Detergent Regulation and classified and labelled in line with the CLP regulation.

Specific national regulatory requirements in the Nordic region

In Norway, the content of phosphorus in detergents (including hand dishwash detergents) is regulated by the Product Regulations (Section 2-12)

Ecolabelling type 1

The Swedish Society for Nature Conservation has the **Bra Miljöval** (Good Environmental Choice) ecolabelling criteria, which cover hand dishwash detergents[5]. There are 48 hand dishwash detergents that carry the Bra Miljöval label[6]. 14 of these products are for consumers and 24 are for professionals.

New criteria for the **EU Ecolabel** were adopted on 23 June 2017. These criteria cover hand dishwash detergents for both the professional and consumer markets. Products containing microorganisms are excluded from the criteria. According to the EU Ecolabel there are no products currently labelled under the new criteria for hand dishwash detergents. There are, however, more than 100 products that carry the EU Ecolabel under the previous generation of the criteria. [7] These licences are valid up to December 2017.

Environmental product declarations (EPDs)

Environmental product declarations give detailed environmental information without any particular requirements being placed on the products. There are also no pre-set requirement levels. The usefulness of the declaration depends on the purchaser's knowledge of the environmental credentials of the product being purchased, and the value in making comparisons depends on the EPDs being drawn up using the same system parameters and conditions. There is no international system for environmental product declarations, but work is underway in this area within ISO. In order to make an environmental product declaration, product category rules (PCRs) must be in place or created.

[5] http://www.naturskyddsforeningen.se/sites/default/files/dokument-media/bra-miljoval/KemiskaProdukter/kriterier_kem_20150312.pdf (23.02.2017).
[6] http://www.naturskyddsforeningen.se/bra-miljoval/register (23.02.17).
[7] http://ec.europa.eu/ecat/category/en/7/hand-dishwashing-detergen (2017-05-08)

The system is not well developed for chemical products. There was no EDP:s on international EDP system website, but there was an EDP for cleaning products[8].

Green Public Procurement (GPP)

The EU has official "GPP Criteria for Cleaning Products & Services"[9], which cover both cleaning products and dishwashing detergents, as well as cleaning services. The criteria state that ecolabelled products that carry a type 1 ecolabel meet both the "core criteria" and the "comprehensive criteria".

Environmental management

Environmental management systems bring order to a company's own operations and produce improvements based on the company's own targets in the environmental field. However, an environmental management system does not contain any specific requirement levels (limit values) for the products or their production. The most important systems are EMAS, which was developed by the EU, and ISO 14001, which is an international standard. Many manufacturers of hand dishwash detergents have environmental management systems in place within their companies. The standards under which they are certified may vary, however.

Raw materials labelling and traceability systems

Traceability systems for raw materials are not commonly used in hand dishwash detergents. Surfactants are the largest raw material group in hand dishwash detergents. Surfactants are made entirely from fossil raw materials, entirely from renewable raw materials, or a surfactant may contain both fossil and non-fossil raw materials. Some surfactants derive partly or entirely from palm oil. It is thus possible to require a proportion of renewables in surfactants without any great need for reformulation of the product. For palm oil there is a RSPO certification system (Round Table för Sustainable Palm Oil).[10] Some producers use already today RSPO certified raw materials, but the level of certification is unclear.

Nordic Ecolabelling's views on raw materials labelling and traceability systems

Nordic Ecolabelling's raw materials group has examined the RSPO standard in relation to the requirements we set for raw material labels, and t the current time, these two systems do not fully meet Nordic Ecolabelling's requirements for sustainability labels. Generally, the standard provides too poor protection for important biological areas since it is among other things permitted to establish plantations on peat bogs, which are an important carbon sink.

As the production of palm oil currently has major environmental consequences, wishes Nordic Ecolabelling to introduce as stringent requirements as possible within the framework of the respective product group.

[8] EDP of E' COSI' http://gryphon.environdec.com/data/files/6/9651/epd302it_ECosi_Detergents_2015.pdf, in search on "detergents" at http://www.environdec.com/en/EPD-Search/ (24.02.2017)
[9] EU GPP criteria: http://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm (visited Aug 2016)
[10] RSPO: http://www.rspo.org/, (besökt 2016-09-20)

In the product groups where there are alternative raw materials and steerability to exclude palm oil without the consequence of a "Burden Shift", Nordic Ecolabelling wishes to exclude the use of palm oil.

In product groups where there are no alternatives and no steerability for Nordic Ecolabelling to avoid these raw materials, Nordic Ecolabelling wishes to set as stringent requirements as possible. This is to ensure that the most environmentally friendly alternative is used in Nordic Swan Ecolabelled products. In these cases, Nordic Ecolabelling judges that RSPO, with its associated traceability systems, the best tool in the market and will therefore require it.

RSPO is a systems that point in a positive direction and Nordic eco-labelling wishes to keep an eye on this development, in order to potentially accept and use it in all criteria in the future.

Other private labelling

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.

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"[11].

The charter was updated in 2010, with the main change being to allow companies to submit "a sustainability assurance for individual products, with an enhanced Charter logo" by showing that the companies meet the new Advanced Sustainability Profiles (ASP)[12]. As of today, there are criteria for nine product groups, including hand dishwash detergents[13].

According to A.I.S.E. the product requirements are based on LCA analyses of the product types and their environmental impact. A.I.S.E. states that the Environmental Safety Check of the formulation is risk-based, and in line with the principles of REACH. The requirements also have a focus on dosing, packaging and information for the user.

[11] https://www.sustainable-cleaning.com/en.publicarea_sustainabilityreport.orb (23.02.2017).
[12] https://www.sustainable-cleaning.com/content_attachments/documents/Charter%202010_OperatingRules_ver04March2011.pdf (23.02.2017)
[13] https://www.sustainable-cleaning.com/en.companyarea_documentation.orb (23.02.2017).

Asthma and Allergy

The Asthma and Allergy Associations in each Nordic country have developed their own label, including for various chemical products. The label focuses on minimising the risk of allergic reactions from use of the product. The labels are managed differently in all the Nordic countries by the local Asthma and Allergy Association. It is mainly a health label that can be found on chemical products such as laundry detergents, rinsing agents, dishwashing detergents and soaps. The associations have open requirements[14] [15] [16] [17], but none of the associations have published entirely specific or precise requirements. It is evaluated from case to case if a product can be labelled by the people handling the licensees or by a product evaluation committee. The organizations in Norway, Finland and Denmark have public information regarding application fees and rules regarding the use of the label. The Swedish website lack exact information regarding fees.[18]

AllergyCertified

AllergyCertified was launched in 2014 as a competitor to the Nordic Asthma and Allergy Association labelling systems[19]. AllergyCertified is a global label. The products awarded the label have been checked and undergone an allergy risk assessment. The individual requirements for awarding the label are not publicly available but fragrances and allergens are not permitted.

As this is a new label, at the current time there are only a few products, none of them hand dishwash detergents that are approved under AllergyCertified.

5 About the criteria development/revision

This chapter presents the goals of the revision and describes their implementation.

Purpose of the criteria development/revision

The main goal has been to create clear and credible criteria that take account of both health and environmental issues and encourage effective products. We will achieve this via tighter packaging criteria that promote the use of recycled plastic, a new requirement concerning renewable raw materials and a tighter requirement regarding preservatives. The revised criteria also aim to make the application and administration process simpler and clearer.

In a drive to achieve more environmental gains, the focus of the revision must be on:

- The opportunity to introduce an information requirement concerning use and the sustainability of renewable raw materials, along the lines of cosmetics

[14] http://www.naaf.no/marked-og-produkt/naafs-merkeordning/kriterier-for-produktvurdering/#Rengjøringsprodukter (23.02.2017)
[15] http://astmaoallergiforbundet.se/wp-content/uploads/2016/10/Kriterier-Kem-tekn.pdf (23.02.2017)
[16] https://www.allergia.fi/allergiatunnus/kriteerit/ (23.02.2017)
[17] http://www.astma-allergi.dk/producent/kriterier (23.02.2017)
[18] http://astmaoallergiforbundet.se/vart-arbete/ansoka-om-svalanmarkning/
[19] http://allergycertified.com/ (visited 08.05.2017)

- Updated WUR requirements to promote new, lighter packaging innovations or more recycled material in packaging, thus helping to reduce the use of fossil raw materials and virgin packaging material
- Tighter requirements concerning sensitising preservatives and fragrances
- CDV amendments to align with DID2016 or later

Other requirements have been reviewed and some have been slightly adjusted.

About this criteria development/revision

The project has been run as a Nordic project. At the start of the project all countries produced national documentation on criteria, industry information and other national information in a workshop. During the course of the project, licence holders, raw material and packaging 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 document and the background document were sent out on public hearing in the time period October 2nd to December 1st 2017. 27 stakeholders responded to the hearing. Most of the responds were detailed comments on the requirement, not the criteria document as a whole. The main part of the comments were concerning the new requirements.There have been some changes done after the public hearing concerning for example the recycling design (O14), the removal of Challengetest in requirement O8 and a new recycling design requirement for pouches has been added.

Project participants

Project Manager	Terhi Uusitalo (FI) /Susanna Vesterlund (SV)
Project Consultant	Thor Hirsch (NO) /Terhi Uusitalo (Fi)
Product specialist NO:	Arne Godal / Thor Hirsch
Product specialist SV:	Maria Tengqvist
Product specialist FI:	Heidi Vaarala
Product specialist DK:	Trine Pedersen
Internal expert (nano)	Terhi Uusitalo/nano group
Internal expert (raw materials)	Raw material group
Internal expert (packaging)	Rebecca Uggla
Product Development Manager	Karen Dahl Jensen (DK)

6 Environmental impact of the product group

This describes, from a life cycle perspective, which areas of hand dishwashing detergents are significant for health and the environment.

To achieve environmental gains, each individual requirement must be relevant. 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 ecolabelling requirements.

These three parameters are to be seen together and as such are referred to as **R**elevance-**P**otential-**S**teerability, 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 acknowledges that there are many actors in the hand dishwashing detergent industry and that there are differences between the products that give those with well-advanced environmental work an advantage.

The task of the criteria is to reduce the potential environmental impact of the products.

The requirements are based to a large degree on the properties of the constituent substances, which can be measured using recognised methods. Most of the environmental impacts that have proven to be relevant can also be regulated using the requirements in the document, thus achieving steerability.

Appendix 1 provides a MECO diagram, which summarises the impact from a hand dishwashing detergent's materials, energy, chemicals and other factors (such as waste, transport, etc.). The MECO analysis was conducted in conjunction with the review of generation 4 in 2010 and is in line with two more recent LCA studies (see below).

The MECO analysis was used to identify which areas pose the greatest environmental and health challenges for hand dishwashing detergents, and therefore where it is most relevant to set requirements. The important parameters according to the MECO and three life cycle analyses[20] are the extraction and production of raw materials (choice of surfactants), packaging, the use phase (water temperature, quantity), emission of chemicals in the use and waste phases (ecotoxicity and biodegradability) and transport. Dosing and performance affect all these parts of the life cycle. The impact in the different phases is described in more depth below using the RPS tool.

The scope of the studies was not fully clarified and assumptions that had been made were not fully followed up in the results. The results should therefore be viewed with a critical eye. They are, however, in line with studies of other chemical product groups and with our own assessments.

Relevance

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

Raw materials

Most of the raw materials in the hand dishwash detergent are organic substances. Both renewable and non-renewable organic raw materials are used,

[20] Laura Golsteijn, Rimousky Menkveld, Henry King, Christine Schneider, Diederik Schowanek and Sascha Nissen, A compilation of life cycle studies for six household detergent product categories in Europe: the basis for product-specific A.I.S.E. Charter Advanced Sustainability Profiles, Environmental Sciences Europe – Bridging Science and Regulation at the Regional and European Level 2015 27:23, http://enveurope.springeropen.com/articles/10.1186/s12302-015-0055-4, 5 October 2015 and Unilever, Machine Dishwash developments steps towards a more sustainable future, 2001, https://www.unilever.com/Images/dishwash_tcm244-409719_en.pdf (visited Aug 2016)

as well as raw materials that are synthesised from both renewable and non-renewable raw materials. Renewable raw materials are defined as raw materials from biological material which are continuously renewed in nature within a short time span, for example grain and wood (European standard EN16575:2014[21]). In the long term there are limited amounts of non-renewable materials because they are extracted from fossil oil, while renewable raw materials are re-established through natural processes. The fact that renewable raw materials are re-established is an important argument for promoting the use of renewable raw materials, i.e. it is relevant to introduce requirements encouraging the use of renewable materials.

Surfactants are the largest raw material group in hand dishwash detergents. Inorganic raw materials are also used, e.g. salts, alkalis and mineral pigments, but with fewer variations and in smaller quantities.

Surfactants are made entirely from fossil raw materials, entirely from renewable raw materials, or a surfactant may contain both fossil and non-fossil raw materials. Renewable raw materials used in these surfactants include palm kernel oil, coconut oil and animal fat. Since many of these raw materials are problematic (see also section 3 Other labels and controls), they cannot be promoted without requiring them to be sustainably produced. 24% of the world's palm oil production goes into consumer products (such as cosmetics, candles and laundry detergents). According to AAK AB, palm oil and palm kernel oil are the main vegetable raw materials in the laundry detergent industry. BASF22 says that palm kernel oil is one of the most important renewable raw materials. In 2013, palm oil accounted for a third of the global vegetable oil market. Palm oil will remain important in the future and, due to among other things that it has the richest yields of all the vegetable oil sources (yield is 4–9 times more productive than other vegetable oil sources).[23] It is therefore relevant to set requirements concerning the production of vegetable raw materials. In the future, the focus can shift towards other vegetable raw materials such as coconut oil, soya and sugar cane.

Manufacture of constituent substances and hand dishwash detergents

Manufacturing constituent substances and products consumes energy in the factories. Life cycle assessments of hand dishwash detergents show that the manufacture of the products is not responsible for the dominant environmental impact in the life cycle of the products.[24]

[21] https://biobs.jrc.ec.europa.eu/sites/default/files/generated/files/policy/CEN%20Bio-Based%20Definitions%20EN16575.pdf (tilgjengelig 11.10.2016)
[22] BASF, *Palm positioning*: https://www.basf.com/en/company/sustainability/responsible-partnering/palm-dialog.html, January 2016 (visited 22.05.2017)
[23] WWF: Palm oil – presentation in a seminar on palm oil and the cosmetics industry in Oslo in June 2016
[24] See for example Laura Golsteijn, Rimousky Menkveld, Henry King, Christine Schneider, Diederik Schowanek and Sascha Nissen, A compilation of life cycle studies for six household detergent product categories in Europe: the basis for product-specific A.I.S.E. Charter Advanced Sustainability Profiles, Environmental Sciences Europe – Bridging Science and Regulation at the Regional and European Level 2015 27:23, http://enveurope.springeropen.com/articles/10.1186/s12302-015-0055-4, Jenny Binstock, Saira Gandhi Erin Steva, Sustainability Assessment, Environment 297A, Life Cycle Analysis: Comparison of Hand-Washing and Dishwasher Machines, Spring 2013, https://www.ioes.ucla.edu/wp-content/uploads/handwashing-vs-dishwashing.pdf

Even though the environmental impact from the manufacture of hand dishwash detergents is not the dominant environmental impact in the product's life cycle, it can be considered relevant because hand dishwash detergents are manufactured in large quantities.

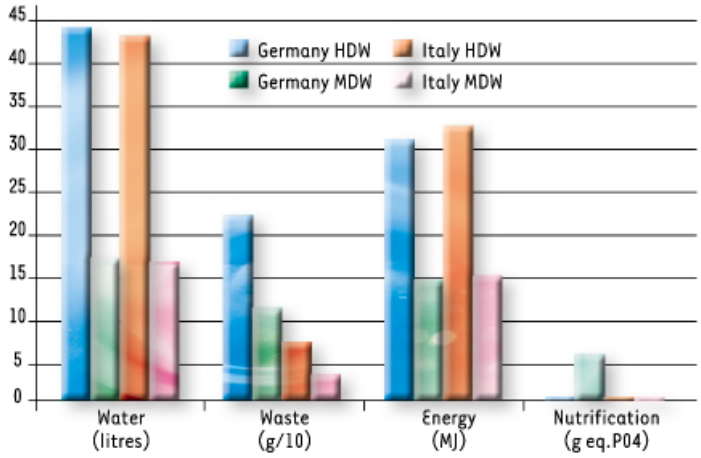
Raw material production appears to have a greater environmental impact, according to the LCAs (see previous references). Raw material producers state that the part of the product's life cycle that accounts for the greatest environmental impact differs from product to product based on the production processes (drying and fermenting, for example, require energy). There are several LCA studies on the manufacture of certain raw materials[25] and the relevance varies depending on the raw material.

Packaging

Hand dishwashing detergent packaging is relevant for its environmental impact. The amount of packaging material used for household chemicals is enormous, and the packaging can vary in size and in the quantity of material in relation to the content.

In figure 1, Unilever's LCA study shows that waste is a key parameter for hand dishwashing detergents, a factor that should also include packaging waste.

Figure 1. Life cycle assessment of hand dishwashing detergents (HDW) in comparison with machine dishwashing detergents (MDW), conducted by Unilever[26], showing that water is a major parameter for hand dishwashing detergents.



In addition, the EU has adopted an action plan on the circular economy[27] which has a clear focus on recovery and recycling, particularly with regard to packaging material.

[25] E.g. *Letchumi Thannimalay and Sumiani Yusoff,* Comparative Analysis of Environmental Evaluation of LAS and MES in Detergent – A Malaysian Case Study, World Applied Sciences Journal 31 (9): 1635-1647, 2014 https://www.idosi.org/wasj/wasj31(9)14/16.pdf
[26] Unilever, Machine dishwash developments – steps towards a more sustainable future, 2001, https://www.unilever.com/Images/dishwash_tcm244-409719_en.pdf (visited Aug 2016)
[27] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Closing the loop – An EU action plan for the Circular Economy, COM(2015) 614 final, http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52015DC0614

For the aforementioned reasons, it is highly relevant to set packaging requirements.

Use phase

Large volumes of hand dishwash detergents are sold each year. Hand dishwash detergents are sold to both professional and consumers. Correct dosing means lower production, which in turn means reduced raw material extraction, and that lowers the amount of energy required to extract and process the raw materials, plus there is the bonus of cutting the use of packaging materials for the raw materials.

