

About Nordic Swan Ecolabelled
De-icers



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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:

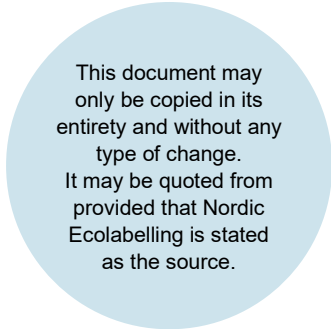
Denmark
Ecolabelling Denmark
info@ecolabel.dk
www.svanemarket.dk

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

Finland
Ecolabelling Finland
joutsen@ecolabel.fi
https://joutsenmerkki.fi/

Norway
Ecolabelling Norway
info@svanemarket.no
www.svanemarket.no

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



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Summary

De-icers are chemical agents that defrost and lower the freezing point to provide anti-freezing protection (preventative) and de-icing (reactive). They are used on winter roads to protect the traveling public by improving road safety, on runways and taxiways at airfield to maintain flight safety during take-off, landing and taxiing and on smaller roads, cycle paths, bridges and in other areas within municipalities.

De-icers are either liquid or solid (granulate). Potassium formate, potassium acetate, CMA (calcium magnesium acetate) and solutions of urea and glycol are examples of liquid de-icers while de-icing salt (NaCl), sodium formate and sodium acetate are solid ones.

Among the de-icers on the market today, it is only formates and acetates that can meet the criteria and be awarded with the Nordic Swan Ecolabel. Studies show that formates and acetates are much gentler on the environment than de-icing salt, urea, and glycol.

After the de-icers have been used, the products either make their way into the public wastewater system via the sewers or directly into the ground and thus into groundwater and surface waters. Therefore, properties such as biodegradability, low ecological toxicity, and the lowest possible discharge of pollutants into the wastewater system or into the ground are important. Thereto, dosing and efficiency affect all stages of the life cycle. Nordic Ecolabelling sets requirements on instructions for use and ice melting capacity, ice undercutting area and ice penetration depth of the de-icer.

The most important changes compared to generation 2 of the criteria are:

- A definition of ingoing substances and impurities is introduced.
- A requirement for classification of ingoing substances is introduced (O4).
- The oxygen demand. The unit and limit value are changed and related to product instead of doze.
- The ecotoxicity requirement is tightened (O7).
- The limit values for nitrogen, phosphorus, and chlorine are tightened (O8).
- The limit values for heavy metals are tightened (O9).
- A list with prohibited substances is introduced (O10).
- The efficiency tests are updated with new test standards. It is no longer possible to perform user tests (O12).
- New requirements customer complaints and traceability – all in line with other similar criterieas from Nordic Ecolabelling.

- Declarations from the manufacturer of the product and all the raw materials are introduced (Appendix 2 and 3).
- The requirements are in line with the requirements from Blue Angel.

1 Environmental impact of de-icers

De-icers are chemical agents that defrost and lower the freezing point to provide anti-freezing protection (preventative) and de-icing (reactive).¹ In regions that experience cold winters, millions of tons of de-icers are applied annually to roads to protect the traveling public by improving road safety.² Precipitation in the form of snow and freezing wintry rain at airfields also requires the use of de-icers for improving grip on for example runways and taxiways. It is only by using de-icers that flight safety can be maintained during take-off, landing and taxiing.³ De-icers are also used on smaller roads, cycle paths, bridges and in other areas within municipalities, for example on artificial grass turfs. When it comes to winter roads, de-icing salt (NaCl) are the most used de-icer. For airfields, formates have become the accepted standard on the European market, with some exceptions where acetates are used. On smaller roads, cycle paths, bridges and in other areas within municipalities, de-icing salt, formates and acetates primarily are used. Historically, also urea and glycol have been used in all areas described above.

De-icers are either liquid or solid (granulate). Potassium formate, potassium acetate, CMA (calcium magnesium acetate) and solutions of urea and glycol are examples of liquid de-icers while de-icing salt (NaCl), sodium formate and sodium acetate are solid ones.