Over-dosing of hand dishwashing detergents is a significant problem, since consumers do not follow the dosing instructions on the label. An internal study/questionnaire by Nordic Ecolabelling indicated that the use and dosing of hand dishwashing detergents varies. These days, many people with a dishwasher use hand dishwashing detergents more as a “semi-RTU” (they apply the detergent directly to the dirty dishes and place them in water) than as instructed on the bottles for dishwashing in a bowl or sink.

The energy used to heat the water for cleaning with concentrated products in the home is a factor in the environmental impact of such products. Lowering the temperature of the water that is used in dishwashing would save energy,

Health considerations are also important, since the products come into direct contact with the user during dishwashing. Allergenic substances can be found in many hand dishwash detergents (e.g. fragrances and preservatives) and these products are a major concern for many consumers.

Waste phase

The key parameters for the constituent raw materials/chemicals are ecotoxicity and biodegradability, since hand dishwash detergents are washed away in wastewater after use and end up in the environment. Products that contain toxic raw materials cause more damage to the environment than those with less toxic raw materials.

Hand washers are also used in places that lack connection to waste water treatment. They are used, for example, at campsites, in summer cottages and on boats, where they go straight into nature.

It is therefore relevant to set requirements on the inherent characteristics of the substances included in the products, such as degradability and aquatic toxicity and to prohibit or reduce problematic substances such as environmentally hazardous fragrances.

Packaging naturally has a major impact on the waste phase. It is relevant for packaging to be recyclable in order to promote material recovery and the circular economy.

Transport

Transport can be an important parameter for both the raw materials and the finished products.[28] The end products are first transported from the factory to the store/point of sale and warehouse. The end user then also transports the product to their home or company. The total distances travelled can thus be considerable.

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.

Raw materials

The surfactants used in hand dishwash detergents are often substances such as alcohol ethoxysulphates (AES), alkyl glycol edters(AGE), alkyl polyglycosides (APG) and betaines. Alcohol ethoxylates (AE) and alkyl sulphates (AS) are also used in surfactants. Of these, APG, betaines, FAS (fatty alcohol sulphates) and AES surfactants may derive entirely from renewable raw materials. It is thus possible to require a proportion of renewables in surfactants without any great need for reformulation of the product.

There is thus potential to promote renewable raw materials and to introduce requirements on renewable raw materials to ensure their origin and their sustainable cultivation. Systems such as RSPO for sustainable palm oil cultivation are currently available. The availability and traceability of sustainable alternatives remains limited, which slightly diminishes the potential at this point in time. Note that these systems do not fully meet Nordic Ecolabelling's requirement for sustainability certification, see also Raw materials labelling and traceability systems in section 3 Other labels and controls. Nordic Ecolabelling experiences a desire both from consumers and certain licence holders that Nordic Ecolabelling should broaden this area and consider introducing requirements for renewable raw materials.

Manufacture of constituent substances and hand dishwash detergents

Energy use and environmental impact from manufacturing are reduced by optimising processes and using renewable energy, for example, and there is potential to set requirements in this area. The choice of raw materials with less of an environmental impact in the manufacturing phase of the life cycle is also an area with a certain amount of potential.

[28] GreenSeal: Amit Kapur, Cheryl Baldwina , Mary Swanson, Nana Wilberforce, Giovanna McClenachan, Mark Rentschler, Comparative Life Cycle Assessment of Conventional and Green Seal-Compliant Industrial and Institutional Cleaning Products, http://www.greenseal.org/Portals/0/Documents/Standards/GS-37%20LCA.pdf, Laura Golsteijn, Rimousky Menkveld, Henry King, Christine Schneider, Diederik Schowanek and Sascha Nissen, A compilation of life cycle studies for six household detergent product categories in Europe: the basis for product-specific A.I.S.E. Charter Advanced Sustainability Profiles, Environmental Sciences Europe – Bridging Science and Regulation at the Regional and European Level 2015 27:23, http://enveurope.springeropen.com/articles/10.1186/s12302-015-0055-4, 5 October 2015

Packaging

The manufacturers can choose for themselves what packaging they use for their products. There is therefore potential for Nordic Ecolabelling only to label those products whose packaging is most optimised in terms of its weight-utility ratio for hand dishwash detergents. For the same reason, there is also potential for requirements that promote the circular economy via a design that encourages recycling. The amount of recycled plastic used in packaging is still relatively small in the Nordic market. The potential for requiring a certain proportion of recycled plastic in packaging is thus rather modest, but it is growing and potential is also emerging in the form of new packaging solutions and uses of recycled materials.

Use phase

Better and more accurate dosing would reduce the quantities used. This can be helped by providing the consumer with clear instructions and by ensuring that the products perform well at the recommended dose. There is thus potential to reduce volumes and encourage the correct dosing.

Although lowering the temperature of the water that is used in dishwashing would also save energy, it is unlikely that people would do it. The potential is therefore low for energy savings.

On the health front, the various products on the market differ in their contents, so there is potential for improvement.

Waste phase

The products on the market differ in the ecotoxicity and biodegradability of their contents, so there is potential for improvement.

Since the packaging in question is plastic, there is potential to make packaging more suitable for material recovery, for example by prohibiting certain material combinations or black packaging that cause problems in the automated process of sorting plastics.

Transport

There is always potential to better organise logistics and switch to better vehicles.

Steerability

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

Raw materials

Promoting renewable raw materials in Nordic Swan Ecolabelled hand dishwash detergents requires that the production of renewable raw materials and the production of vegetable oil in particular, are sustainable. RSPO[29] is one of the initiatives that seeks to promote the production of sustainably grown palm oil. However, the complexity of the production and delivery chain can make it difficult for smaller manufacturers in particular to fully trace their raw materials.

Nordic Ecolabelling considers that steerability of setting requirements on the origin of raw materials has had a positive development in recent years with regard to palm oil. Major actors in the market, manufacturers of hand dishwash detergents and raw materials producers alike, have stated that they will switch to certified palm oil by 2020.[30] However, the complexity of the production and supply chain can make it difficult especially for smaller producers to have full traceability on their raw materials.

Other problematic vegetable raw materials such as soya and sugar cane also have certification systems.[31] These are used to a lesser extent than palm oil in hand dishwash detergents.

Although standards have their shortcomings, Nordic Ecolabelling considers that for the product groups where there are no alternatives and palm oil derivatives are used in large quantities, RSPO certification is a good start.

There is no such system for fossil raw materials and their origin is not steerable. There is, however, steerability with regard to limiting the quantity of fossil raw materials and we do this via our policy requirements.

There is EU legislation on animal fats: These are covered by EU Regulation 1774/2002 of 3 October 2002 laying down health rules concerning animal by-products not intended for human consumption, which ensures traceability to the point of origin of waste and residues.

Manufacture of constituent substances and the hand dishwash detergent

The manufacturers control their factories and it is therefore possible to set steerable general requirements concerning energy and water consumption in the manufacturing process. Nordic Swan Ecolabelled and non-Swan Ecolabelled products are, however, manufactured on the same line and it would therefore be impossible to tie the requirement solely to the Nordic Swan Ecolabelled products.

Quality procedures can safeguard good quality. Requirements on pollutants ensure purer constituent substances. These are steerable requirements.

[29] http://www.rspo.org/
[30] e.g. Unilever: https://www.unilever.com/sustainable-living/reducing-environmental-impact/sustainable-sourcing/transforming-the-palm-oil-industry/ (23.05.2017), Henkel: http://sustainabilityreport.henkel.com/product-stewardship/raw-materials/ (23.05.2017), BASF: https://www.basf.com/en/company/sustainability/responsible-partnering/palm-dialog.html, January 2016 (visited 22.05.2017)
[31] Bonsucro: https://www.bonsucro.com (23.05.2017) RTRS: http://www.responsiblesoy.org/?lang=en (23.05.2017)

Nordic Ecolabelling's requirements concerning the manufacture of raw materials would offer less steerability, since our licence holders do not own the manufacturing process. Good, credible databases of life cycle data on raw material manufacture could, in the future, provide a way to steer manufacturers towards raw materials with less of an environmental impact. However, such databases do not exist at this time.

Packaging

When it comes to packaging, Nordic Ecolabelling believes it is possible to steer manufacturers toward packaging with less of an environmental impact through a WUR (weight-utility ratio) requirement, since the manufacturers are free to choose which packaging they use. Steerability thus also exists in other requirements that promote recycling of packaging and the circular economy.

Use phase

It is very difficult to control what the users do when cleaning, in terms of both dosing and water consumption. Nordic Ecolabelling has requirements concerning user instructions and performance as a way to steer users towards more correct use of the products.

In terms of health, manufacturers have major influence over the raw materials that are added to the products and they are aware of the health effects of the raw materials. There are thus excellent opportunities to set fully steerable health requirements for the constituent raw materials.

Waste phase

The manufacturers have major influence over the raw materials that are added to the products and they are aware of the health effects of the raw materials. There are thus excellent opportunities to set fully steerable requirements concerning the ecotoxicity and biodegradability of the constituent raw materials.

As mentioned in the packaging section above, there is scope to steer manufacturers towards packaging that is better suited to material recovery, since the manufacturers have the freedom to choose their packaging.

Transport

Steerability is low in this area, since Nordic Ecolabelling has little scope to influence the transport used by raw material manufacturers and manufacturers of hand dishwash detergents. This is because the licence holders do not usually own the distribution systems they use.

7 Justification of the requirements

7.1 Definition of the product group

The product group includes hand dishwashing detergents for both professionals and consumers. Products with disinfectant effects or products that are intended to prevent the growth of microorganisms (e.g. bacteria) are excluded from the criteria. These products have been excluded since generation 2. The reason for excluding them was that the authorities had very clear opinions about these products[32]. For one thing, they thought that the products were unnecessary and that the marketing led to their unnecessary use. In addition, the authorities believed there was a risk of over-reliance on the products and therefore a risk of ignoring the fact that it is more important to maintain good hygiene. This was coupled with a desire not to increase the risk of resistance.

Generation 5 introduced a clarification that products are judged to be professional products if 80% or more of sales are to the professional market. Clarifying when a product counts as a professional or a consumer product makes it easier for both the administrators and the applicants to know which requirements must be fulfilled. In the case of hand dishwashing detergents, it is requirement O6 regarding fragrances in the professional products that separates consumer from professional, although the performance test requirement also makes it clear that professional products must be tested against other professional products, while consumer products are tested against other consumer products.

Ready-to-use products are not included in the criteria. Such products currently have a limited market share, so their potential is low. One environmental gain from RTU products might be less use of chemicals due to a lower risk of over-dosing. However, RTU products involve extra transport of water, which needs to be justified by greater environmental gains if the criteria are to be fulfilled for such products.

Pre-soaks for professional use may be Nordic Swan Ecolabelled under the Nordic Ecolabelling criteria for dishwasher detergents for professional use.

Hand dishwashing tablets that are diluted at least 10 times by the user to form the finished product was included into the product group definition on November 11, 2021. This product type is relatively new on the market and saves transportation of water as the consumers dilute the product themselves. Further, the amount of plastic packaging is reduced, as several tabs are usually sold along with a single spray bottle.

7.2 General requirements

The definition of constituent substances is included to explain what is meant by constituent substances and impurities. The requirement has been changed

[32] Avoid cleaning products and cosmetic products with antibacterial substances, news feed from (www.mst.dk/nyheder) Danish Health Authorities, Statens Seruminstitut (Research Institute in the health sector in Denmark, Forbrugerinformationen og Ministry of Environment and Food Denmark, 25 October 2000.

compared with the previous generation of the criteria. The aim has been to make the criteria easier to understand.

Definition:

The requirements in the criteria document and accompanying appendices apply to all ingoing substances in the Nordic Swan Ecolabelled product. Impurities are not regarded as ingoing substances and are exempt from the requirements.

Ingoing substances and impurities are defined below, unless stated otherwise in the requirements.

- Ingoing substances: all substances in the Nordic Swan Ecolabelled product, including additives (e.g. preservatives and stabilisers) in the raw materials. Substances known to be released from ingoing substances (e.g. formaldehyde, arylamine, in situ-generated preservatives) are also regarded as ingoing substances.

- Impurities: residuals, pollutants, contaminants etc. from production, incl. production of raw materials that remain in the raw material/ingredient and/or in the in the Nordic Swan Ecolabelled product in concentrations less than ≤100,0 ppm (≤0,01000 weight percent ≤100, 0 mg/kg) in the Nordic Swan Ecolabelled product.
- Impurities in the raw materials exceeding concentrations of ≥ 10000 ppm (≥1,000 weight percent, ≥10000 mg/kg) are always regarded as ingoing substances, regardless of the concentration in the Nordic Swan Ecolabelled product.

Examples of impurities are residues of the following: residues or reagents incl. residues of monomers, catalysts, by-products, scavengers, and detergents for production equipment and carry-over from other or previous production lines.

O1 Description of the product

The applicant must give detailed information on the hand dishwashing detergent to which the application relates. The following information is required:

- Description of the product
- The product must carry information on the recommended dosing on the primary packaging.
  - The recommended dosing for a normal degree of soiling must be clearly and simply stated on the label/packaging.
  - For consumer products, the dosing must be stated as X number of millilitres to Y litres of water or as Z teaspoons* to Y litres of water.
  - For products intended for professional use, the dosing may, for example, be stated as X ml or an equivalent Y pumps or similar per Z litre of water.
  - For hand dishwashing tablets intended to use as sprays, dosage must be given both for washing a single item (e.g. dish, pan etc.) as well for preparing a full kitchen-sink of hand dishwashing solution.

    **1 teaspoon equals 5 ml*
- A complete formulation for the product. The formulation must for each ingoing raw material include:

  - Trade name
  - Chemical name for the main component, and, if relevant, additives (e.g. colorants, preservatives, and stabilizers)
  - Amount (both with and without solvents, e.g. water)
  - CAS no. / EC no.
  - Function
  - DID no. for substances that can be placed in the DID list
- A safety data sheet for each ingoing raw material

The DID number is an ingredient's number on the DID list, which is used in calculating chemical requirements. The DID list can be obtained from Nordic Ecolabelling's websites, see contact information on page 2.

☒ Description of the product, e.g. label and product data sheet (if available) that includes dosing instructions. The information on labels and/or product data sheets must be in the languages in which the product is marketed.

☒ A complete declaration of the composition of the product with information as set out in the requirement. Nordic Ecolabelling's calculation sheet can be used and can be obtained from Nordic Ecolabelling's websites.

☒ Safety data sheets for each raw material in line with prevailing European legislation (Annex II to REACH Regulation, 1907/2006/E2EC).

Background to requirement O1

A description of the product (e.g. label) and its areas of use is required, in order to assess whether the product falls within the product group definition.

Dosing of the hand dishwash detergent is an important parameter for preventing over-dosing. Over-dosing has a major impact in the form of unnecessary quantities of chemicals being discharged into the environment. All phases of the life cycle are affected by over-dosing, since it causes unnecessary raw material production, manufacturing and transport. Products must have a label and/or product data sheet explaining how to dilute the product. See also O9, maximum dosing.

Nordic Ecolabelling needs to know the complete formulation, with all ingoing raw materials. 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 2017) means compliance with Appendix II of REACH (Regulation (EC) No 1907/2006 as amended by Regulation (EU) 215/830).

The requirement has been adjusted slightly compared with the previous version of the criteria and the description of the product was added to the requirement..

O2 Classification of the product

The product must not be classified as shown in table O2:

Table O2 Classification of the product

CLP Regulation 1272/2008		
Classification	Hazard Class and Category Code	Hazard statement
Hazardous to the aquatic environment	Aquatic Acute 1 Aquatic Chronic 1 Aquatic Chronic 2 Aquatic Chronic 3 Aquatic Chronic 4	H400 H410 H411 H412 H413
Hazardous to the ozone layer	Ozone	H420
Carcinogenicity*	Carc. 1A or 1B Carc. 2	H350 H351
Germ cell mutagenicity*	Muta. 1A or 1B Muta. 2	H340 H341
Reproductive toxicity*	Repr. 1A or 1B Repr. 2 Lact.	H360 H361 H362
Acute toxicity	Acute Tox 1 or 2 Acute Tox 1 or 2 Acute Tox 1 or 2 Acute Tox 3 Acute Tox 3 Acute Tox 3 Acute Tox 4 Acute Tox 4 Acute Tox 4	H300 H310 H330 H301 H311 H331 H302 H312 H332
Specific target organ toxicity, singel or repeated exposure	STOT SE 1 STOT SE 2 STOT RE 1 STOT RE 2	H370 H371 H372 H373
Skin corrosion/irritation	Skin Corr. 1A, 1B or 1C	H314
Aspiration hazard	Asp. Tox. 1	H304
Respiratory or skin sensitisation**	Resp. Sens. 1, 1A or 1B Skin Sens. 1, 1A or 1B	H334 H317

** The classifications concern all classification variants. For example, H350 also covers classification H350i.*

*** Products labelled with EUH208: "Contains (name of sensitising substance). May cause an allergic reaction." can not be Nordic Swan Ecolabelled.*

Please note that the producer/supplier is responsible for the classification.

✉ Safety data sheets for the product in line with prevailing European legislation (Annex II to REACH Regulation, 1907/2006/E2EC).

Background to requirement O2

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

The classification of acute toxicity or organ toxicity 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 with such classifications entering the market, but has still opted to retain the requirement.

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. See also requirement O4. Excluding CMR substances is an important parameter from a health perspective, which is why substances classified as CMR are also excluded at raw material level (see requirement O3). For communication reasons, however, the requirement is also retained at product level.

Products must also not be classified as sensitising or carry the label "Contains (name of sensitising substance). May cause an allergic reaction." (EUH208). This means that the limit for the most sensitising substances (Skin sens 1A and Resp sens 1A) has been made tougher by a factor of 10, compared with generation 5 of the criteria. Generation 5 did not contain a ban on the label EUH208, but sensitising substances were restricted under a ban on classification of the product as sensitising and on a level of ≥ 0.10% by weight in requirement R4. The requirement has been updated since the previous generation to take account of current legislation, and now refers only to the CLP Regulation 1272/2008. The ban on H420 (Hazardous to the ozone layer) has been added since the last generation. Nordic Ecolabelling does not believe there is any great risk of products with H420 entering the market, but has chosen to introduce the requirement to emphasise that no form of environmental hazard classification is permitted.

The requirement also relates to the industry's self-classification.

7.3 Sustainable raw materials

O3 Sustainable raw materials

1. The licence holder must document that they are working to increase their purchasing of sustainable and renewable raw materials or that they require their manufacturer to work on increasing their purchasing of sustainable renewable raw materials in the Nordic Swan Ecolabelled hand dishwashing detergent. This can for example be done by promoting certified raw materials, by avoiding problematic raw materials or by changing from fossil based raw materials to sustainable raw materials. The targets must be quantitative and time-based, and they must be set by the company's management.
2. The following data is required for each organic raw material/ingredient in the Nordic Swan Ecolabelled hand dishwashing detergent:
    a) The proportion of the raw material/constituent part of the raw material/ingredient that comprises renewable raw material or originates from renewable raw material, calculated on an annual basis.

    The calculation of the proportion of the renewable material can be done using the following formula:

    Used amount renewable material / (used amount renewable material + used amount non-renewable material) x 100%

    Amounts in kg, molar weight or carbon atoms can be used in the calculation. Average carbon chain lengths can be used.

b) What does the renewable raw material consist of or from what renewable material is it derived from (e.g. palm oil, coconut oil, grape seed oil, beeswax)?

c) Does the renewable raw material have any sustainability certification? If yes, state which and at what level of traceability (No Traceability, Identity Preserved, Segregated, Mass Balance, Book & Claim)?

✉ 1. Policy or equivalent documentation of the licence holders work for renewable and sustainable materials in Nordic Swan Ecolabelled products, including quantitative, time-based targets.

✉ 2. Appendix 3 from the raw material supplier.

Background to requirement O3

Hand dishwashing detergents use constituent substances from both renewable and non-renewable organic raw materials. Renewable raw materials are defined as raw materials from biological material which are continuously renewed in nature within a short time span, for example grain and wood (European standard EN16575:2014[33]). If needed, this can be measured by the carbon-14 method ASTM D6866. Renewable raw materials are defined here as both vegetable raw materials and animal raw materials. This includes for example palm oil, coconut oil, rapeseed oil and beeswax. In addition, there are minerals as parts of organic raw materials, and e.g. in pigments. There are limited amounts of non-renewable organic raw materials because they tend to be extracted from fossil oil, which is non-renewable.

The renewable base materials used in hand dishwash detergents are usually various oils and fats, which are subsequently turned into e.g. surfactants and emulsifiers.

The requirement on sustainable raw material procurement is similar to the requirement in the generation 3 of the Nordic Ecolabelling criteria for cosmetics, adopted in November 2016, The revision of the criteria for cosmetics in 2016, showed that setting an absolute requirement concerning the proportion of sustainable renewable raw materials was too early but that a requirement on sustainable renewable raw materials is important. All licence holders are compelled to focus on their raw material choices by the requirement to work towards increasing renewable and sustainable raw materials in their production, and to list all the raw materials, their renewable sources and any certification. The manufacturers are now required to set more concrete, measurable and time-based targets concerning their purchasing of sustainable raw materials. This can be done, for example, by promoting certified raw materials or by avoiding problematic materials or by changing from fossil raw materials to sustainable renewable raw materials. The requirement is written so that the policy required is on the Nordic Swan Ecolabelled products and not on the entire company, since the Nordic Swan Ecolabel is a product label, i.e. not labelling entire companies.

The goal of the requirement is to give the hand dishwash detergent manufacturers more of a focus on the origin of the raw material and associated certification schemes and that it sharpens their focus on renewable raw materials when they are selecting and purchasing raw materials in their everyday

[33] https://biobs.jrc.ec.europa.eu/sites/default/files/generated/files/policy/CEN%20Bio-Based%20Definitions%20EN16575.pdf (tilgjengelig 11.10.2016)

operations. For each individual raw material, the hand dishwash detergent manufacturers must document the origin, the certification scheme and the amount of the raw material in the product formulation. The knowledge that Nordic Ecolabelling acquires via this documentation will, in the long term, make it possible to set specific requirements concerning the content of renewable raw materials in Nordic Swan Ecolabelled hand dishwash detergents. At the same time, the hand dishwash detergent manufacturers gain an overview of all the raw materials in their Nordic Swan Ecolabelled formulations, so they can quickly see how much needs to be changed, when specific requirements concerning renewable raw materials are introduced. As the hand dishwash detergent manufacturers increase their focus on the origin of the raw materials and the certification schemes, they will immediately begin to consider renewable raw materials as alternatives to the traditional/usual raw materials. Chemicals suppliers will then need to offer more renewable and certified raw materials. It is therefore expected that the proportion of renewable raw materials in Nordic Swan Ecolabelled hand dishwash detergents will continue to increase during the lifetime of the criteria.

The requirement text states that the hand dishwash detergent licence holder must work to increase its purchasing of renewable and sustainable raw materials. If, however, a licence holder already uses a high level of renewable and sustainable raw materials in the Nordic Swan Ecolabelled products, that manufacturer does not have to set high ambitions to be even better.

The proportion of renewable material in the raw material can be calculated in different ways. The calculation can be done on the amounts in kg or carbon atoms in the renewable and non-renewable parts. The applicant needs to fill out the method for calculation in appendix 3 for the renewable raw material. The requirement is in this generation mainly an informative requirement and the Nordic Ecolabelling has therefore not chosen to set an absolute requirement on what method to be used.

O4 Certified raw materials from oil palms

Palm oil, palm kernel oil and palm oil derivatives must be certified according to RSPO. Mass Balance, Segregated or Identity Preserved are accepted as traceability systems.

The requirement does not include raw materials < 1% in the final product.

✉ Information from raw material producer wheher palm oil, palm kernel oil or palm oil or palm kernel oil derivatives are included in the raw material, Appendix 3 can be used.

✉ A valid RSPO CoC certificate

✉ The producer of raw materials or the producer of the Nordic Swan Ecolabelled product must show by means of a balance calculation and / or invoices / delivery notes that the proportion of certified raw material corresponds to the amount of certified palm oil raw materials. Alternatively, a declaration from the producer of raw materials that all purchased palm oil raw materials are certified.

Background to requirement O4

In addition to the policy requirement on sustainable raw material purchasing (O3), Nordic Ecolabelling also sets requirements concerning the production of the palm oil that is used in raw materials for hand dishwash detergents.

Oil palms are a very common source of raw material, in the form of palm oil, palm kernel oil and their derivatives. One way to reduce the negative effects of the increasing use of palm oil products (e.g. rain forest destruction and unsustainable farming) is to increase the proportion of certified sustainable crops.

The most widely used certification system for palm oil is Round Table on Sustainable Palm Oil (RSPO). Nordic Ecolabelling has judged RSPO's standard for sustainable palm oil production and considers it not to meet Nordic Ecolabelling's requirements for sustainability labels. In product groups where there are no alternatives and no steerability for Nordic Ecolabelling to avoid palm oil, Nordic Ecolabelling sets as stringent requirements as possible. This means requirements on RSPO certified raw materials, with its associated traceability systems. Sustainability standards also exist for other potentially problematic vegetable raw materials such as soya or sugar. These raw materials are not used as widely in hand dishwash detergents. Coconut is widely used but is not yet subject to sustainability standards. Animal fat is used in small amounts and use is restricted by EU legislation (1774/2002).

Palm oil is difficult to avoid in hand dishwash detergents.

The complexity of the production and delivery chain makes it difficult for smaller manufacturers in particular to fully trace their raw materials. There is, however, good evidence that the potential is increasing: for example, BASF stated at the Sustainable Cosmetics Summit in 201534 that they are very close to attaining their target[35] for all the palm kernel oil they buy to come from RSPO certified production. Norwegian and Swedish chemical industry associations have also published initiatives on the use of palm oil in their products, with the participants in the initiative undertaking to ensure that at least 90% of the palm oil used will be sustainably produced by the year 2020.[36]

[34] (BASF, 2015)
[35] BASF, *Palm positioning*: https://www.basf.com/en/company/sustainability/responsible-partnering/palm-dialog.html, January 2016 (visited 22.05.2017)
[36] KoHF – Kosmetik- och hygienföretagen, Initiativ för hållbar palmolja i kemisk-tekniska produkter, 1 October 2015, https://www.kohf.se/nyheter2/2015/10/01/vi-tar-initiativ-for-hallbar-palmolja-i-kemisk-tekniska-produkter?rq=palmolja Vaskemiddelleverandørenes Forening (VLF) och Kosmetikkleverandørenes forening (KLF), Norsk initiativ om bruk av bærekraftig palmeolje i kosmetikk og vaskemidler, 1 June 2017

Other ecolabels such as the EU Ecolabel[37], Bra Miljöval[38] and Australia's Good Environmental Choice[39] set ambitious requirements on the proportion of sustainable palm oil and palm kernel oil derivatives in hand dishwash detergents. GECA sets a requirement that at least 20% of the palm oil must be certified in line with RSPO Mass Balance or equivalent and the remainder must be Book & Claim certified. In the proposal that it sent out for consultation (dated 17 May 2017) Bra Miljöval has a requirement that the company's senior management team must have adopted a policy or equivalent to increase the proportion of renewable raw materials over time and that the transition to renewable raw materials must take place in a way that is socially and environmentally sustainable. The licence holder must also know about the proportion of renewable raw materials in each ingredient. Bra Miljöval sets even requirements that non-chemically modified oils, fats and other substances from oil palms must come from organic production and all other palm oil in ingredients must be certified in accordance with RSPO Mass Balance, Segregated or Identity Preserved. The EU Ecolabel requires all the palm oil in products to have RSPO or equivalent certification at Mass Balance level or better and all palm oil derivatives must have RSPO or equivalent certification at Book & Claim level.

A limit stating that raw materials < 1% in the final product does not have to fulfil the requirement. This means that if for example palm oil is included in perfume, colorant or preservatives does not have to be documented in this requirement. But the main types of raw materials, such as surfactants, are covered by the requirement.

7.4 Requirements for constituent substances

O5 Classification of ingoing substances

Ingoing substances in the product must not be classified as shown in table O5:

Table O5 Classification of ingoing substances

CLP Regulation 1272/2008:		
Classification	Hazard Class and Category Code	Hazard statement
Carcinogenic*	Carc. 1A or 1B Carc. 2	H350 H351
Mutagenic*	Muta. 1A or 1B Muta. 2	H340 H341
Toxic for reproduction*	Repr. 1A or 1B Repr. 2 -	H360 H361 H362
Respiratory or skin sensitisation**	Resp. Sens. 1 Skin Sens. 1	H334 H317

[37] EU Ecolabel, COMMISSION DECISION establishing the EU Ecolabel criteria for hard surface cleaning products, 25 Nov 2016, http://ec.europa.eu/transparency/regcomitology/index.cfm?do=search.documentdetail&dos_id=0&ds_id=48133&version=2

[38] Swedish Society for Nature Conservation, Remissversion för kriterier Bra Miljöval Kemiska produkter 2017:X http://www.naturskyddsforeningen.se/sites/default/files/dokument-media/kriterier_kemiska_produkter_170515.pdf

[39] Good Environmental Choice Australia, Environmental Performance Standard Cleaning Products, Standard No: CPv2.2i-2012 Issued: 9 July 2014 http://www.geca.org.au/media/medialibrary/2016/07/Cleaning_Products_CPv2.2i-2012_1.pdf

* The classifications concern all classification variants. For example, H350 also covers classification H350i.

** The following substances are exempt:

- Fragrance in consumer products (See O7).
- Enzymes (including stabilisers and preservatives in the enzyme raw material) can be included if they are in liquid form or granulate capsules.

☒ Safety data sheet for each raw material in line with European legislation (Annex II to REACH, Regulation (EC) No 1907/2006).

☒ Appendix 2 and 3 or equivalent certification completed and signed.

Background to requirement O5

For the same reason as described under requirement O2, there is a requirement that none of the constituent substances may be classified as carcinogenic, mutagenic, reprotoxic or sensitising.

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 hand dishwash detergents in practice. In health terms, CMR substances are not desirable in hand dishwash detergents, since they are to a large extent handled by consumers in the home. This will also exclude potentially mutagenic and/or toxic for reproduction effects in the environment.

The requirement also relates to the industry's self-classification.

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, which is also prohibited under this requirement.

Lilial (CAS 80-54-6) has been self-classified as Repr2 H361 and is therefore excluded from use under this requirement.[40] 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.

The substances that are often classified as sensitising are fragrance substances, preservatives and enzymes. The requirement means, therefore, that no sensitising preservatives such as MI (CAS 2682-20-4) can be used in hand dishwashing detergents. Allergies to preservatives, particularly MI (CAS 2682-20-4) have risen in recent years[41] and Nordic Ecolabelling does not want to contribute towards unnecessary exposure.

[40] https://echa.europa.eu/fi/brief-profile/-/briefprofile/100.001.173 (08.05.2017)
[41] (Svedman, ym., 2012), (SCCS, 2013)

A large proportion of our licence holders and the Nordic retail chains wish to avoid MI (CAS 2682-20-4) as a preservative. Many of the Danish and Norwegian retail chains have banned MI in their Private Labels, and some also have bans/restrictions on MI in branded goods.[42] Nordic Ecolabelling understands that the requirement is much tougher but, following contact with manufacturers, preservative suppliers and end users, Nordic Ecolabelling has concluded that it is possible to produce hand dishwashing detergents without sensitising preservatives. Hand dishwashing detergents are a relatively homogeneous product group, with all the products focused on doing the same job (cleaning dishes), and over half of today's Nordic Swan Ecolabelled preservative-containing hand dishwashing products use preservatives that are non-sensitising (and at the same time not classified as environmentally hazardous). It thus appears to be possible to preserve this product group using non-sensitising preservatives. Nordic Ecolabelling believes this requirement is strongly justified, since hand dishwashing products are usually used in direct contact with the skin during dishwashing. This means that the hands are in contact with the product for a prolonged period of time, which makes allergenic substances undesirable.

An exemption is made for sensitising fragrances in consumer products, and they are restricted under the requirement O7.

Enzymes
Enzymes are exempt from the requirement prohibiting sensitising substances, since it is difficult to find enzymes that are not classified as sensitising and the positive environmental effects of enzymes are substantial. However, only enzymes in liquid form or in the form of granules are permitted. This cuts the risk of dust-forming enzymes in the manufacture of hand dishwashing products. The exemption also applies to stabilisers and preservatives in the enzyme raw material. This is because enzymes are proteins and therefore readily biodegradable. Proteases are also unstable due to self-hydrolysis.

Preservatives and stabilisers are therefore needed to keep enzymes stable until they are used.

In generation 6, requirements R3 and R4 from generation 5 have been merged together and tightened with regard to sensitising substances, such that only sensitising fragrances are approved, in limited amounts.

O6 Prohibited substances

The following substances are excluded from use in the product:

- Alkylphenol ethoxylates (APEO) and/or alkylphenol derivatives (APD)
- EDTA (Ethylene diamine tetraacetate and its salts) and DTPA (Diethylenetriamine pentaacetate)
- Quarternary ammonium salts that are not readily degradable
- Organic chlorine compounds and hypochlorites
- Methyldibromo glutaronitrile (MG, CAS 35691-65-7)
- Nitro musks and polycyclic musk compounds
- Per- and polyfluorinated compounds (PFC)
- Phosphate, phosphonate, phosphonic acid and phosphoric acid
- BHT (butylated hydroxytoluene, CAS 128-37-0)

[42] Communication with the major Nordic retail chains in spring 2017.

There is an exemption for BHT in fragrances in quantities of ≤100 ppm, on condition that the amount in the hand dishwash detergent does not exceed 1 ppm.

- Microplastics
  Microplastic means particles with a size of below 5 mm of insoluble macromolecular plastic, obtained through one of the following processes:

  (a) a polymerisation process such as polyaddition or polycondensation or a similar process using monomers or other starting substances;

  (b) chemical modification of natural or synthetic macromolecules;

  (c) microbial fermentation.

- Substances that are considered to be potential endocrine disruptors in category 1 or 2, according to official lists within the EU. The EU's report on endocrine disruptors can be read in full at http://ec.europa.eu/environment/chemicals/endocrine/pdf/final_report_2007.pdf (Appendix L, page 238 onwards)
- Substances evaluated by 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 and substances that have not yet been investigated, but which meet these criteria.
- Substances judged to be "Substances of very high concern", which are included on the Candidate List: https://echa.europa.eu/candidate-list-table.
- Nanomaterials/particles
  Nanomaterials/particles are defined in accordance with the European Commission's definition of nanomaterials dated 18 October 2011: "A natural, incidental or purposely manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for at least 50% of the particles in the number size distribution, one or more external dimensions are in the size range of 1-100 nm." Examples are ZnO, TiO_2, SiO_2, Ag and laponite with particles of nanosize in concentrations exceeding 50%. Polymer emulsions are not considered to be nanomaterial.

✉ A duly completed and signed declaration of compliance with the requirement, Appendix 2 or similar documentation for the product, Appendix 3 or similar signed documentation for the raw materials.

Background to requirement O6

There are several problematic substances that are difficult to exclude through general requirements concerning the product's chemistry. Nordic Ecolabelling has compiled a list of the substances that must not be added to products. The aim of the list is to prohibit substances that are not excluded from use via other requirements, but that are associated with environmental and health risks. Some substances are included in the list for the sake of clarity, even though they are prohibited under other requirements. There are also double requirements in the list below. For example, certain perfluorinated substances are also SVHC substances.

The requirements have been amended slightly compared with generation 5. A few new substances (such as microplastics and nanoparticles) have been added to the list.

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 have been phased out of most products through legislation. These substances are excluded from use under the surfactants requirement (R12). Declaring APEO and APD together with other substances under requirement O6 is not considered to add very much extra work for the applicant, but it does simplify the administration process.

The requirement is the same as in generation 5.

EDTA

EDTA (Ethylenediaminetetraacetic acid) and its salts are not readily degradable and the EU's risk assessment states that under the conditions at municipal water treatment plants EDTA is either not broken down or only breaks down to a slight degree according to an EU report from 2004[43]. Today there are more environmentally aware alternatives that are degradable and that can replace EDTA in chemical technical products. EDTA has been replaced by readily biodegradeable alternatives such as MGDA (methylglycine diacetic acid) and GLDA (glutamic acid diacetic acid) in almost all consumer products in Europe

The requirement is the same as in generation 5.

Quarternary ammonium salts that are not readily degradable

Quarternary ammonium compounds of cationic surfactants with adverse environmental effects, such as not being readily degradable, are excluded from use. There are sub-groups (such as esterquats) with good environmental properties, which are not excluded. Quarternary ammonium compounds are often highly toxic to aquatic organisms and, combined with the fact that they are not readily degradable, this results in the environmental hazard classification H411 or H412. Quarternary ammonium compounds are associated with bacterial resistance to antibiotics[44] and can promote certain types of allergy.