De-icing salt

De-icing salt (NaCl) cause great damage to the environment and surroundings. Salt damage along roads, because of winter road salting, is well documented and has been known for several years. It includes both damages because of direct spraying with de-icing salt and damage because of absorption through the roots of trees and plants. Damage caused by direct spraying exists up to 10 meters from the road, while damage caused by absorption through roots can appear at a significantly greater distance from the road. The impact is mainly of an acute nature and causes damage to leaves and needles. However, long-term effects in the form of changes in soil structure and nutrient content can also occur. Field studies have shown that the concentration of chloride ions and sodium ions in the groundwater near roads, has increased where de-icing salt have been used. The increase in concentration is strongly dependent on local conditions and the extent

¹ Blue Angel, Movement Area De-icers for Airfields, DE-UZ 99, Basic Award Criteria, Edition January 2021, Version 1.

² Hintz, D. W. m.fl., Current water quality guidelines across North America and Europe do not protect lakes from salinization, 2022.

³ Blue Angel, Movement Area De-icers for Airfields, DE-UZ 99, Basic Award Criteria, Edition January 2021, Version 1.

of salting. In some cases, the groundwater cannot be used for drinking water supply.^{4, 5}

Results from studies on damage to wildlife also show that de-icing salt are toxic to small mammals and birds. In addition, de-icing salt attract both larger and smaller animals that need additional salt in their food if it is not salty enough. This causes many fatal accidents on roads in the USA and Canada.⁶

Corrosion damage because of de-icing salt is extensive. The damage includes corrosion on cars, bridges and houses near roads where de-icing salt are applied. Corrosion means, among other things, that cars and other vehicles have a shorter lifespan, so that production and related environmental burdens increase.^{7, 8, 9, 10}

According to a study from 2022, the negative effects of de-icing salt occur earlier than previously known. Already at salinities below the EU's limit values, animal life in lakes is negatively affected.¹¹

Urea and glycol

There are also environmental problems with the use of urea and glycol. Both compounds have high oxygen consumption during degradation which can result in oxygen-poor conditions in aquatic environments. Also, urea has a high nitrogen content which contribute to eutrophication in oceans, lakes and waterways.

Formates and acetates

Studies show that formates and acetates are much gentler on the environment and health than de-icing salt, urea, and glycol.^{12, 13, 14, 15}

A Danish study, based on field experiments in the municipality of Copenhagen, compared two sites where different de-icers were used; de-icing salt (NaCl) on the first site and potassium formate on the second site (there was also a third site with no application of de-icers as a reference). On all sites, newly planted linden trees of the same clone were examined. There was a clear effect from the application of significant amounts of NaCl on the first site. The salt affected both

⁴ Vejdirektoratet, Danmark, Vejsalt, træer og buske, 1998, Rapport nr. 142.

⁵ Miljøstyrelsen, Danmark, Vejsalt i miljøet – problemets omfang. Skov Og landskab konference – Vejsalt mod det 21. århundrede, 2001.

⁶ Colorado Department of Transportation Research Branch, The SeaCrest Group, Evaluation of selected deicers based on a review of the literature, 2001.

⁷ Bang, S.S. & Johnston, D., Environmental Effects of Sodium Aceate/Formiate Deicer, 1998, Ice ShearTM. Arch. Environ. Contam. Toxicol. 35, 580- 587.

⁸ Vejdirektoratet, Danmark, Vejsalt, træer og buske, 1998, Rapport nr. 142.

⁹ Nystén, T. & Hellstén, P., Migration of alternative de-icing chemicals in shallow aquifers, 2002, Præsentation fra Finlands Miljöcentral.

¹⁰ Miljøstyrelsen, Danmark, Vejsalt i miljøet – problemets omfang. Skov Og landskab konference – Vejsalt mod det 21. århundrede, 2001.

¹¹ Hintz, D. W. m.fl., Current water quality guidelines across North America and Europe do not protect lakes from salinization, 2022.

¹² Bang, S.S. & Johnston, D., Environmental Effects of Sodium Aceate/Formiate Deicer, 1998, Ice ShearTM. Arch. Environ. Contam. Toxicol. 35, 580- 587.

¹³ Nystén, T. & Hellstén, P., Migration of alternative de-icing chemicals in shallow aquifers, 2002, Præsentation fra Finlands Miljöcentral.

¹⁴ Københavns Universitet, Institut for geovidenskab og naturforvaltning, Alternativ glatførebekæmpelse i København – virkning på beplantninger og jord, 2014.