The requirement is the same as in generation 5.

Organic chlorine compounds and hypochlorites

Sodium hypochlorite or organic chlorine compounds such as triclosan are used as disinfecting/antibacterial substances. These may be or lead to the formation of toxic and bioaccumulative substances that are hard to break down. Sodium hypochlorite can constitute an environmental risk due to the risk of creating organic chlorine compounds. These have been prioritised for special attention specifically due to their use in consumer products (for example cleaning

[43] European Union (2004) Risk Assessment Tetrasodium Ethylenediaminetetraacetate (CAS No: 64-02-8), Final Report, https://echa.europa.eu/documents/10162/415c121b-12cd-40a2-bd56-812c57c303ce
[44] Buffet-Bataillon S., Tattevin, P., Bonnaure-Mallet, M, Jolivet-Goudeon, A. (2012). Emergence of resistance to antibacterial agents: the role of quaternary ammonium compounds – a critical review. International Journal of Antimicrobial Agents 39: 381–389. DOI: 10.1016/j.ijantimicag.2012.01.011

products), along with the risk of toxic chlorine vapour being formed when mixed with acid.[45]

The requirement represents a tightening compared with generation 5 of the criteria.

Methyldibromo glutaronitrile (MG)

MG (CAS 35691-65-7) is a highly allergenic substance. Studies show it to be so allergenic that it can cause allergic reactions even when present in products that are washed off immediately[46]. MG has no harmonised classification, but it is usually classified as H302, H315, H317, H318 and H400 and is therefore not entirely excluded by other requirements concerning classification of constituent substances.

The requirement is the same as in generation 5.

Nitro musks and polycyclic musks

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 under IFRA. Excluding nitro and polycyclic musks therefore remains relevant as a preventive measure.

The requirement is the same as in generation 5.

Per- and polyfluorinated compounds (PFC)

Per- and polyfluorinated compounds (PFCs) constitute a group of substances that have harmful properties. Certain per- and polyfluorinated compounds can be broken down into the very stable PFOS (perfluorooctane sulphonate) and PFOA (perfluorooctanoic acid) and similar substances. These substances are found all over the globe, from the large oceans to the Arctic. PFOS have also been found in birds and fish and in their eggs. The substances are extremely persistent and are easily absorbed by the body.[47] The substances in this group impact on the biological processes of the body and are suspected to be endocrine disruptors, carcinogenic and to have a negative impact on the human immune system.[48]

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[45] LOUS, 2009: List of adverse substances 2009. Information from the Danish Environmental Protection Agency no. 3 2010 http://www2.mst.dk/udgiv/publikationer/2010/978-87-92617-15-6/pdf/978-87-92617-16-3.pdf

46 Dobel, Shima, Miljøstyrelsen article published 15.04.2005: “Dansk pres giver resultat: EU-forbud på vej mod konserveringsmidlet MG i kosmetik”

[47] Borg, D., Tissue Distribution Studies And Risk Assessment Of Perfluoroalkylated And Polyfluoroalkylated Substances (PFASS), Doctoral thesis, Institute Of Environmental Medicine (IMM) Karolinska Institutet, Stockholm, Sweden 2013 http://publications.ki.se/xmlui/bitstream/handle/10616/41507/Thesis_Daniel_Borg.pdf?sequence=1

[48] For example, Heilmann, C. et al, Persistente fluorbindelser reducerer immunfunktionen, Ugeskr Læger 177/7, 30.3.2015 OSPAR 2005: Hazardous Substances Series, Perfluorooctane Sulphonate (PFOS), OSPAR Commission, 2005 (2006 Update), MST, 2005b: Environmental project no. 1013, 2005,

PFOA, APFO (ammonium pentadecene fluoro octanoate) and certain fluoride acids are on the Candidate List due to their reprotoxicity, as well as PBT. There are new research results showing that shorter chains (2–6 carbon atoms) have been discovered in nature.[49]

A Swedish report shows that the compounds are used in certain cleaning products.[50] However, we do not know that these substances have been used in hand dishwash detergents. For reasons of communication and due to the precautionary principle, however, Nordic Ecolabelling has chosen to place PFCs on the list of prohibited substances.

This is a new requirement that was not included in the preceding generation.

Phosphate, phosphonate, phosphonic acid and phosphoric acid

Hand dishwashing products are a product group that is used in many different places, including locations not connected to the municipal wastewater network (e.g. campsites and summer cottages). It is therefore extremely important to restrict substances that have known negative impacts on the environment. Phosphates and other phosphorus compounds are not commonly present in hand dishwashing products, but for safety's sake phosphorous as phosphates**,** phosphonate, phosphonic acid and phosphoric acid are prohibited in generation 6 of the criteria for hand dishwashing products. This is a change compared to the requirement in the public hearing document where all phosphorous compounds were excluded. This change gives an opportunity to allow elementary phosphorous in other types of compounds in the products.

This is a new requirement that was not included in the preceding generation.

BHT

BHT (butylated hydroxytoluene, CAS 128-37-0) is classified by some[51] as muta., carc., repr.[52], and it is thus excluded via its hazard classification, but for the sake of clarity it also remains on the list of prohibited substances. Fragrances do, however, contain small quantities of BHT as antioxidants that ensure the stability of the fragrance blend, which can also affect the stability of the whole product. An exemption has been included to allow up to 100 ppm BHT in the fragrance blend as long as the concentration of BHT in the final product does not exceed 1 ppm.

This is a new requirement that was not included in the preceding generation.

More Environmentally Friendly Alternatives to PFOS-compounds and PFOA, Danish Environmental Protection Agency, 2005.

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

[50] Swedish Chemicals Agency, 2015 http://www.kemi.se/global/rapporter/2015/report-7-15-occurrence-and-use-of-highly-fluorinated-substances-and-alternatives.pdf (visited 22.03.2016)

[51] (ECHA, ei pvm), http://mst.dk/virksomhed-myndighed/kemikalier/stoflister-og-databaser/vejledende-liste-til-selvklassificering-af-farlige-stoffer/

[52] (ECHA, ei pvm)

Microplastics

Microplastics are small plastic particles < 5 mm.[53] When microplastics are rinsed down the drain, they often end up in the sludge, but they also pass through the treatment works.[54] If the particles then continue on to lakes and seas, they are eaten by mussels, fish and other animals, causing injury. Some microplastics are then gradually broken down to even smaller particles by sunlight. They can also absorb harmful substances.

There do not currently appear to be any hand dishwash detergents containing microplastics on the Nordic market. It is unlikely, but not impossible, that they could begin appearing. For this reason and due to the widespread awareness of the issue, Nordic Ecolabelling wants to be clear and apply the precautionary principle in prohibiting the use if microplastics in hand dishwash detergents.

The definition of microplastics has been updated after the public hearing to be the same as used by the EU Ecolabel[55] to harmonize between the documents. The definition is as follows:

> *Microplastic means particles with a size of below 5 mm of insoluble macromolecular plastic, obtained through one of the following processes:*
>
> *(a) a polymerisation process such as polyaddition or polycondensation or a similar process using monomers or other starting substances;*
>
> *(b) chemical modification of natural or synthetic macromolecules;*
>
> *(c) microbial fermentation.*

This is a new requirement that was not included in the preceding generation.

Candidate List and SVHC, Substances of Very High Concern

SVHC, Substances of Very High Concern, is a term to describe the substances which fulfil the criteria in article 57 of the REACH Regulation, which states: substances which are CMR (categories 1A and 1B in accordance with the CLP Regulation), PBT substances, vPvB substances (see the section below) and substances which are endocrine disruptors or environmentally hazardous without fulfilling the requirements for PBT or vPvB. SVHC can be included on the Candidate List with a view to subsequent inclusion on the Approval List. This means that the substance is subject to regulation (prohibition, phasing-out or another type of restriction). On the basis of these adverse characteristics, Nordic Ecolabelling prohibits substances on the Candidate List. Other SVHC substances are addressed via the prohibition of PBT and vPvB substances, and the requirement of classification and prohibition of endocrine disruptors.

The requirement concerning SVHC substances is the same as in generation 5 of the criteria.

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[53] Miljøstyrelsen, Environmental project No. 1793 Microplastics Occurrence, effects and sources of releases to the environment in Denmark, 2015, http://www2.mst.dk/Udgiv/publications/2015/10/978-87-93352-80-3.pdf
[54] Miljøstyrelsen, Environmental Project No. 1906 Microplastic in Danish wastewater Sources, occurrences and fate, 2017, http://www2.mst.dk/Udgiv/publications/2017/03/978-87-93529-44-1.pdf
[55] EU Ecolabel, http://ec.europa.eu/environment/ecolabel/products-groups-and-criteria.html

Potential endocrine disruptors

Potential endocrine disruptors are substances which can affect the endocrine balance of people and animals. Hormones control a number of vital processes in the body and are particularly important to the development and growth of people, animals and plants. Changes in the hormone balance can have adverse effects, and there is special focus on hormones which affect sexual development and reproduction. Several studies have shown effects on animals that can be assumed to be due to changes in the hormone balance. Discharges to the aquatic environment are one of the biggest sources of the spreading of endocrine disruptors.[56] Nordic Ecolabelling prohibits 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 the hormone balance), in line with the EU's original report on "Endocrine disruptors"[57] or later studies.[58]

The European Commission is currently developing criteria for endocrine disruptors.[59] Nordic Ecolabelling is monitoring this development and may change the requirement when the EU criteria for the identification of endocrine disruptors are published.

The requirement concerning endocrine disruptors is the same as in generation 5 of the criteria.

PBT and vPvB

PBT (persistent, bioaccumulative and toxic) and vPvB (very persistent and very bioaccumulative) are organic substances as defined in Annex XIII of REACH (Directive 1907/2006/EC)[60]. Nordic Ecolabelling does not generally wish to have these substances.

Most PBT/vPvB are excluded automatically from hand dishwash detergents due to the restrictions on environmentally hazardous substances (see O4). Since some of them, primarily vPvB, may possibly not be excluded in accordance with O4, they are prohibited by Nordic Ecolabelling.

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[56] Miljøstatus i Norge (2008): Endocrine disrupters: http://www.miljostatus.no/Tema/Kjemikalier/Noen-farlige-kjemikalier/Hormonforstyrrende-stoffer/#D (dated February 26 2009)
[57] DG Environment (2002): Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption. FINAL REPORT. European Commission DG ENV / BKH Consulting Engineers with TNO Nutrition and Food Research. 21 June 2000
[58] DG Environment. (2002): Endocrine disrupters: Study on gathering information on 435 substances with insufficient data. http://ec.europa.eu/environment/endocrine/documents/bkh_report.pdf#page=1, European Commission / DG ENV / WRc-NSF. (2002): Study on the scientific evaluation of 12 substances in the context of endocrine disrupter priority list of actions, http://ec.europa.eu/environment/chemicals/endocrine/pdf/wrc_report.pdf#page=29
DHI water and environment. (2007): Study on enhancing the Endocrine Disrupter priority list with a focus on low production volume chemicals. DG Environment. http://ec.europa.eu/environment/chemicals/endocrine/pdf/final_report_2007.pdf
[59] Chemical watch, News, Andriukaitis promises EDC criteria "before the summer", 04.02.2016, https://chemicalwatch.com/44841/andriukaitis-promises-edc-criteria-before-the-summer
[60] REGULATION (EC) No. 1907/2006 of the EUROPEAN PARLIAMENT AND THE COUNCIL of 18 December 2006 concerning the registration, authorisation and restriction of chemicals (Reach) http://eur-lex.europa.eu/legal-content/sv/TXT/PDF/?uri=CELEX:02006R1907-20160203

Under the requirement, substances that have not yet been investigated but that meet the criteria for PBT and vPvB are also prohibited. The ban thus also applies to PBT and vPvB substances on the SIN list that are not yet on the SVHC list.

The requirement concerning PBT and vPvB substances is the same as in generation 5 of the criteria.

Nanoparticles

Nanotechnology, which also includes nanoparticles, is used in many product areas, including those for which Nordic Ecolabelling has criteria. The greatest cause for concern is the use of nanoparticles, which can be released and thereby affect health and the environment. There is concern among public authorities, environmental organisations and others about the lack of knowledge regarding the potential detrimental effects on health and the environment. There do not currently appear to be any hand dishwash detergents containing nanoparticles on the Nordic market. Internet searches indicate that there are some products that use nanosilver as an antibacterial agent in other countries. It is therefore not impossible that substances such as nanosilver could begin being used for their bacteria-killing properties. Nordic Ecolabelling therefore wishes to apply the precautionary principle and prohibit the use of nanomaterials in hand dishwash detergents.

On 18 October 2011, the European Commission made a recommendation for a definition of nanomaterials, stating that a nanomaterial is a "natural, incidental or manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for 50% or more of the particles in the number size distribution, one or more external dimensions is in the size range 1–100 nm." Nordic Ecolabelling adheres to the wording in this definition.

In some of Nordic Ecolabelling's criteria documents there have been exemptions made for pigments from the nanorequirement. In categories such as cleaning products and hand dishwashing products there has not been a need for an exemption, but if pigments used for these products are defined as nanoparticles according to this definition Nordic Ecolabelling will evaluate a need for exemption.

This is a new requirement that was not included in the preceding generation.

Other substances discussed under this requirement

There was a discussion about whether the Chemsec's SIN list (Substitute It Now)[61] should be included in the list of prohibited substances. We have chosen not to do this, since we have no steerability over an external list, when it is updated and what substances it covers. According to discussions with Chemsec in 2017 and their SIN list website[62], the SIN list is updated automatically to include all the SVHC substances, plus there are occasionally separate projects to consider substances for inclusion on the SIN list. We can, however, use inclusion on the list as justification for a ban on specific relevant substances. According to a review of the SIN list and the requirements in these criteria, there are 15

[61] http://chemsec.org/ (2017-06-14)
[62] http://chemsec.org/business-tool/sin-list/sin-list-updates/ (14.06.2017)

substances on the SIN list that we do not prohibit, most of which are PBT/vPvB substances and endocrine disruptors. We have come to the conclusion that these substances are not relevant for hand dishwash detergents, since they relate to organotin compounds and bisphenols, for example. In writing in the background document about substances that are on the SIN list for being PBT or vPvB (see above) we do, however, cover the four PBT/vPvB substances on the SIN list that are not yet on the SVHC list.

Halogenated/aromatic solvents, siloxanes and phthalates are judged not to be relevant for the product group and are not included on the list of prohibited substances. However, they are restricted via other requirements due to their undesirable properties. For example, many phthalates, halogenated solvents and so on can be found on the SVHC list.

O7 Fragrances

The requirement also includes fragrances in plant extracts:

a) Fragrances must be added in line with IFRA's guidelines.

The guidelines of IFRA (International Fragrance Association) can be found at www.ifraorg.org/

b) Fragrances must not be present in professional products.

Products for professional use are defined here as products that are marketed for use in professional contexts such as institutions, catering kitchens, restaurants and within the public sector.

Where products are sold to both professionals and consumers, the product is considered a professional product if the proportion sold to professionals is 80% or higher. Where there is any confusion about whether a product is for professionals or consumers, Nordic Ecolabelling may require documentation explaining where the product is intended to be sold. The requirement also includes fragrances in plant extracts.

c) A fragrance substance which is judged to be sensitising with the hazard statement H317 and/or H334, or which is subject to declaration, may be present at a maximum of 0.0100% (100 ppm) in the consumer product.

d) The fragrance substances in table O7 may be present in products at a maximum of 0.0100% (100 ppm) per substance in consumer products:

Table O7 Other fragrance substances that may be present to a maximum of 100 ppm

INCI name (eller om en inte finns, parfymering namn i enlighet med CosIng)	CAS nummer
Cananga Odorata och 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
Cinnamomum cassia leaf oil/Cinnamomum zeylanicum, ext.	8007-80-5/84649-98-9

e) HICC, chloroatranol and atranol are not permitted in the product.

✉ Appendix 2 and 3 or equivalent certification completed and signed plus fragrance specifications.

✉ Calculation of the amount of the 26 allergens, substances classified as H334 and/or H317 and substances listed in table O7 present in the end product.

Background to requirement O7

Fragrances are a group of constituent substances that do not generally have a cleaning effect in the product, and at the same time they contain a number of substances with negative health aspects, particularly allergens, as well as negative environmental effects, since they are usually not readily biodegradable and they tend to be classified as hazardous to the environment. Most fragrances contain substances that are classified as H334 and/or H317 and many are classified as H411, H412 or H413.

According to the Videnscenter for Allergi (the Danish centre for research into allergies) there is in principle no limit for when an allergy causes problems63 . It is felt, however, that a total ban on sensitising fragrances would make Nordic Swan Ecolabelled hand dishwash detergents much less widespread on the market, and this would reduce the overall health and environmental gains from ecolabelled products in this category, as many consumers demand perfumed products. Since both retailers and manufacturers state that fragrances are relevant for a large number of customers, fragrances are permitted in hand dishwash detergents for the consumer market. Consumers can choose between fragranced and fragrance-free products because the existence of fragrance must always be declared on the packaging.

Requirement a) The requirement for compliance with the guidelines of IFRA (International Fragrance Association)64 ensures that the manufacture, handling

[63] Personal contact with Jeanne Duus, Videncenter for Allergi, 2009
[64] http://www.ifraorg.org/GuideLines.asp.

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. The requirement is the same as in generation 5 of the criteria.

Requirement b) Fragrances are not permitted in professional products. Professional dishwashing personnel use hand dishwashing products in their working environment, but are unable to control which products are purchased. A worker/dishwasher is usually not able to choose whether the product should be fragrance-free and is likely to be exposed to fragrances involuntarily. The same applies to public procurement, where central purchasers buy in products for municipalities, county councils and institutions, and the dishwashing personnel are not involved in the product choice. Professional dishwashing personnel are more exposed to dishwashing products than consumers are, since they work in a dishwashing room all day.

Products for professional use are defined here as products that are marketed for use in professional contexts such as institutions, catering kitchens, restaurants and within the public sector. Products sold for break rooms in the workplace are thus not automatically considered to be professional products under this definition. The product is not considered to be professional if it is exclusively marketed towards retailers.

Nordic Ecolabelling is aware that there are products that are primarily marketed to consumers, but that are also sold via wholesalers for professional use. In this case, the steerability associated with ecolabelling is small, which is why products that are mainly sold to consumers/retailers are treated as consumer products. A product is considered to primarily go to the one market, if the proportion sold to that category (professional or consumer) is > 80%. A threshold of 80% makes it clear that the majority of the products are sold to the one market (e.g. the professional market), which is why the limit has been set at this level.