¹⁵ Miljøstyrelsen, Danmark, Luftforurening med partikler i Danmark, Miljøprojekt Nr. 1021, 2005.

the soil and soil solution chemistry, increasing the concentration and leaching. The trees on the site had lower health status, less chlorophyll in the leaves and reduced growth rate, compared to the trees on the site where potassium formate was used. On the site where potassium formate was applied, no negative effects on tree growth and health were observed. In spite of the relative short project period, the tree's function and growth were clearly better at the second than the first site. It was not possible to predict the future health status or death rate of the trees within the scope of the study. However, it is likely that the trees on the first site will fail to thrive after longer time of application of NaCl, and this will likely lead to degraded aesthetic and biological value and premature tree death.¹⁶

According to a study from the Environmental Protection Agency in Denmark, 20% of the particle pollution in Copenhagen comes from the use of de-icing salt.¹⁷ Another Swedish study assessed different measures to reduce the PM10 levels along streets in Scandinavian cities based on tests in Stockholm. The study showed that the use of calcium magnesium acetate (CMA), on a highway during dry conditions resulted in an average reduction of around 35% in the daily PM10 averages.¹⁸ This means that CMA has a double effect; besides being a de-icer it works as a dust suppressant.

Nordic Swan Ecolabelled de-icers

Among the de-icers on the market today, it is only formates and acetates that can meet the criteria and be awarded with the Nordic Swan Ecolabel. Substitution of de-icing salt (NaCl) with both formates and acetates, means great environmental gains. They are both more expensive than de-icing salt (NaCl) though, which is the reason why they are still only used in a few places besides airports; for example, bridges, in individual municipalities and private areas.

After the de-icers have been used, the products either make their way into the public wastewater system via the sewers or directly into the ground and thus into groundwater and surface waters (direct or indirect discharge).¹⁹ Therefore, properties such as biodegradability, low ecological toxicity, and the lowest possible discharge of pollutants into the wastewater system or into the ground (COD, nitrogen, phosphorous, chloride and heavy metals) are important. Thereto, dosing and efficiency affect all stages of the life cycle. Nordic Ecolabelling sets requirements on instructions for use and ice melting capacity, ice undercutting area and ice penetration depth of the de-icer.

1.1 The Nordic Swan Ecolabel's criteria in relation to the Blue Angel's criteria

The German ecolabel Blue Angel also has criteria for de-icers: Low-Pollutant Movement Area De-icers Airfields (DE-UZ 99). They were revised in 2020 and published in January 2021. The criteria apply to movement area de-icers for use on airfields. Since formates have become the accepted standard for de-icers on

¹⁶ Københavns Universitet, Institut for geovidenskab og naturforvaltning, Alternativ glatførebekæmpelse i København – virkning på beplantninger og jord, 2014.

¹⁷ Miljøstyrelsen, Danmark, Luftforurening med partikler i Danmark, Miljøprojekt Nr. 1021, 2005.

¹⁸ Norman, M. & Johansson, M., Studies of some measures to reduce road dust emissions from paved roads in Scandinavia, 2006.

¹⁹ Blue Angel, Movement Area De-icers for Airfields, DE-UZ 99, Basic Award Criteria, Edition January 2021, Version 1.

airports on the European market, only formates, not acetates, can be certified within the criteria.

The scope of the Nordic Swan Ecolabel's criteria is broader than the Blue Angel's since the criteria apply for de-icers for use on many types of flat areas, not only airfields. In the light of that, Nordic Ecolabelling also includes acetates in the criteria. As described above, both formates and acetates are much gentler on the environment than de-icing salt. Nordic Ecolabelling also considers acetates, not only formates, important for the out-phasing of de-icing salt.

2 Justification of the requirements

This chapter presents new and revised requirements, explains the background to them, the chosen requirement levels and any changes compared with generation 2 of the criteria. The appendices referred to are those that appear in the criteria document "Nordic Swan Ecolabelling of de-icers".

2.1 Definition of the product group

A Nordic Swan Ecolabel may be awarded for de-icers used for the purpose of removing ice and snow on flat areas, preventing further ice formation, or maintaining friction on for example runways at airports, roads, bridges, and cycle paths.

The de-icers may be either liquid or solid (granulate). Sand and grit cannot be Nordic Swan Ecolabelled.

Among the de-icers on the market today, it is only formates and acetates that can meet the criteria and be awarded with the Nordic Swan Ecolabel.

De-icing salt (NaCl) and other commonly used de-icers based on chloride ions cannot be Nordic Swan Ecolabelled, as the total chlorine content is far above the limit value of 100 mg / kg in the criteria.