The requirement includes an additional comment aimed at avoiding confusion about what counts as a professional or a consumer product. This addition states that if Nordic Ecolabelling feels there is any doubt about whether a product is a consumer product, for example, the applicant must submit sales statistics or similar to prove where the product is sold.

The requirement is the same as in generation 5, but has been merged with other fragrance requirements.

Requirement c) The restriction on sensitising fragrance substances is included in order to reduce the risk of allergies when using ecolabelled hand dishwash detergents. The aim of the requirement concerning allergenic 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 limiting sensitising substances. The requirement is the same as in generation 5 of the criteria.

Requirements d) and e) relate to substances that have more recently been judged to be sensitising: In June 2012 a new opinion was issued by the EU's

Scientific Committee, SCCS, stating that 127 substances should be declared on products instead of the current 26, "Scientific Committee on Consumer Safety SCCS OPINION on Fragrance allergens in cosmetic products (SCCS/1459/11)[65]". In this report, SCCS recommends that all the fragrance substances for which they have evidence of being potential allergens must be declared by name on cosmetic products. Among the 127 fragrance substances, 26 are already restricted under the Detergent Regulation, and in total 20 have the hazard classification H317. SCCS refrains from recommending decided maximum limits for the content of all the fragrance substances in cosmetic products, particularly due to a lack of underlying data. However, SCCS states that the general limit of 100 ppm is tolerated by the majority of consumers, and wishes to guard against the development of new allergy sufferers among both generally tolerant and sensitive people.

Nordic Ecolabelling has conducted a dialogue with IFRA and fragrance producers and checked the status of IDEA (International Dialogue for the Evaluation of Allergens)[66] concerning the 127 allergenic fragrances. SCCS and IDEA are working to develop methods for quantifying more of these 127 substances. This work has not been completed and the earliest date by which there is expected to be a declaration requirement in European legislation is 2019. In light of this, Nordic Ecolabelling has chosen to tighten up the requirement on fragrances by adding a requirement to restrict the 7 substances (see table 2), with the greatest risk of sensitisation in the SCCS report (SCCS/1459/11)[67]. Most of these 7 substances do not have a harmonised classification under ECHA's summary of classification[68], but some are classified as H317. A gradual ban on more fragrance substances will be introduced in accordance with the SCCS recommendations, but the change will keep pace with testing methods and the scope to document that fragrances are not found in the fragrance blend.

SCCS also recommends that three substances Chloroatranol, Atranol and Hydroxyisohexyl 3-cyclohexene carboxaldehyde (HICC) are not included in cosmetic products. We therefore consider it relevant to also prohibit their presence in hand dishwash detergents. Chloratranol and Atranol occur in Oak moss (Evernia Prunastri) and Tree moss (Evernia Furfuracea) extract. Nordic Ecolabelling also wishes to exclude these from Nordic Swan Ecolabelled hand dishwash detergents.

The Danish Environmental Protection Agency has investigated 42 sensitising fragrance substances, in order to assess whether these substances are potent enough to meet the criteria for classification as strong/extreme skin sensitisers in category 1A, as set out in the CLP regulation.[69] The report concludes that 11

[65] SCCS (Scientific Committee on Consumer Safety), opinion on fragrance allergens in cosmetic products, 13–14 December 2011
http://ec.europa.eu/health/scientific_committees/consumer_safety/docs/sccs_o_073.pdf
[66] http://www.ideaproject.info/ (03.06.2015)
[67] SCCS (Scientific Committee on Consumer Safety), opinion on fragrance allergens in cosmetic products, 13–14 December 2011
http://ec.europa.eu/health/scientific_committees/consumer_safety/docs/sccs_o_073.pdf
[68] ECHA, Summary of Classification and Labelling, https://echa.europa.eu/sv/information-on-chemicals/cl-inventory-database (08.05.2017)
[69] Miljøstyrelsen 2016, Environmental project No. 1840, Evaluation of selected sensitizing fragrance substances A LOUS follow-up project http://www2.mst.dk/Udgiv/publications/2016/03/978-87-93435-46-9.pdf

fragrances should be classified in the subcategory 1A (strong/extreme skin sensitisers). These substances are as follows:

Citral CAS no. 5392-40-5, Cinnamaldehyde CAS no. 104-55-2, Cinnamyl alcohol CAS no. 104-54-1, Coumarin CAS no. 91-64-5, Eugenol CAS no. 97-53-0, Farnesol CAS no. 4602-84-0, Geraniol CAS no. 106-24-1, 7-Hydroxycitronellal CAS no. 107-75-5, Methyl oct-2-ynoate CAS no. 111-12-6, Evernia prunastri, ext. (Oakmoss extract) CAS no. 90028-68-5 and Cinnamomum cassia leaf oil/Cinnamomum zeylanicum, ext. CAS no. 8007-80-5/CAS no. 84649-98-9. The first 10 substances are among the 26 fragrances that are subject to declaration and these are already governed by Nordic Ecolabelling's requirements. Cinnamomum cassia leaf oil/Cinnamomum zeylanicum, ext. CAS no. 8007-80-5/CAS no. 84649-98-9 is new and has been added to the list in table O7.

Nordic Ecolabelling believes that this requirement is highly motivated because hand dishwashing agents can be used in direct contact with the skin during the washing. The hands are in contact with the product for a long time and sensitizing substances are not desirable.

Note that nitro musks are prohibited in fragrances under requirement O6 and that Lilial (CAS 80-54-6) is self-classified as Repr2 H361 and is therefore excluded from use via O5.

The requirements d) and e) are new.

O8 Preservatives

a) Preservatives included in the product or 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 value for the highest measured BCF is to be used, see appendix 1.

✉ Documentation of BCF or logKow, Appendix 2 and 3 or safety data sheet for the preservative.

Background to requirement O8

Note that MI (methyl isothiazolinone, cas 2682-20-4) and other sensitizing preservatives are prohibited according to O5 and O6.

Preservatives are added to liquid products to prevent bacterial growth in the products. Hand dishwash detergents usually need to be preserved and do not have self-preserving properties to the same extent as liquid laundry detergents, for example, so there is a need to add preservatives to hand dishwash detergents. Nevertheless, since preservatives are generally toxic to aquatic organisms and can cause hypersensitivity and allergies, Nordic Ecolabelling wishes to limit preservatives via a requirement that they must not be bioaccumulative and that the levels must be optimised.

Nordic Ecolabelling's requirements concerning preservatives are strict. Preservatives used in hand dishwash detergents must according to Biocidal Products Regulation ((EU) 528/2012) be approved to PT6 (product type 6: Preservatives for products during storage) in line with the Biocidal Products Regulation. Today there are 51 PT6 preservatives that can be used in hand

dishwash detergents (10 approved and 41 under review). Of these, around a half are sensitising (of which 6 are isothiazolinones plus DTBMA, which forms isothiazolinone). 12 are formaldehyde donors. The different preservatives are not necessarily interchangeable. They have different levels of effect on different types of microorganisms (gram positive and gram negative bacteria and fungi). Some organic acids, such as lactic acid and sorbic acid, also have relatively little effect when the pH sits around the neutral area, while peroxides and DBNPA are not used very widely as they break down relatively quickly. Isothiazolinones and formaldehyde donors are the two main families of biocidal active substances for hand dishwash detergents.[70]

There are several other requirements, in addition to the requirement on preservatives, which also restrict the range of preservatives. Via the CMR ban (see O5), for example, we prohibit formaldehyde and formaldehyde-releasing products, the latter of which have been widespread. The ban on organochlorides (see O6) excludes CMIT (chloromethylisothiazolinone, CAS 26172-55-4), which is also a common preservative. The ban on endocrine disruptors (see O6) rules out 2-Phenylphenol, for example.

Preservatives may be used in the products and in constituent substances only if they are not bioaccumulative. Bioaccumulative substances collect in the fatty 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, the highest measured BCF is always the determining factor in the assessment of a substance's bioaccumulative potential.

The requirement ensures that licence holders do not begin using undesirable preservatives that can enter the ecosystem.

The requirement is the same as in generation 5 of the criteria.

A requirement for optimised quantities of preservatives was previously included in this requirement in order to avoid the unnecessary addition of preservatives. This is documented via a Challenge test (provocation test, load test), which is performed in conjunction with the development of the product or equivalent. The requirement on Challenge tests was included in generation 5 of the criteria but the Nordic Ecolabelling has decided to remove that after the public hearing in generation 6.

The Nordic Ecolabelling considers the risk of additions of increased amounts of preservatives to be small, since there are other requirements in this document limiting the amounts of preservatives in hand dishwashing detergents (for example CDV, long term environmental effects and sensitizing substances) in combination with the additional cost for producers when adding more

[70] https://circabc.europa.eu/sd/a/8035cf70-bf96-4c4d-90c2-0faae8652287/CA-Nov14-Doc.4.6%20-%20PT6%20impact%20assessment.pdf

preservatives than necessary. The extra environmental gain by a requirement on Challenge tests is therefore considered to be small. The producers do often perform Challenge tests during product development to optimize the additions of preservatives, but the test is not always done exactly the way as Nordic Ecolabelling previously had stated in the requirement.

This updated requirement is therefore different compared to the requirement in generation 5.

7.5 Dosing, ecotoxicity and biodegradability

O9 Maximum dosing

The dosing is calculated as the recommended dose in grams per litre of water.

The recommended dose must not exceed **1.0 grams per litre of water**.

For density calculations, density at room temperature shall be used. If the dose is specified as an interval, the highest figure in the interval must be used in the dosing calculation for this requirement, and in the WUR requirement (O16).

For hand dishwashing tablets: Tablets are dissolved following the manufacturer's instructions. The dosage is calculated for in-use solution, when the detergent is used for a full kitchen-sink.

✉ Calculation of dose per litre of water and a product label or draft label with the specified dose.

Background to requirement O9

The revision work for generation 5 in 2012 included an internal questionnaire aimed at gaining a better picture of hand dishwashing detergent dosing in the home (see also the section Patterns of use). The conclusion of the survey was that people use their hand dishwashing detergent without fully following the instructions on the recommended dose. In short, over-dosing occurs or users dose without measuring. Many people now have dishwashers and they only hand wash a small proportion of their dishes, and so they may not always fill up the whole sink with water, which tends to result in dishwashing with a higher concentration than is stated on the product.

During the revision work in 2012, various calculations and assessments were performed to achieve a good match with the way consumers use the product. There is, for example, often a correlation between viscosity and active content, i.e. products with high active content usually have a higher viscosity. A product with higher viscosity might conceivably be dispensed in smaller quantities, since when squeezing it out of the bottle it is thicker/less fluid, compared with one that contains a lot of water. Nordic Ecolabelling thus believes that consumers/users are, to a certain extent, most likely to dispense small quantities of a concentrated/viscous product than of a non-concentrated/less viscous product. However, this correlation between consumer dosing and concentration is not linear. At a certain point, the concentration of the product does not lead to the same low dosing, with a higher concentration simply leading to greater over-dosing.

As far as we can tell, consumers do not dose entirely in line with the manufacturer's recommendations, and we also do not have grounds to claim that

products with lower recommended dosing levels are dosed in smaller amounts than those with higher recommended dosing levels.

Since the situation concerning the use of hand dishwashing detergents, dosing instructions and viscosity is complex, we developed a requirement which Nordic Ecolabelling believes takes account of both over-dosing and the desire to avoid too much transport of water (in the form of products with relatively high water content). We have kept this requirement in generation 6.

In order to promote the high-viscosity products to some extent, the limit has been set such that products with a dose less than or equal to 0.6 g/l working solution (the average value for the ecolabelled hand dishwashing detergents scrutinised in the revision for generation 5) are to use a figure of 0.60 g/l when calculating CDV, while those that have a higher dose (i.e. 0.61 g/l – 1.0 g/l) are to use the stated dose.

It is not entirely accurate for all varieties of use, but it is judged to be the most accurate in the context, considering the products overall. Nordic Ecolabelling does not wish to promote the most concentrated products, since patterns of use suggest that consumers do not use the products as instructed, but at the same time Nordic Ecolabelling does not wish to encourage the highly diluted products.

The requirement is the same as in generation 5 of the criteria.

O10 Long-term environmental effects

The use of constituent substances which are classified with any of the hazard statements H410, H411 or H412 is limited as follows:

$FV=100*CH_{410} + 10*CH_{411} + CH_{412} \leq 0{,}010$ grams/litre in-use solution

where

CH_{410} = concentration of substances with H410 in grams/litre in-use solution*

CH_{411} = concentration of substances with H411 in grams/litre in-use solution*

CH_{412} = concentration of substances with H412 in grams/litre in-use solution*

** The amount of ingoing substances with respective classification in the product at a dose of 0.60 grams / litre in-use solution, if the indicated dose on the label is less than or equal to 0.6 g / l. For products with dosage above 0.60g / litre in-use solution, the indicated dosage is used.*

Exemptions:

- Protease/Subtilisin classified as Aquatic Chronic 2 (H411) is exempt from the requirement, see also the requirement concerning enzymes in O5.

- Surfactants classified as H411 and H412 are exempted from the requirement, on condition that they are readily biodegradable** and anaerobically biodegradable***.

*** In accordance with the DID list, version 2016 or later. If the substance is not on the DID list, or data on the DID list is lacking, the substance is documented in accordance with test method no. 301 A–F or no. 310 in the OECD guidelines for testing of chemicals, or other equivalent test methods evaluated by an independent body and controlled by Nordic Ecolabelling..*

**** In accordance with the DID list, version 2016 or later. If the substance is not on the DID list, or data on the DID list is lacking, the substance is documented in*

accordance with ISO 11734, ECETOC no. 28 (June 1988) or OECD 311 or other equivalent test methods evaluated by an independent body and controlled by Nordic Ecolabelling.

If information about the substance being hazardous to the environment (in the form of data concerning toxicity and biodegradability, or toxicity and bioaccumulability) is not available, the substance is treated as a worst case, i.e. as environmentally hazardous, H410.

☒ Calculation according to the above formula showing that the requirement is fulfilled. Nordic Ecolabelling's calculation sheet can be used and can be obtained from Nordic Ecolabelling's websites.

☒ Appendices 2 (product) and 3 (raw material) signed and completed, or alternatively equivalent signed information.

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

Background to requirement O10

A Nordic Swan Ecolabelled hand dishwash detergent must never be classified as environmentally hazardous, see requirement O2 Classification of the product. Substances that are classified as environmentally hazardous may be present in hand dishwash detergents in limited quantities. Substances with poor biodegradability may cause environmental problems today or in the future. The effect will be very serious if poorly degradable substances are also toxic. Limitation of these adverse characteristics will reduce the risk of negative environmental impacts. The environmental properties of hand dishwash detergents are important, because hand dishwash detergents are discharged via the treatment plant into the recipient watercourse. Consequently, a requirement has been set concerning the maximum content of environmentally hazardous substances in a product. By weighting the parameters, substances classified as H410 are subject to the greatest limitation. The weighting in the formula below is connected to classification limits for environmentally hazardous substances (CLP, table 4.1.2, Classification of compounds in terms of the risk of long-term adverse effects by summarising the concentrations of the classified constituents).

Nordic Ecolabelling has decided not to include M-factors, multiplication factors*, in the requirement, since most of the substances included in hand dishwash detergents in this product group have M-factor 1. This also entails that substances for which there is no data and for which a "worst case" assessment is made are counted as H410 with M-factor=1.

** An M-factor is applied to the concentration of a substance classified as hazardous to the aquatic environment in the categories of acute 1 and chronic 1, on classification in accordance with CLP*[71].

The requirement limits are tougher compared with generation 5, since our licensing data shows that there is capacity for such a change. The majority of substances classified as environmentally hazardous can be found in fragrances (which is why there are different limit values for professional and consumer

[71] ECHA: http://echa.europa.eu/documents/10162/13643/pg_7_clp_notif_sv.pdf (visited 03.05.2016)

products, with fragrances prohibited in the former), but environmentally harmful substances can also be found in preservatives, for example.

Self-classification is also considered in addition to harmonized classification. If information of hazard to the environment (in the form of data concerning toxicity and biodegradability, or toxicity and bioaccumulability) is not available, the substance is treated as a worst case, i.e. as environmentally hazardous, H410.

Exemptions

As part of the 2nd ATP to CLP, the basis for environmental risk classification was amended (as from 1 December 2012). Previously, to have the environmental risk classification "long-term environmental effects" (R50/53, R51/53 and R52/53), there had to be evidence that the substance was not readily biodegradable. But in the CLP system, substances can have a risk classification in the "long-term effects for aquatic organisms" (H410, H411, H412) category solely for the substance's chronic toxicity (if data exists), even if the substance is readily biodegradable. This mostly affects surfactants, which often have low toxicity values, but are biodegradable.

There are also other substances, such as the protease enzyme, which are classified as H411 according to the new classification rules. Enzymes are exempted because they are so active that they break down long before they reach watercourses. However, they have positive environmental effects since less surfactants can be used to achieve the same cleaning results when using enzymes.

Nordic Ecolabelling has decided to continue exempting aerobically and anaerobically biodegradable surfactants with the H412 classification (Harmful to aquatic life with long-lasting effects) from the requirement, in the same way as in the criteria for cleaning products. It has been decided to grant the same exemption to H411-classified surfactants as to H412-classified ones. Introducing this additional exemption will not give rise to the certification of more toxic formulations than the ones already approved today. The requirement "Classification of the chemical product" will restrict the amount of H411 and H412 classified surfactants to 2,5% and 25%, respectively. In addition, the "Critical dilution volume"-requirement will restrict the content of highly aquatic toxic surfactants.

The requirement has been tightened for some product categories compared to generation 5.

In future revisions, Nordic Ecolabelling will always review the products in order to assess the need for these exemptions. A decision has been made to investigate the consequences of the following actions on the requirement "Long-term environmental effects":

- All exemptions are removed and all classified substances including surfactants must be included in the calculation, regardless of their classification category (H410, H411 and H412).
- The M-factors for H410-classified substances must be included in the calculation.

Because of these two actions, new limit values will have to be set to expect formulations to meet the new version of the requirement.

O11 Critical dilution volume (CDV)

The critical dilution volume (CDV) is calculated for all constituent substances included in the hand dishwash detergent. CDV is a theoretical value that takes account of each substance's toxicity and biodegradability in the environment.