Urea (CO(NH₂)₂) cannot be Nordic Swan Ecolabelled, as the content of nitrogen exceeds the limit value of 800 mg / kg product in the criteria.

Glycol cannot be Nordic Swan Ecolabelled since, the oxygen consumption limit is exceeded (0,50 mg/g product)

Sand and grit cannot be Nordic Swan Ecolabelled for the following reasons:

- A continued reduction in the natural grit of the subsoil can cause problems for the quality of groundwater, as natural grit acts as a filter for impurities.
- Extraction of grit from mountains can be destructive to natural areas, which is to be preserved for future generations.

- When placing sand and grit, particles are released into the air, which can cause respiratory diseases in humans.²⁰

2.2 Environmental requirements

The requirements in the criteria document and accompanying appendices apply to all ingoing substances in the Nordic Swan Ecolabelled de-icer. 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 Nordic Swan Ecolabelled product in concentrations less than 100 ppm (0,0100 w-%, 100 mg/kg).
- Impurities in the raw materials exceeding concentrations of 1,0% are always regarded as ingoing substances, regardless of the concentration of the raw material in the Nordic Swan Ecolabelled product.
- A raw material consists of substances (one or more). Chemical requirements for substances apply to requirements for each substance. Limit values for impurities include both the product (0,0100 w-%) and the raw material (1,0%).

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 provide the following information about the de-icer.

- Description of the physical form of the product (e.g., whether the product is liquid or solid).
 - Description of the product's area of use.
 - The product's volume or weight.
 - All trade names if the product is sold in multiple countries.
- Description of the product in line with Appendix 1.
- Copy of label and/or product sheet can be sent in as part of the documentation.

²⁰ Heikki Tervahattus, Urban Dust Project, 2003.

Background to requirement O1

A description of the product is needed for Nordic Ecolabelling to be able to assess whether the product fits into the product group definition.

The requirement is unchanged compared to generation 2 of the criteria.

O2 Formulation

The applicant must provide a complete recipe for the de-icer. The recipe must contain the information below for each ingoing raw material. If a raw material contains of two or more substances, each substance must be declared.

- Trade name
 - Chemical name of all ingoing substances and impurities
 - Amount (both with and without solvents, e.g., water)
 - CAS no. / EC no.
 - Function of the substance
- The complete recipe of the de-icer as set out in the requirement.
- Safety data sheet for each raw material in line with prevailing European legislation (Annex II to REACH Regulation, 1907/2006/EC).

Background to requirement O2

Nordic Ecolabelling needs the complete recipe for the product to check that it meets the requirements.

The requirement is unchanged compared to generation 2 of the criteria.

O3 Classification of the product

The de-icer must not be classified in accordance with hazard classes described in the table below.

Table 1 Classification of the product

Classification of chemical products CLP Regulation 1272/2008:		
Hazard statement	Hazard class and category	Hazard code
Hazardous to the aquatic environment	Aquatic Acute 1	H400
	Aquatic Chronic 1	H410
	Aquatic Chronic 2	H411
	Aquatic Chronic 3	H412
	Aquatic Chronic 4	H413
Hazardous to the ozone layer	Ozone	H420
Carcinogenicity*	Carc. 1A or 1B	H350
	Carc. 2	H351
Germ cell mutagenicity*	Muta. 1A or 1B	H340
	Muta. 2	H341
Reproductive toxicity*	Repr. 1A or 1B	H360
	Repr. 2	H361
	Lact	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, single 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 Skin Irrit. 2	H314 H315
Aspiration hazard	Asp. Tox. 1	H304
Respiratory or skin sensitisation	Resp. Sens. 1, 1A or 1B Skin Sens. 1, 1A or 1B	H334 H317
Serious eye damage or eye irritation	Eye Dam. 1 Skin Irrit. 2	H318 H319

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

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

- Product label or safety data sheet for the product in line with prevailing European legislation (Annex II to REACH Regulation, 1907/2006/EC).
- Completed and signed declaration from the manufacturer of the product (Appendix 2).

Background to requirement O3

Nordic Ecolabelling sets requirement concerning environmental and health classifications of products, to ensure that products which are toxic or harmful to the environment and/or health cannot be Nordic Swan Ecolabelled.

The requirement has been changed compared to generation 2 of the criteria to be in line with Nordic Ecolabelling's other criteria for chemical technical products.

O4 Classification of ingoing substances

Ingoing substances in the de-icer must not be classified in accordance with hazard classes described in the table below.