A product's critical dilution volume is calculated at a dose of 0.60 g/l of working solution, if the stated dose is less than or equal to 0.60 g/l. If the recommended dose exceeds 0.60 g/l, the recommended dose itself is used in the calculations. The recommended dose, however, cannot exceed 1,0 g/l (see O9).

The product's critical dilution volume (CDV) may not exceed the following limit value for $CDV_{chronic}$

CDVchronic $\leq$ 1500 litres

CDV is calculated using the following formula for all substances in the product:

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

$dose_i$ = the constituent volume of each individual substance "i", in g/l in-use solution

DF_i = degradation factor for substance "i", in accordance with the DID list

TFi chronic = chronic toxicity factor for substance "i", in accordance with the DID list.

If TF_i chronic is lacking, TF_i acute can be used.

☒ Calculation of $CDV_{chronic}$ for the hand dishwash detergent.

Nordic Ecolabelling's calculation sheet can be used and can be obtained from Nordic Ecolabelling's websites

Reference to the DID list, version 2016 or later. If substances are not on the DID list, or data on the DID list is lacking, the parameters must be calculated based on the guidance in part B of the DID list, and the related documentation must be submitted.

Background to requirement O11

CDV is a theoretical value that takes account of each substance's toxicity and biodegradability in the environment. The method was developed together with the EU Ecolabel. A maximum limit for CDV ensures that the Nordic Swan Ecolabelled products have a very small impact on the recipient watercourse.

The critical dilution volume (CDV) is calculated for all ingoing substances included in the hand dishwash detergent. Constituent substances are all the substances covered by the definition at the start of the requirement text, plus impurities from raw materials if they make up over 100 ppm of the product or 1.0% of the raw material and thus qualify for inclusion in the CDV calculation.

After the DID list was updated to include large amounts of additional chronic data in 2014, a review of the licensing data (based on the 2014 DID list) indicated a need to update the upper limit for CDVchronic. In version 5.2, the upper limit for CDVchronic was therefore adjusted from 2500 to 1000. (The upper limit for CDVacute was not adjusted and remained at 2500.) The limit proved to be very tough, and so it has been raised to 1500 compared with generation 5. The requirement has, however, been tightened by excluding calculations using acute values. As in generation 5, the limit values have been set based on a dose of 0.60

g/l of working solution, and higher doses for those that currently have a recommended dose > 0.60 g/l. See also under section Dosing, ecotoxicity and biodegradability (O9).

Generation 6 refers only to the most recent DID list from 2016 or later.

The CDV limit is only stated with chronic values, as in generation 5. The use of chronic data is generally preferable, since long-term toxicity data is considered of higher quality and gives more precise/reliable estimates of potential environmental effects compared with acute toxicity data. The requirement specifies that if TFchronic is lacking, TFacute may be used. The safety margins are much larger for acute toxicity values than for chronic values.

O12 Surfactants – aerobically and anaerobically biodegradable

f) All surfactants must be easily biodegradable according to test method no. 301 A–F in the OECD guidelines for testing of chemicals or other equivalent testing methods evaluated by an independent body and controlled by Nordic Ecolabelling..

g) All surfactants must be anaerobically biodegradable in accordance with ISO 11734, ECETOC no. 28, OECD 311 or equivalent testing methods evaluated by an independent body and controlled by Nordic Ecolabelling.

✉ Reference to the DID list dated 2016 or later versions.

✉ If the DID list, dated 2016 or later, 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 1. 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, independent third party, and refer to relevant data from literature that has been subject to scientific scrutiny.

Background to requirement O12

Surfactants are widely used in hand dishwash detergents and constitute a large proportion of the chemicals in such products. As hand washers are also used in places that lack connection to waste water treatment and go straight into nature it is relevant to set requirements on biodegradability of surfactants.

Compounds 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 biodegradable substances is often in short supply. Rapid biodegradability under oxygen-rich (aerobic) and oxygen-poor (anaerobic) conditions is therefore of major environmental importance. Surfactants are considered to be essential in this context, since they are a group of organic substances that appear in large quantities, and since many surfactants are toxic to aquatic organisms. The Detergent Regulation requires surfactants to be aerobically degradable.

The detergent regulation prescribes that surfactants must be aerobically biodegradable, but there are opportunities for exemptions from the detergent regulation for products for professional use. This possibility has so far been used only once in the EU[72], for a surfactant that can be used in CIP products. Since

[72] Appendix V in detergent regulation 648/2004, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:104:0001:0035:EN:PDF

the possibility exists, we believe it is appropriate to retain the requirement of aerobic biodegradability of surfactants It is therefore very important to require surfactants (irrespective of function) to be biodegradable in both aerobic and anaerobic conditions for this product group.

In the latest version of the EU Ecolabel's criteria for hand dishwash detergents (adopted on 23 June 2017) only surfactants classed as H400 or H412 must be anaerobically biodegradable. Instead there is a limit for the total quantity of non-anaerobically biodegradable surfactants. Nordic Ecolabelling has not identified sufficient environmental gains to justify removing the requirement concerning anaerobically biodegradable surfactants, and has chosen instead to retain the requirement.

The requirement is the same as in generation 5 of the criteria.

7.6 Performance

Under the requirement, a product must be at least as good as or better than the product with which it is being compared (the reference product).

O13 Performance test

Performance is measured as the product's cleaning ability (ability to remove soiling/make dishes clean), and its cleaning capacity (how long the product lasts), and it is compared with a reference product.

The product must be as good as or better than the reference. This entails that at least 80% of the testing rounds (e.g. 4 out of 5) must yield a positive result for the test product (as good as or better than the reference product) in order for the test product to be considered in compliance with the performance requirement. Alternatively, the applicant may use statistical methods and, with a one-sided 95% confidence interval, show that the test product is as good as or better than the reference product in at least 80% of the testing rounds.

The performance must be tested in a laboratory test (see test laboratory requirements in Appendix 1) within the parameters described in Appendix 5. The results are to be presented in the report, as set out in Appendix 5. The test must be performed by a laboratory that meets the requirements concerning test laboratories in Appendix 1.

- The reference product is tested at the lowest recommended dose, as stated on the packaging. If there are no dosing instructions for the reference, the dose is set at the same as for the test product.
- The test product is tested at the lowest recommended dose. Hand dishwashing tablets should be tested as in-use solution, when the detergent is used for a full kitchen-sink, following the instructions.
- The reference product is defined as a product that at the time is one of the most well-established/market-leading hand dishwashing detergents in a Nordic country or in the countries in which the product will be sold.
- The reference product must be a product other than the product that is set to be ecolabelled. The reference product must be made by a manufacturer other than the one that produces the applicant product.
- The reference product must be purchased specifically for the test. Products for the professional market are to be tested against another

professional product, and similarly a consumer product must be compared against another consumer product. If the product is marketed to both the professional and consumer markets, the test is performed against a professional product.

✉ Test report showing that the product is as good as or better than the reference product, in accordance with Appendix 5.

✉ Documentation on the test laboratory, in accordance with Appendix 1.

Background to requirement O13 Performance

Effectiveness is a key parameter in showing that the product offers the cleaning performance that consumers demand. The performance must be satisfactory at the recommended dose. Dishwashing performance must be demonstrated at the lowest dose stated on the packaging. The reason for not using the fixed dose of 0.6 g/l (as in the requirements concerning CDV and environmentally hazardous substances) is that the stated dose on the bottle is the information that end consumers receive, and thus they will expect the product to perform at that dose.

The test must be carried out in a laboratory. The manufacturer's laboratory may be used for the performance test, see test laboratory requirements in Appendix 1.

In generation 5 of the criteria, Nordic Ecolabelling examined the possibility of approving performance tests other than the framework test used in previous versions of the criteria for the Nordic Ecolabelling of hand dishwashing detergents. Nordic Ecolabelling chose to retain the framework test from the previous generation, but with clarifications and added stipulations concerning the method and reporting, in order to ensure that the tests performed demonstrate that the product is as good as or better than the reference. Nordic Ecolabelling's framework test is now a method that includes the most relevant parameters from the IKW test, while continuing to allow scope to optimise the test. In generation 6, Nordic Ecolabelling has chosen to keep the existing test in the criteria, but has updated the requirements concerning test laboratories. The requirements concerning the laboratory are set out in Appendix 1 of the criteria.

The IKW test is considered to have the advantage of being a more standardised test, but it has its shortcomings with regard to Nordic conditions:

In the Nordic region, we generally have soft water, while the IKW test requires hard water. Nordic Ecolabelling wants the tests to continue being performed at the relevant water hardness for the Nordic region, with no desire to standardise the test at high water hardness. The testing instructions for the IKW test specify which fats and so on must be used for soiling. The two recipes for soil stated in the test comprise 12 components, which are considered slightly excessive by several of the parties with which Nordic Ecolabelling has been in contact. Nordic Ecolabelling's framework test now specifies that the manufacturer must report the soil composition used in the test and that the soil mix must also contain carbohydrates and protein (such as flour and egg). The test also states that the soil must mainly comprise both animal and vegetable fats. Nordic Ecolabelling has additionally been informed that it can be difficult in the IKW test to demonstrate that an increased dose of the product gives an increased effect. Nordic Ecolabelling's test with only water is therefore included as a parameter for judging the test itself, i.e. demonstrating that the test can show a difference between dishwashing with and without detergent.

In generation 5 of the criteria, the requirement concerning cleaning capacity stated that a method for assessing this may be the one used in the IKW test, which involves continuing the test until the foam has gone. Nordic Ecolabelling's test also includes the parameter of cleaning ability, which is not found in the IKW test. This is included to ensure that the plates that are dishwashed come out clean, showing that the dishwashing detergent is effective in removing soil.

In previous versions of the criteria for hand dishwashing detergents, it was also possible to test a product against the reference formulation stated in the EU Ecolabel's test, i.e. the reference formulation in the IKW test. This option was removed in generation 5, since the reference formulation was developed for testing at a high water hardness level (14°dH), which in most cases is not a relevant water hardness level for the Nordic region. Nordic Ecolabelling wishes to maintain the performance that is found in today's ecolabelled products and has therefore chosen to continue comparing the products against a market leader.

Additional text was introduced to the requirement in generation 5, stating that professional products must be compared with another professional product. This requirement was added, since products for the professional market face different demands, not least concerning the ability to remove tough burned-on residues and clean very greasy dishes, compared with consumer products. Nordic Ecolabelling therefore considers it relevant for the product to be compared with equivalent products on the market.

The requirements concerning the laboratory are set out in Appendix 1 of the criteria. In generation 5 of the criteria, the laboratory requirement for the performance test was that it must meet the general requirements of standard EN ISO 17025 or have official GLP status. In version 6, Nordic Ecolabelling wishes to give applicants greater flexibility by also accepting tests from other competent and independent testing institutes. In version 5 of the criteria, Nordic Ecolabelling allowed the use of the applicant's own laboratory, under certain conditions. In version 6, Nordic Ecolabelling wishes to make it even more acceptable for the manufacturers to use their own laboratories for performance testing.

The applicant's own laboratory, and external testing institutes that do not meet EN ISO 17025 or have official GLP status, may be approved to carry out performance tests. In this case, the following conditions must be met:

- The organisation must be ISO 9001 certified or certified according to the International Features Standards (IFS) standard for Household and Personal Care.
- The test laboratory must be covered by the certification, and the performance test must be included in the quality management system.
- Nordic Ecolabelling is to be given access to all the raw data from the performance test.

The applicant's own laboratory may be approved to carry out performance tests even if the test laboratory and the performance test are not covered by ISO 9001 or IFS standard for Household and Personal Care certification. The following conditions must be met:

- The organisation must have a quality assurance system, and the performance test must be described in that system.
- Nordic Ecolabelling is to be given access to all the raw data from the performance test.
- The laboratory must document that the test method used is aimed at differentiating between different hand dishwashing detergents, and that the results achieved are reproducible.
- It must be possible for Nordic Ecolabelling to come and observe the performance of a test.

7.7 Packaging

The EU has chosen to work in line with the idea of the circular economy and adopted an action plan[73] that has a clear focus on recovery and recycling, particularly with regard to packaging material. The principle is based on promoting the alternatives that give the best overall outcome for the environment. Collecting waste can either lead to a high level of material recovery, where valuable materials are returned back into the economy, or to an ineffective system where recyclable waste largely ends up in landfill or is sent for incineration. The notion of waste appears to be undergoing something of a transformation, so that it is now more about resources that can be used for new products. This puts a greater focus on the design of products, because the design affects how well a product can be recycled. The design also affects how valuable the collected recovered material might be.

EU has now accepted a plastic strategy[74] focusing on making recycling of plastics more profitable, reduce the use of single use plastic products, stop the littering of oceans, push investments and innovations regarding minimization of waste and work toward global solutions and standards to reduce the amounts of plastic used.

The Plastic strategy also states that the EU commission will work toward more requirements on packaging design to improve recycling. On page 7 in the plastic strategy[75] it says: "To support improved design while preserving the internal market, EU action is essential. The Commission will work on a revision of the essential requirements for placing packaging on the market[76]. The objective will be to ensure that, by 2030, all plastics packaging placed on the EU market is reusable or easily recycled[77]. In this context, the Commission will also look into ways of maximising the impact of new rules on Extended Producers Responsibility (EPR), and support the development of economic incentives to reward the most sustainable design choices. It will also assess the potential for

[73] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Closing the loop – An EU action plan for the Circular Economy, COM(2015) 614 final, http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52015DC0614
[74] EU, Plastic Waste: a European strategy to protect the planet, defend our citizens and empower our industries, 2018, http://europa.eu/rapid/press-release_IP-18-5_en.htm (besökt 2018-01-24)
[75] EU, Plastic Waste: a European strategy to protect the planet, defend our citizens and empower our industries, 2018, http://europa.eu/rapid/press-release_IP-18-5_en.htm (besökt 2018-01-24)
[76] Directive 94/62/EC on Packaging and Packaging Waste.
[77] i.e. it can be recycled cost-effectively.

setting a new recycling target for plastic packaging, similar to those put forward in 2015 for other packaging materials."

In Europe, the demand for plastics stood at 49 million tonnes in 2015, 40% of which was for packaging material, followed by construction material at 20%. Practically all of the plastic packaging was intended for single use[78].

In this new generation, Nordic Ecolabelling wishes to set requirements that ensure products can be recycled to a greater extent, so that the recovered materials can be used again, thus contributing to the circular economy. With its waste management hierarchy, the EU's Waste Framework Directive sets out an order of priority for legislation and policies aimed at preventing and managing waste, and this hierarchy is often illustrated using the waste pyramid. The most important priority is to prevent waste, followed by reuse, recycling, energy recovery and disposal. The aim is for waste to be managed as close to the top of the hierarchy as possible. In "Closing the loop – An EU action plan for the Circular Economy"[79], greater recycling and material recovery is highlighted as a key aspect of the circular economy. Nordic Ecolabelling therefore feels that it is important to have requirements concerning material recovery.

Although the circular economy underscores the importance of a high level of recyclability, it should not be forgotten that in environmental terms, the gains and impact that the packaging system entails must be seen in the context of the

whole value chain. The main function of packaging is, of course, to ensure that the product reaches the end user and can be used as intended. However, small adjustments to the packaging can have a major influence on sorting and recycling. So, in order to contribute to greater circularity, it is important to bear in mind recycling technology considerations. Although (from an LCA perspective) packaging tends to be seen as a minor part of the overall environmental impact that an individual product type might have, Nordic Ecolabelling sees considerable relevance, potential and steerability in contributing to a high degree of circularity by setting packaging requirements. The criteria document contains several packaging requirements, all of which have three core objectives:

1. To stimulate greater collection of packaging for recycling.
2. To stimulate greater use of the plastic currently collected in the production of new products. This is driven primarily via the WUR requirement, but also by requiring that virgin plastic must not be coloured, in order to stimulate a more closed circle.
3. To stimulate an improvement in the quality of the collected and recycled material. This is driven, for example, by specific requirements restricting filler levels, colourants and undesirable combinations of materials in packaging, closures and labels.

But is there an environmental justification for recycling plastic? Or could it be worse for the climate, for example, to recycle than to manufacture new plastics? In 2015, the Nordic Council of Ministers published a report, "Climate benefits of

[78] Swedish Society for Nature Conservation 2017, Rätt plast på rätt plats – om svårnedbrytbar plast I naturen och plastens roll I den cirkulära ekonomin.
[79] Closing the loop – An EU action plan for the Circular Economy, EU Commission 2015 http://eur-ex.europa.eu/resource.html?uri=cellar:8a8ef5e8-99a0-11e5-b3b7-01aa75ed71a1.0001.02/DOC_1&format=PDF

material recycling – Inventory of Average Greenhouse Gas Emissions for Denmark, Norway and Sweden", whose results indicated that, in CO_2eq, there may be climatic benefits from recycling plastic. The size of those gains is, however, related to the choice of material and the recycling method used, and the results of the study cannot be used as a precise measure of the scale of the gains. Nevertheless, the report's conclusion is that:

"The emissions from secondary production are lower for all materials, implying that both the difference and the percent variance between secondary and primary production are negative[80]*."*

Although an ecocycle-based approach is not entirely new, the recycling of plastic appears, to some extent, to be in its infancy. There are many projects under way, and we are set to see enormous progress in this area. Nordic Ecolabelling is aware that everything could change, but hopes that the newly formulated packaging requirements will provide a good baseline that in the future can be adapted, expanded or redefined depending on what future systems look like.

About the recycling of plastic packaging

Different materials have different NIR reflections (near infrared reflectance), densities and melting points. Packaging comprises several components, such as bottle, closure and label, and each of these may be made from one or more different materials. According to Swedish recycling collection service FTI's report

"En plastmolekyls livsresa, ÅTERVINNING AV PLASTFÖRPACKNINGAR – SÅ HÄR FUNGERAR DET" (A plastic molecule's journey through life, RECYCLING OF PLASTIC PACKAGING – HOW IT WORKS), hard plastic packaging is sorted with the help of infrared (NIR) scanners, which identify what type of plastic each item of packaging is made from. The IR scanner communicates with a mechanical separator that operates with great precision to divert each item onto the right conveyor belt depending on its type. The sorted packaging fractions then go on to be ground, washed, dried and melted into granules[81]. However, the NIR detector has its limitations, since it has problems identifying products that are dark colours. In fact pigments such as furnace black can take away any chance of the NIR detector identifying the material[82]. The sorting is not based entirely on NIR. There is also a separation process that uses a water bath, and in this context the various densities of the plastics are a key factor. One example is that the addition of calcium carbonate quickly changes the density of the packaging, and this also affects the separation process[83],[84]. Another density-related example is that labels and closures on PET bottles should have a density of less than 1 g/cm^3 for optimal separation. PET has a density of 1.38, which means that the material sinks in water. Having closures and labels with a density of less than 1 ensures optimal separation[85]. This can be compared with the reverse situation for PP bottles, for

[80] Nordic Council of Ministers, Tema Nord 2015:547, Climate benefits of material recycling – Inventory of Average Greenhouse Emissions for Denmark, Norway and Sweden, page 74.
[81] FTI AB, PLASTFÖRPACKNINGAR, En plastmolekyls livsresa, ÅTERVINNING AV PLASTFÖRPACKNINGAR – SÅ HÄR FUNGERAR DET.
[82] Förpacknings- och Tidningsinsamlingen, Plastförpackningar – En återvinningsmanual version 0.7, June 2017.
[83] Förpacknings- och Tidningsinsamlingen, Plastförpackningar – En återvinningsmanual version 0.7, June 2017.
[84] http://www.plasticsrecycling.org/pp sourced on 08.08.2017
[85] http://www.plasticsrecycling.org/pp sourced on 08.08.2017

example. PP has a density of less than 1 and so the label's density should be above 1 g/cm^3 [86].

So how is the melting point relevant in this context? One example may be that a small amount of HDPE in a PP fraction might not be too much of a problem, whereas the converse, with small amounts of PP in an HDPE fraction can cause major damage. This is because PP has a higher melting point than HDPE, which creates problems during granulation of the recovered material. If the HDPE fraction is then used, for example, to extrude pipes, the presence of PP will cause lower stability and cracks in the pipes[87].

Nordic Ecolabelling have set requirements on packaging to increase the possibility to recycle the material to make the materials be reused and there contribute to circular economy. Requirements O14-O16 are requirements on the primary packaging such as bottles, containers, pouches, cardboard boxes etc. The requirement regarding recycling design has been divided into two requirements, one for pouches (O15) and one for other types of packaging (O14).

Hand dishwashing tablets must be diluted at least 10 times by the user to the finished product with a certain amount of water. If they are sold with a refill bottle, both the tablet packaging and the refill bottle must meet the packaging requirements. If spray bottles are used, they must have a permanent aerosol reducing foaming nozzle.

O14 A - Recycling design of packaging (except pouches)

Plastic packaging should have a design that enables material recovery. This means that:

- The plastic packaging and closure must be made from Polyethylene (PE), Polypropylene (PP) or Polyethylene terephthalate (PET).
- Exemption is made for spray devices which may contain the following plastics in small technical details: polyoxymethylene (POM), expanded polyethylene (EPE), ethylene-butyl acrylate copolymer (EBA), synthetic rubber copolymer of acrylonitrile and butadiene (NBR), and up to 6% Ethylene vinyl acetate (EVA).
- PS (polystyrene) and PVC (polyvinylchloride) or plastics based on other types of halogenated plastics must not be present in the closure.
- Packaging should be white or uncoloured. Exemption: packaging containing recycled plastic (Post Consumer Recycled) may be coloured/tinted. The colouration may not include carbon black. Exemption is made for small amounts of carbon black used in other colours than black. It must then be documented that the NIR sensor reads and sorts the box/bottle/container or the closure to the correct plastic fraction.
- Carbon black pigments can not be added to the closures. Exemption is made for small amounts of carbon black used in other colours than black. It must then be documented that the NIR sensor reads and sorts the box/bottle/container or the closure to the correct plastic fraction.

[86] Förpacknings- och Tidningsinsamlingen, Plastförpackningar – En återvinningsmanual version 0.7, June 2017.
[87] Förpacknings- och Tidningsinsamlingen, Plastförpackningar – En återvinningsmanual version 0.7, June 2017.

- Fillers (such as CaCO3) can not be included in PE or PP packaging and closures at a level that the density of the plastic exceeds 0.995g / cm3.
- Metal parts must not be part of packaging or closure.

  Exemption is made for small metal parts in pumps.
- Packaging and closures must be compatible with each other, in accordance with the following:
  - PET: Closures must have a density of less than 1 g / cm^3.
    - Silicon closures are not allowed.
      Exemption is made for PET-Squeeze bottles: Closures may include a membrane composed of floating silicon with a density of less than 0.95 g/cm^3 (containing less than 1000 ppm of D4, D5, and D6). The packaging must be certified as fully recyclable according to RecyClass guidelines. Additionally, the packaging must attain a minimum recyclability score of B, as verified by a recyclability rate certificate by RecyClass.
  - PP and PE:
    Silicon closures are not allowed.
  - PE: PP/OPP-closures are not allowed unless the following test or similar is stated on the packaging: Take the cap off prior to recycling to improve recycling.

Packaging includes bottles, containers and similar. Closures includes caps/lids, dosage equipment and pumps mounted on the packaging.

- Hand dishwashing tablets that are diluted in spray bottles: all spray products must have a permanent aerosol reducing foaming nozzle.

☒ Packaging specifications (including bottle, labels and closures) or certificate showing the plastic used and what colours the packaging and closure has.

☒ Appendix 4 declaration from the manufacturer of the packaging.

☒ A signed declaration of compliance with the stated material composition for the packaging, including bottle the closure, filler, colourant where applicable, Appendix 4 or an equivalent declaration may be used.

☒ Declaration/documentation from the manufacturer of the spray trigger, stating that it has a permanent foaming nozzle.

☒ A calculation showing that the density measurement is not exceeded.

☒ Information of label size compared to the surface of the packaging.

☒ Label showing text regarding instruction to remove the cap before recycling, where applicable.

O14 B - Labels for rigid plastic packaging: Design for recycling of packaging

- For containers in polyethene (PE) and polypropene (PP): The following label materials are permitted:
  - Polyolefin plastic labels (PE and PP) as well as PET or PET-G labels with density > 1.0 g/cm^3. For labels of different material than the packaging, the suitability must be substantiated in accordance with Recyclass'

Washing quick test procedure. For film labels applied on HDPE & PP containers, version 1.0[88].

- Paper labels without fibre loss. The suitability must be substantiated in accordance with Recyclass' Washing quick test procedure: For paper labels applied on HDPE & PP containers, standard laboratory practice, version 1.0[89].

- Containers in polyethylene terephthalate (PET) must have a label of a different plastic material, with a density < 1.0 g/ cm^3, or a paper label without fibre loss.

  - Paper labels without fibre loss: The suitability must be substantiated in accordance with Recyclass' Washing quick test procedure: For paper labels applied on HDPE & PP containers, standard laboratory practice, version 1.0[90].

Note: PET-G is not allowed in labels on PET containers. For the time being, cPET labels are also not permitted. Nordic Ecolabelling will consider allowing cPET-labels with the appropriate specifications, if cPET labels become endorsed by EPBP (The European PET Bottle Platform) for PET bottles and/or by RecyClass (www.recyclass.eu).

- Polystyrene (PS), polyvinyl chloride (PVC) and other halogenated plastics must not be used in labels.

- Metallized labels/shrink film labels are not permitted.

  Exemption for lightly metallized labels by vacuum deposition techniques containing an aluminium layer below 5 micrometres if the packaging is proven to be as recyclable as a packaging with a label without metal, according to a sorting test carried out at a sorting facility. Recyclass sorting test or other equivalent test methods can be used.

- For labels of different material than the packaging:

  Labels must not cover more than 60% of the container. The calculation of the percentage shall be based on the two-dimensional profile of the container i.e., the area of the top and bottom of the packaging and the sides of a box/ container/bottle/can shall not be included in the calculation. If the label on the front of pack and back of pack are of different size, the maximum percentage of 60% shall be fulfilled for each side separately. For a cylindrical bottle, the calculation can also be based on the three-dimensional profile exclusive bottom and top of the bottle.

- Direct print on the container is not permitted except for date codes, batch codes and UFI (Unique Formula Identifier).

Label means "traditional label", shrink film label/sleeve, direct print etc.

Please note: Nordic Ecolabelling conducted a project on labels in 2020 and concluded that requirements on labels should be included in the criteria. This requirement is introduced with a transition period until 2024-12-31. More information can be found in the

[88] https://recyclass.eu/wp-content/uploads/2021/10/RecyClass-Washing-QT-Procedure-for-Film-Labels-applied-on-HDPE-and-PP-Containers_FINAL.pdf (Accessed on 2021-11-19)
[89] https://recyclass.eu/wp-content/uploads/2021/10/RecyClass-Washing-QT-Procedure-for-Paper-Labels-applied-on-HDPE-and-PP-Containers_FINAL.pdf (Accessed on 2021-11-19)
[90] https://recyclass.eu/wp-content/uploads/2021/10/RecyClass-Washing-QT-Procedure-for-Paper-Labels-applied-on-HDPE-and-PP-Containers_FINAL.pdf (Accessed on 2021-11-19)

background document under section "Labels" under the argumentation regarding requirement O14.

- ✉ Label specifications showing the material used and density. Appendix 4 Declaration from the manufacturer(s) of the packaging can be used as part of the documentation.
- ✉ If plastic labels of different material than the container is used on PE or PP containers. Test report from a laboratory fulfilling the conditions in Appendix 1, showing that the label is approved.
- ✉ If paper labels are used: Test report from a laboratory fulfilling the conditions in Appendix 1, showing that the label is approved.
- ✉ Declarations that PS, PVC and other halogenated plastics, aluminium and other metals have not been used. Appendix 4 can be used.
- ✉ For labels of different material than the packaging: Calculation of label size compared to the surface of the container.
- ✉ Declaration from the applicant that direct print is not used except for date codes, batch codes and UFI. Appendix 2 can be used.

Background to requirement O14A + O14B

The Nordic Ecolabelling has chosen to set requirements on recycling design to increase the possibilities for recycling of the packaging material and thereby be in line with the EU plastic strategy.

The EU Ecolabel has a section on Packaging in its criteria for "Hard-surface hand dishwash detergents", which were adopted on 23 June 2017. The technical report v 3.0 emphasises the importance of packaging being designed for effective recycling by avoiding potential impurities and combinations of materials that prevent separation of different materials, or that reduce the quality of the recovered material. Packaging that is easiest to be recycled will use only one material, but unfortunately this is not always the best solution from a transport or dosing perspective. The Nordic Ecolabelling has not forbidden all combinations of different materials, but has excluded the worst combinations. In the EU Ecolabel's criteria work it became apparent that in many cases combinations of different materials can allow the overall quantity of material to be reduced, which is a particularly important consideration. This in turn can lead to reduced transportation and landfill, which can be a significant issue in countries with a low level of recycling and a lack of recycling facilities. Both Nordic Ecolabelling and the EU Ecolabel's work have resulted in packaging requirements that focus on supporting recycling.

Exemptions to the requirements are made, where other types of materials than specified cannot be dispensed with in specific types of packaging, or where the recyclability of the packaging is not impaired.

Primary packaging (Bottle/container)

"Plastförpackningar – En återvinningsmanual från FTI" (Plastic Packaging – A recycling manual from FTI) lists plastic packaging made from Polyethylene (PE), Polypropylene (PP) and Polyethylene terephthalate (PET) as the plastic types

that are best from a recycling perspective. PP and HDPE packaging works for every stage of the recycling process. Since these types of plastic are considered to be the best (from a recycling perspective), Nordic Ecolabelling also sets requirement that the plastic bottles should be made from these plastic materials.

PET has a limited market of purchasers, [91], which for example is a reason given by FTi regarding their wish not to include PET as an alternative packaging material in this product group. PET is today mainly used for clear/transparent bottles. There are initiatives where PET-bottles are collected and used to produce other products such as for example textiles.

Textile Exchange[92], [93] writes that they need to increase their usage of recycled polyester for textiles with at least 25% by year 2020. They also write: "Developing rPET production around the globe, will lead to more efficient supply chains and increase the availability of more sustainable fibre choices in the market"

The Nordic Ecolabelling has therefore chosen to keep PET as an alternative plastic material to be used in the packaging for hand dishwashing detergents.

After the public hearing a separate requirement for products sold in pouches has been added, since there were questions from producers whether they should fulfil the same requirements as other packaging. See more regarding thus under requirement O15.

Compostable/biodegradable plastics such as PLA are not suitable for recycling in today's systems, and can cause problems in the existing material recovery process. Such compostable/biodegradable plastic therefore does not fit in with the EU's objective of increasing material recovery and promoting the circular economy in the current Nordic recycling system as it stands today. Nordic Ecolabelling has therefore decided not to include compostable/biodegradable plastic on the list of accepted packaging materials.

Closure (caps/lids/pumps)

Since Polyethylene (PE), Polypropylene (PP) and Polyethylene terephthalate (PET) are the plastic types that are best from a recycling perspective are PS and PVC or plastics based on other types of halogenated plastics not allowed in the closure.

Colourants and printing

Nordic Ecolabelling wishes to encourage the highest possible quality and purity of the products that enter the material recovery systems. The leaflet from Plastkretsen and FTI also mentions the way that colourants and inks affect the recycling potential and the quality of recycled plastic. Reducing the use of chemical colourants is one of the tips given. Colourless plastics have the highest recovery value, making them easier to recycle. Dark colours, including the use of carbon black, can cause problems in modern and automated sorting plants, as the

[91] Ny Teknik, Någon måste också vilja köpa returplasten, 170303, https://www.nyteknik.se/opinion/nagon-maste-ocksa-vilja-kopa-returplasten-6829606 (visited 171215)
[92] Ecotextile, Plans unveiled to boost recycled polyester use, Oct 10 2017, https://www.ecotextile.com/2017101023015/materials-production-news/plans-unveiled-to-boost-recycled-polyester-use.html (besökt 2018-01-16)
[93] Textile Exchange, Recycled Polyester round table, http://textileexchange.org/materials/pfm-round-tables/rpet/ (besökt 2018-01-16)

systems have difficulty analysing dark colours. These products can therefore end up in the residual waste fraction and not be recycled.

During the public hearing comments from FTI were that packaging that is white or transparent is the best choice when it comes to recycling, since such packaging does not cause problems during scanning/sorting of the bottles and also make the reusage of the plastic more attractive. Other recyclers state the same regarding white and transparent packaging. The Nordic Ecolabelling has after the public hearing decided to exclude black coloured closures. For the packaging the Nordic Ecolabel has however chosen to go one step further and only allow white and clear packaging. A quick screening on the web showed that the main part of the packages for hand dishwashing detergents were transparent or white. In the recycling process the pigments can not be removed from the recycled materials. So when it comes to packaging made from recycled plastic* they are exempted from this requirement and can be coloured/tinted. The coloration/tint can not be done with Carbon black, since that is the pigment that causes most problems during recycling. When discussing with stakeholders the Nordic Ecolabel has received information that recycled plastics often are tinted to get a more appreciative colour.

* The recycled plastic here refers to Post Consumer Recycled plastic to harmonize with the WUR requirement.

Label

The Nordic Ecolabelling has after the public hearing chosen not to set specific requirements on the labels in this generation. In the draft that was sent out on public hearing there were requirements on labels regarding type of plastic and a ban on paper labels. Nordic Ecolabelling knows that there are large environmental problems connected to labels used on different packaging. Many comments during the hearing also showed that different producers have chosen different ways when it comes to what labels to put on what bottle. There are also national differences in how the producers have chosen types of labels. When it comes to recycling the best alternative is when the label is made of the same material as the bottle.

When it comes to paper labels on plastic bottles fibres from the paper labels may be transferred into the recycled plastic and cause problems for the manufacture of new products. The paper fibres adversely affect the properties of the recycled material (since the water bath is unable to remove all the paper fibres from the plastics stream) and cause an unpleasant odour[94]. Paper labels can also cause problems in the sorting step. If the NIR hits the label instead of the packaging the entire packaging will end up in the rejected fraction.

After the public hearing Nordic Ecolabelling has had discussions on whether to exclude sleeves, ie labels covering the whole bottle, since they cause problems during sorting of the plastic materials. A requirement has now been added to

[94] Förpacknings- och Tidningsinsamlingen, Plastförpackningar – En återvinningsmanual version 0,7, juni 2017.

limit the labels to cover a maximum of 60% of the surface of the packaging. The limit of 60% has been set since that is the limit recyclers[95] suggest.

Metal

Metal residues, for their part, cause plastics to be rejected if there are metal detectors on the sorting line. Metal residues can also break down the plastic and become a problem in later plastic production[96] [97] which is the reason for not allowing metals in the packaging.

It was decided in May 2019 to allow metal parts in pumps for hand dishwashing bottles. Recyclers have confirmed that while this metal is not recycled as metal, it does not interfere with plastic recycling. However, pumps help controlled and correct dosing.

It was decided in January 2023 to allow lightly metallized labels by vacuum deposition techniques containing an aluminium layer below 5 micrometres. High quantity of metals inside or on the surface of the packaging may affect sorting of the plastic material by reflecting NIR-light and consequently disturb the sensor. However, if the packaging follows the recycling compatibility guidelines developed by FTI or RecyClass and gets a high score according to their ranking methodology, the metal contained will only have a pigmentation effect on the recyclate. It is important to point out that The Nordic Swan Ecolabel reserves the right to re-evaluate this decision in the up-coming revision of the criteria.

Compatibility

EU Ecolabel has a re quirement on labels, shrink film labels and closures should have a density less than 1 g/cm^3 which has been backed up by EU Ecolabel Technical report[98]. In the draft sent out on public consultation the Nordic Ecolabelling had a smilar requirement on the density of labels, but this has been removed after the consultation period. Nordic Ecolabelling will start a project to evaluate labels and their effect on the recycling process, see above.

The consultation draft of the criteria for Disposables for food (2017) proposed a maximum limit of 20% inorganic filler in plastic. The consultation draft was, however, amended following feedback from Grønt Punkt in Norway and FTI in Sweden, and subsequent exchanges, since such a large amount of inorganic filler affects the ability to recycle such items. This is because the inorganic filler can change the density of the plastic. If the plastic becomes too heavy, it sinks to the bottom in the water bath and is separated out for incineration instead of material recovery. This is why the criteria for hand dishwash detergents also contain a requirement that filler must not be added to the HDPE to such a level that its density exceeds 1 g/cm^3 and to PP in such level that the density does not exceed 1 g/cm^3.