Table 2 Classification of ingoing substances

Classification of chemical products CLP Regulation 1272/2008:		
Hazard statement	Hazard class and category	Hazard code
Carcinogenicity*	Carc. 1A or 1B Carc. 2	H350 H351
Germ cell mutagenicity*	Muta. 1A or 1B Muta. 2	H340 H341
Reproductive toxicity*	Repr. 1A or 1B Repr. 2 Lact	H360 H361 H362
Endocrine disruption for human health**	ED HH 1 ED HH 2	EUH380 EUH381

Endocrine disruption for the environment**	ED ENV 1 ED ENV 2	EUH431 EUH431
Persistent, Bioaccumulative and Toxic properties**	PBT	EUH440
Very Persistent, Very Bioaccumulative properties**	vPvB	EUH441
Persistent, Mobile and Toxic properties	PMT	EUH450
Very Persistent, Very Mobile properties	vPvM	EUH451

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

* Complexing agents of the MGDA and GLDA type may contain NTA impurities in the raw material in concentrations of less than 0.2% if the concentration of NTA in the product is below 0.1%.

** See also O10 for additional criteria for potential or identified endocrine disruptors and PBT/vPvB substances.

- Safety data sheet for each raw material in line with prevailing European legislation (Annex II to REACH Regulation, 1907/2006/EC).
- Completed and signed declaration from the manufacturer of the product (Appendix 2).
- Completed and signed declaration from the raw material supplier (Appendix 3).

Background to requirement O4

Excluding carcinogenic, mutagenic and reproduction toxic (CMR) substances is an important parameter from a health perspective. Complexing agents of the MGDA and GLDA type may contain NTA impurities in the raw material. NTA as an impurity in complexing agents is therefore, exempted from the requirement, but with the restriction that the concentration must be less than 0.2% in the raw material and less than 0.1% in the product which is best practice in the industry.

The Nordic Swan Ecolabel has included the new CLP classifications to align with the European Green Deal's goal of a toxic-free environment. This inclusion reflects the need to establish hazard identification for endocrine disruptors and addresses criteria for environmental toxicity, persistency, mobility and bioaccumulation. By incorporating these classifications, Nordic Swan Ecolabel ensures that the criteria relate to up-to-date scientific understanding and regulatory compliance. Additionally, the inclusion of PMT and vPvM substances is crucial due to their persistence, mobility and potential impact on water quality. The Nordic Swan Ecolabel aims for comprehensive hazard identification and protection of the environment and human health.

The requirement is new compared to generation 2 of the criteria.

O5 Biodegradability

The de-icer must be readily biodegradable according to test method No 301 A–F or No 310 in OECD guidelines for testing of chemicals or other equivalent test methods evaluated by an independent body and controlled by Nordic Ecolabelling. Alternatively, the biodegradability of all constituent raw materials

(with the exception of inorganic compounds) meeting the requirement, can be documented.

- Test report and results according to the requirement.

Background to requirement O5

The biodegradability of the de-icer is important for how long it affects the environment. All commonly used de-icers have a harmful effect, bigger or smaller, if they are in a vulnerable environment for too long. To avoid this, a requirement has been set for the biodegradability of the product.

The requirement has been changed compared to generation 2 of the criteria to be in line with Nordic Ecolabelling's other criteria for chemical technical products.

O6 Oxygen demand

The products must comply with a chemical oxygen demand (COD) limit of maximum 0,50 g O₂/g of product. For products with other ingoing elements then C,H,Cl,N,Na,O,P and S - alternative 1 must be used.

Alternative 1:

The applicant shall verify compliance with the requirement by submitting a test report on the COD value in accordance with DIN 38 409-41 or DIN ISO 15705. (or equivalent testing methods evaluated by an independent body and controlled by Nordic Ecolabelling).

Alternative 2:

The ThOD value for the de-icer in use form are calculated.

The calculation of ThOD can be made from the elemental composition of each substance, in accordance with the following methods as described in OECD 301 for the compound structure C_cH_hCl_{cl}N_nNa_{Na}O_oP_pS_s.

For calculation of ThOD, this calculator may be used:

<https://www.aropha.com/thod-calculator.html>

- Test report and results or a calculation according to the requirement.