Nordic Ecolabelling had a requirement, during the hearing, to ban OPP and PP closures on HDPE bottles. The reason for this was that PP has a higher melting

[95] Grönt Punkt, Basic Facts Report on Design for recycling, 2017, https://www.grontpunkt.no/media/2777/report-gpn-design-for-recycling-0704174.pdf (besökt 2018-01-29)
[96] Plaskretsen and FTI, Bättre förutsättningar för återvinning av plastförpackningar.
[97] http://www.plasticsrecycling.org/hdpe sourced on 08.08.2017
[98] JRC Technical Reports, Revision of six EU Ecolabel Criteria for detergents and cleaning products http://susproc.jrc.ec.europa.eu/detergents/docs/Technical%20background%20report.pdf, 2016

point than HDPE and thus causes problems when using the recovered HDPE fraction[99],[100]. PP labels on an HDPE bottle weigh very little in this context, but a PP closure on an HDPE bottle leads to too much PP in the HDPE fraction, in percentage terms[101]. During the consultation period comments were recieved showing that the market is not yet ready for such a ban on PP closures on HDPE-bottles. There are advantages of having different plastic materials in closure and bottle when looking at how well the bottle is closed and avoids leakage. The producers also state that it is hard to injection mold flip top closures in HDPE. It is also hard for the producers to go from HDPE bottles to PP bottles due to differences in mechanical properties. HDPE has for example better properties at low temperatures and can handle impact better, which is a requirement for UN goods*. Nordic Ecolabelling has therefore chosen to remove this band and have instead added a text to engourage the user to separate bottle and closure before recycling. Nordic Ecolabelling will look closer on this and re-evaluate this during comming revisions.

*UN products are products classified as "dangerous goods" during transport

This is a new requirement that was not included in the preceding generation.

The label project and O14B

The label requirements are based on the findings in a label project run by Nordic Ecolabelling in the summer/autumn of 2020 for laundry detergents, cleaning products and hand dishwashing detergents. The requirement was introduced into the criteria 2021 and enters into force after a transition period. Key players within the recycling industry in Sweden (FTI), Finland (Uusiomuovi), Norway (RoAF, Mepex, Norner, Grønt Punkt Norge) and Denmark (Plastindustrien) were consulted, in order to ensure relevant requirements with respect to the current Nordic waste streams. Furthermore, major label producers and suppliers, as well all Nordic Swan Ecolabel licensees within the above-mentioned product categories were consulted, to ensure achievable requirements.

PE and PP containers should preferably have labels of the same plastic material, in order to facilitate correct sorting by the NIR sensor. However, other label materials are accepted due to the current market situation. Removable labels are preferred, in order to avoid decreasing the final quality of the recyclate further, by introducing different polymers in addition to adhesive and inks. Therefore passing Recyclass' Washing quick test procedure is required. Moreover PET and PET-G labels must have a density > 1.0 g/m^3, to be separated from the PE and PP containers in the float/sink bath. Paper labels must be without fibre loss because residue paper fibres cause quality issues in the recycled plastic.

PET labels must have labels with density <1.0 g/ml to ensure correct separation in the float/sink bath. (PET has a density > 1.0 g/ml). As a consequence, for the time being, cPET labels are not allowed. Nordic Ecolabelling will consider to allow cPET-labels with the appropriate specifications, if cPET labels become endorsed by EPBP (The European PET Bottle Platform) for PET bottles and/or

[99] Förpacknings- och Tidningsinsamlingen, Plastförpackningar – En återvinningsmanual version 0.7, June 2017.
[100] http://www.plasticsrecycling.org/hdpe sourced on 08.08.2017
[101] http://www.plasticsrecycling.org/hdpe sourced on 08.08.2017

by RecyClass (www.recyclass.eu). Paper labels must be without fibre loss because residue paper fibres cause quality issues in the recycled plastic.

PET-G labels/shrink film labels are excluded on PET containers since PET-G is problematic in recycling in large quantities as it is not compatible with the PET commonly used for the containers (A-PET).PVC and other halogenated plastics are excluded since they lead to adverse environmental impacts in waste handling.

If the NIR sensor at the sorting facility hits the label instead of the bottle, the bottle may end up in the rejected fraction. Therefore, labels and shrink film labels of different materials than the container must not cover more than 60% of the container surface.

Laser printing is permitted as there are no inks used in the process.

Direct printing on the container is restricted, as ink residues lower the quality of the recycled plastic.

Metallized labels can be detected by metal detectors causing the packaging to be sorted to reject. Thin metal layers do not seem to possess major problems for the sorting or recycling, if the labels can be separated from the containers . However, these metal materials will not be recycled, and single use of metal is not supportable from a resource point of view.

This is a new requirement introduced ultimo 2021.

O15 Recycling design of pouches

- The plastic packaging and closure must be made from Polyethylene (PE), Polypropylene (PP) or Polyethylene terephthalate (PET).
- The packaging should be made of monomaterial, ie not laminates with layers of different materials.
- Silicone, PS and PVC or plastics based on other types of halogenated plastics must not be present in the closure or label.
- Carbon black pigments can not be added to the pouch.

  Exemption is made for text and pictograms.

  Exemption is also made for small amounts of carbon black used in other colours than black. It must then be documented that the NIR sensor reads and sorts the pouch to the correct plastic fraction
- Carbon black pigments can not be added to the closures. Exemption is made for small amounts of carbon black used in other colours than black. It must then be documented that the NIR sensor reads and sorts the closure to the correct plastic fraction.
- Fillers (such as $CaCO_3$) can not be included in PE or PP packaging and closures at a level that the density of the plastic exceeds 0.995g / cm^3.

- Barrier coatings can only be made out of EVOH (Ethylene vinyl alcohol) in maximum amounts of 5% related to the total weight.

Closures include caps and lids. The packaging includes pouches or other plastic "bags".

✉ Packaging specifications (including pouch, labels, and closures) or certificate showing the plastic used and what colours the packaging and closure has.

✉ Appendix 4 declaration from the manufacturer of the packaging.

✉ A signed declaration of compliance with the stated material composition and barrier coatings, for the packaging including pouch, closure, filler, colourant where applicable, Appendix 4 or an equivalent declaration may be used.

✉ A calculation showing that the density measurement is not exceeded.

Background to requirement O15

During the public consultation period questions arose regarding products sold in pouches and whether they should fulfil the same packaging requirements as bottles and containers when it comes to recycling design. Nordic Ecolabelling chose to include a new requirement for this type of packaging to avoid making O14 too complicated.

The requirement is the same as O14 on plastics. Nordic Ecolabelling has had dialogues with FTi regarding pouches. They suggested only accepting pouches of PE since they are the easiest to recycle, but since this is the first generation of this requirement Nordic Ecolabelling has decided to use the same requirements on plastics as in O14 for bottles/containers etc. An extra requirement has been added regarding not allowing laminates of different material layers, ie the pouches should be made of monomaterials.

Nordic Ecolabelling has decided only accepting EVOH up to maximum 5% (in relation to the maximum weight) as a barrier coating. This is in line with what the recycling companies recommend so that the recycling process is not adversely affected. In the EU Ecolabel there is a requirement on barrier coatings banning polyamide barriers, functional polyolefins, metallised barriers and light-blocking barriers. The requirement of Nordic Ecolabelling mean that these are also excluded. Some adjustments were made to the requirement in January 2020 as the requirement was harmonized with the same requirement in criteria for laundry detergents and stain removers.

O16 The requirements on colours and fillers are the same as in O14.Weight-Utility Ratio (WUR)

WUR is a measure of the amount of packaging used to deliver an amount of product with a certain benefit.

The exemptions from WUR calculation are:

- Packaging made from more than 80% post-consumer recycled (PCR)* raw material is exempted from the requirement.
- Products that are supplied in packaging that is part of a take-back system** for a product.

** Post-consumer/commercial recycled material is defined in the requirement according to ISO 14021:2016:*

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

*** Take-back system refers to packaging that are taken back, washed and refilled. Packaging that is a part of a recycling system where the packaging is recycled into new plastic is not part of what here is called a take-back system.*

The calculation of WUR (grams of packaging/litre of in-use solution) is performed as follows:

$$WUR = \Sigma [(2*Vi - 2.5*Ri)/(Di * ti)] \leq \text{limit value}$$

Limit value:

Liquid hand dishwashing detergents: 0,1 gram packaging / litre in-use solution

Hand dishwashing tablets: 30 gram packaging / litre in-use solution

Vi = Weight of primary packaging in grams, including closure, fitted dosing devices and similar + any refills (that are sold per original bottle) in grams including closures.

Ri = Weight (g) of recycled material (postconsumer) in the packaging component (i) in grams.

Packaging is considered postconsumer recycled if the raw materials are recovered following use by consumers. If the raw material is industrial waste from the material or packaging producer's own production, the material is not considered to be recycled.

Di = No. of functional doses in the primary packaging component (i). For products that are sold pre-diluted, D = product volume (in no. of litres).

If the primary packaging is sold packaged together with a refill, D is calculated as the sum of the functional doses in both packs (just as V is the sum of the weight of both packs (see description of V)).

Hand dishwashing tablets: in-use solution, is here defined as the tab diluted in the bottle following the manufacturer's instruction.

✉ Declaration/documentation from the packaging manufacturer stating the type of material in the packaging components (e.g. closure (cap, spray nozzle etc.), bottle and labels). Appendix 5 can be used.

✉ Calculation of weight-utility ratio (WUR) and required documentation on reuse of the packaging component. Nordic Ecolabelling's calculation sheet can be used and can be obtained from Nordic Ecolabelling's websites

✉ Declaration from the packaging manufacturer about the proportion of recycled material, if recovered/recycled material is used. Appendix 5 can be used.

✉ If the exemption is used:

- Documentation that shows that packaging made of more than 80% post-consumer recycled (PCR) material (Appendix 4 can be used).

or

- Documentation that shows is part of a take-back system for a product.

Background to requirement O16

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 restriction promotes the use of concentrated products by relating the amount of packaging to the dose.

Nordic Ecolabelling has chosen to set a requirement for primary packaging in the hand dishwash detergent criteria for two reasons: There is little steerability of distribution packaging and it punishes small-scale manufacturers unnecessarily harshly. In addition, it is through optimising primary packaging that the greatest environmental gains can be made for products such as hand dishwash detergents.

Included in the primary packaging is the weight of the packaging in which the hand dishwash detergent is packed. This also includes labels, closures and any fitted dosing devices, etc.

The requirement level has been made stricter at 0,1 g/l as it has become apparent that the limit was very easy to meet, particularly for concentrated products. The equation has also been changed to promote the usage of recycled materials instead of punishing the use of virgin materials. The weight of the recycled materials is now being subtracted from the weight of the packaging. In addition, in this generation of the criteria a weighting factor of 2.5 has been added to the WUR calculation, in order to promote the use of recycled material in the packaging. The aim is to stimulate the choice of packaging that uses recycled raw materials. The factor has been chosen so that if you have 80% recycled material, WUR = 0. Packaging made from more than 80% post-consumer recycled/regrind (PCR) raw materials, is thus exempted from the WUR calculation, as in the EU Ecolabel. It appears to be a suitable way to try to encourage a high proportion of recycled packaging material. However, even a small amount (e.g. 5%) of recycled material helps to meet the requirement if you are on the borderline. The availability of packaging made from recycled raw materials is apparently low in the Nordic market, but Nordic Ecolabelling believes there is the utmost relevance in trying to stimulate greater recycling. A definition of post-consumer/commercial recycled material was added to the requirement in January 2020.

Since the relevance is high but the Nordic availability (of recycled plastic raw material for this type of plastic packaging) is currently limited[102], there is no absolute requirement that the packaging must be made from a certain amount of recycled raw material. There are, however, sources in other parts of Europe (Benelux, UK, France)[103]. The WUR calculation may be incorporated via changes to several parameters, but in this generation of the criteria recycled material is given a slightly higher weighting than before. The purpose of the weighting is to simulate increased demand for plastic packaging from recycled plastic.

[102] Telephone conversation with Pernilla Kulleborn 02.06.2017.
[103] Telephone conversation with Pernilla Kulleborn 02.06.2017.

The requirement level for the WUR calculation has been set based on Nordic Ecolabelling's experiences of the licensing work for both professional products and consumer products.

The reuse factor has been removed from this generation. It is highly uncommon to sell refills of hand dishwashing detergents, since the product group comprises only concentrated products.

The letter N has been changed, after the public consultation, to the letter R in the equation above, since this factor stands for the amount of recycled material in this generation of the criteria. In the previous generation the factor with letter N was the amount of virgin material in the packaging. Nordic Ecolabelling has chosen the letter R as recycling. The text above has therefore been changed to the following:

> Ri = Weight (g) of recycled material (postconsumer) in the packaging component (i) in grams.

In this generation of the criteria, the WUR requirement includes an exemption for packaging that is made from more than 80% recycled material. The EU Ecolabel has introduced this in its criteria for Hand dishwash detergents, and Nordic Ecolabelling believes it is an appropriate way to try to stimulate a high proportion of recycled packaging material.

Take-back system for a packaging is exempted since if packaging is recycled as such (taken back, washed and refilled) reduces the need for virgin materials in the packaging. Take back systems are not the same as packaging materials that are part of a recycling system where the packaging is recycled and used as new plastic materials. The requirement is stricter than generation 5.

7.8 Quality and regulatory requirements

Quality and regulatory requirements are general requirements that are always included in Nordic Ecolabelling's product criteria. The purpose of these is to ensure that fundamental quality assurance and applicable environmental requirements from the authorities are dealt with appropriately. They also ensure compliance with Nordic Ecolabelling's requirements for the product throughout the period of validity of the licence.

These requirements have been changed to match the standard wording in the criteria template.

O17 Responsible person and organisation

The company shall appoint individuals who are responsible for ensuring the fulfilment of the Nordic Ecolabelling requirements, for marketing and for finance, as well as a contact person for communications with Nordic Ecolabelling.

✉ Organisational chart showing who is responsible for the above.

O18 Documentation

The licensee must archive the documentation that is sent in with the application, or in a similar way maintain information in the Nordic Ecolabelling data system.

🔑 Checked on site as necessary.

O19 Quality of hand dishwash detergent

The licensee must guarantee that the quality of the Nordic Swan Ecolabelled product does not deteriorate during the validity period of the licence.

🔑 The claims archive is checked on site.

O20 Planned changes

Written notice must be given to Nordic Ecolabelling of planned changes in products and markets that have a bearing on Nordic Ecolabelling requirements.

✉ Procedures detailing how planned changes in products and markets are handled.

O21 Unplanned nonconformities

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

✉ Procedures detailing how unplanned nonconformities are handled.

O22 Traceability

The licensee must be able to trace the Nordic Swan Ecolabelled product in the production. A manufactured / sold product should be able to trace back to the date (time and date) and the location (specific factory), as well as the relevant machine / production line where it was produced. In addition, it should be possible to link the product with the actual raw material.

✉ Description / routines of how the requirement is met.

O23 Legislation and regulations

The licensee shall ensure compliance with all applicable local laws and provisions at all production facilities for the Nordic Swan Ecolabelled product, e.g. with regard to safety, working environment, environmental legislation and site-specific terms/permits.

✉ Duly signed application form.

🔑 The requirement is checked on site. The applicant must be able to describe on on-site inspection to which regulatory authorities they are subject to, as well as the authorities' site-specific conditions and environmental concessions.

8 Areas without requirements

The requirement concerning the bioaccumulation of colourants has been deleted. Colourants are added in extremely small quantities and are not considered one of the major environmental concerns in a hand dishwash detergent. Colourants are also regulated by the CDV requirement.

With regard to packaging, requirements concerning DIN labelling, sorting instructions and take-back systems were discussed, but these were considered to lack RPS and so they are not in the criteria.

9 Changes compared to previous version

The key changes compared with the previous version are new packaging requirements, a new requirement concerning sustainable raw materials, the ban on sensitizing substances and an amended CDV calculation in line with DID2016. All changes are listed in table 2 below.

Table 2 Comparison of requirements for hand dishwash detergents in generation 5 and generation 6 of the criteria.

Req. consultation draft generation 6	Req. generation 5	Same requirement	Changed	New requirement	Comments
O1 Description of the product	R1, R18		x		The requirements have been merged and amended slightly
O2 Classification of the product	R2		X		Classification only in line with CLP and EUH208, H420 and H314 has been added
O3 Sustainable raw materials	-			X	New requirement with focus on sustainable extraction of raw materials
O4 Palm oil	-			X	New requirement with focus on the origin of palm oil
O5 Classification of constituent substances	R3+R4		X		2 requirements merged. Sensitizing substances not allowed with exception to fragrances
O6 Prohibited substances	R7		X		New substances have been added to the list, including micro plastics and PFCs
O7 Fragrances	R5+R6		X		9 new fragrances restricted and 3 prohibited.
O8 Preservatives	R9		X		Challenge test has been removed
O10 Long-term environmental effects	R11		X		Req. limit tightened, Classification only in line with CLP
O11 CVD	R13		X		DID2016, req. limit tightened and harmonised, product types merged
O12 Surfactants – aerobically and anaerobically biodegradable	R12	X			DID2016
O15 Performance test	R19		X		Requirements on test lab adjusted
O16 Recycling design			X	X	New requirements to promote the circular economy.
O17 WUR	R16		X		Req. limit tightened and new factor that promotes the use of recycled materials added
O18-O22 Quality and regulatory requirements	R17, R20–R26		X		Quality and regulatory requirements have been changed to match the standard wording in the criteria template.

Appendix 1 MECO analysis

MECO is an acronym for materials, energy, chemicals and other (waste, transport, etc.). This analysis provides a brief summary of the impact of a product in different stages of its lifecycle.

Table 1. MECO analysis for hand dishwashing detergent

	Material phase	Production phase		Use phase	Waste phase	Transport phase
		Raw materials	Product			
Material	Extraction of surfactants and other ingredients from oil or plants	Manufacture of surfactants, packaging	Packaging	Fossil fuels for electricity and heat Overdosing	Packing incinerated/ recycled	Pallets, plastic outer packaging, cardboard
Energy	Primary production, energy for extraction of oil/vegetable oil and thus emissions of CO_2	Energy consumption and CO_2 emissions during the process	(Relatively low) Energy consumption and CO_2 emissions during the process	Temperature and quantity of washing water	Energy from incineration of packaging	Transport of ingredients and finished product
Chemicals		Classification, emissions from primary production, manufacture of plastics	Classification, emissions from manufacture of hand dishwashing detergent and plastics	Allergies (preservatives + fragrances), dosing/overdosing	Packaging and emission of washing water: Biodegradability and ecotoxicity	
Other	Working environment, ecosystem	Working environment		Allergies, working environment for professional users, performance		Ecodriving, logistics