Background to requirement O6

All organic products have an oxygen consumption which can be harmful to the environment, as the balance of the ecosystem can be greatly shifted in low-oxygen conditions. An example of these are aquatic environments exposed to an overload of organic matter. The oxygen in water is used to break down the organic substances, and the environment becomes low in oxygen, so animals higher up in the food chain (crustaceans, fish etc.) die. This creates an imbalance in ecosystem, which is also harmful to humans.

The requirement prevents glycol from being Nordic Swan Ecolabelled.

The requirement is a merging of two requirements in generation 2 of the criteria. The limit value is changed compared to the previous criteria generation and is related to "per g product" instead of "per m²".

07 Ecotoxicity

Alternative 1:

The de-icer may not contain any raw material that display an aquatic ecotoxicity for algae, daphnia, fish, and bacteria in the product of $EC_{50} \leq 100$ mg/l.

Alternative 2:

Compliance with the aquatic toxicity requirements can be verified by testing the complete product.

- Alternative 1: Safety data sheet for each raw material in line with prevailing European legislation (Annex II to REACH Regulation, 1907/2006/EC) and reference to DID number* or test report for the raw material covering each of the groups of organisms below:
- Daphnia test in accordance with OECD 202 Part 1, EG C.2 or DIN EN ISO 6341.
 - Fish test in accordance with OECD 203, EG C.1 or a fish embryo test in accordance with DIN EN ISO 15088 or OECD 236.
 - Algae test in accordance with OECD 201, EG C.3 or ISO 8692.
 - Bacteria test (pseudomonas cell multiplication inhibition test) in accordance with DIN EN ISO 10712 or a luminescent bacteria test in accordance with DIN EN ISO 11348-1 or DIN EN ISO 11348-2.
- * The DID number is an ingredient's number on the DID list, version 2016 or later, which is used when calculating chemical requirements. The DID list can be obtained from Nordic Ecolabelling's websites, see addresses on page 2.*
- Alternative 2: Compliance with the aquatic toxicity requirements can also be verified by testing the product. If there is no fish test available for the product, performing a new test as verification for the Nordic Swan Ecolabel is not permitted because this involves testing vertebrate animals (exception OECD 236 or Part C49 of the Annex for Regulation (EG) No 440/2008).

Background to requirement 07

De-icers may be toxic to organisms in the environment and can harm both plants and animals. Therefore, the aquatic ecotoxicity must be less than a fixed limit value for all ingredients in the de-icer.

If a raw material contains two or more substances, and the applicant wants to refer to the DID list, each substance must be declared with a DID number.

The requirement is tightened compared to generation 2 of the criteria, by removing the exception for substances in the range between 1 and 100 mg/l if they are readily degradable. The cut off limits for individual substances and the total product, are also removed.

08 Limitations on nitrogen, phosphorus, and chlorine

The following limit values may not be exceeded in the de-icer:

- Nitrogen content: 800 mg / kg product
- Phosphorous content: 800 mg / kg product
- Content of total chlorine: 100 mg / kg product

- ☒ For nitrogen content: Safety data sheet for each raw material in line with prevailing European legislation (Annex II to REACH Regulation, 1907/2006/EC) and test report for the total bound nitrogen in accordance with DIN EN 16169 with addition for analysis technique using Kjeldahl (total nitrogen).
- ☒ For phosphorous content: Test report in accordance with DIN EN ISO 6878 or DIN 38405-11.
- ☒ For chlorine content: Test report in accordance with DIN EN ISO 10304-1 or DIN 38405-1.

Background to requirement O8

Both phosphorus and nitrogen are fertilizers that can lead to eutrophication in oceans, lakes and waterways if they leak into the surrounding environment. It is primarily the corrosion inhibitors (P-inhibitors or N-inhibitors) in formate de-icers that is the source of nitrogen and phosphorus.

The limit value for nitrogen prevents urea ($\text{CO}(\text{NH}_2)_2$) from being Nordic Swan Ecolabelled.

Chloride ions in a certain concentration is toxic to organisms both on land and in water. Many studies show that this is one of the biggest problems with the use of de-icers based on chloride ions. The limit value is set on total chlorine because it is easier to measure more accurately than chloride ions in a highly concentrated salt.

The limit value excludes de-icing salt (NaCl), and other commonly used de-icers based on chloride ions from the criteria.

The requirement is a merging of two requirements in generation 2 of the criteria. The limit values are tightened compared to the previous criteria generation.

O9 Heavy metals

The limit values in the table below may not be exceeded in the de-icer.

Table 3 Limit values for heavy metals

Heavy metal	Limit value (mg / kg product)
Arsenic	0,1
Cadmium	0,1
Chromium	2
Copper	2
Lead	0,1
Mercury	0,1
Nickel	2

When testing for the content of heavy metals, ICP- or AAS methods must be used. For each metal a method using a detection limit of at least ten times lower than the level of the requirement must be applied.

- ☒ Test report and results conducted by a third part test institution. The test report must contain the results of testing for the total content of heavy metals, information on the method of analysis and the sensitivity of the method.

Background to requirement O9

Heavy metals are hazardous to both health and the environment. There may be an added content of heavy metals, as a component of e.g., corrosion inhibitors, they can originate from the electrolysis of NaOH and KOH using membrane technology and, for CMA which is produced from calcined dolomite, magnesium oxide and acetic acid, they can originate from the calcined dolomite.

Formats generally have a lower content of heavy metals than acetates because of the calcined dolomite. The limit values are set so that the acetates with the lowest content can meet the requirement. For more information about why Nordic Ecolabelling includes acetates in the criteria, see the section 1.1 The Nordic Swan Ecolabel's criteria in relation to the Blue Angel's criteria. The limits are now almost the same as Blue Angel and are set per gram product.

The requirement is tightened compared to generation 2 of the criteria.

O10 Prohibited substances

The following substances are excluded from use in the de-icer:

- Bisphenols and bisphenol derivatives²¹
- DTPA (diethylenetriamine pentaacetate), CAS no. 67-43-6
- EDTA (ethylenediaminetetraacetic acid), CAS no. 13235-36-4, and its salts
- MI (methylisothiazolinone), CAS no. 2682-20-4
- Microplastics

We use the same definition of microplastics as the EU:*

Microplastics are synthetic polymer microparticles, which means polymers that are solid and which fulfil both of the following conditions:

a) are contained in particles and constitute at least 1 % by weight of those particles; or build a continuous surface coating on particles;

b) at least 1 % by weight of the particles referred to in point (a) fulfil either of the following conditions:

i) all dimensions of the particles are equal to or less than 5 mm;

ii) the length of the particles is equal to or less than 15 mm and their length to diameter ratio is greater than 3.

The following polymers are excluded from this designation:

a) polymers that are the result of a polymerisation process that has taken place in nature, independently of the process through which they have been extracted, which are not chemically modified substances;

b) polymers that are degradable as proved in accordance with Appendix [X] of the Annex XVII to Regulation (EC) No 1907/2006;

c) polymers that have a solubility greater than 2 g/L as proved in accordance with Appendix [Y] of the Annex XVII to Regulation (EC) No 1907/2006;

d) polymers that do not contain carbon atoms in their chemical structure.

²¹ Assessment of regulatory needs: Bisphenols. ECHA – 16 December 2021: Section 2.1: Bisphenols for which further EU RRM is proposed – restriction <https://echa.europa.eu/documents/10162/c2a8b29d-0e2d-7df8-dac1-2433e2477b02>

*[The regulation](#) is not officially adopted yet. See [Annex](#) for the definition.

- Nanomaterials/-particles

Nanomaterials/-particles are defined according to the EU Commission Recommendation on the Definition of Nanomaterial (2022/C 229/01):

'Nanomaterial' means a natural, incidental or manufactured material consisting of solid particles that are present, either on their own or as identifiable constituent particles in aggregates or agglomerates, and where 50 % or more of these particles in the number-based size distribution fulfil at least one of the following conditions:

(a) one or more external dimensions of the particle are in the size range 1 nm to 100 nm;

(b) the particle has an elongated shape, such as a rod, fibre or tube, where two external dimensions are smaller than 1 nm and the other dimension is larger than 100 nm;

(c) the particle has a plate-like shape, where one external dimension is smaller than 1 nm and the other dimensions are larger than 100 nm.

- Nitroalkanes: nitromethane (CAS no. 75-52-5), 1-nitropropane (CAS no. 108-03-2) and nitroethane (CAS no. 79-24-3).
- NTA (nitrilotriacetic acid), CAS no. 139-13-9 and its salts.

Exemption: Complexing agents of the MGDA and GLDA type may contain NTA impurities in the raw material in concentrations of less than 0.2% if the concentration of NTA in the product is below 0.1%.

- PFAS (per- and polyfluoroalkyl substances).
- Potential or identified endocrine disruptors according to any of the EU member state initiative "Endocrine Disruptor Lists" List I; II; and III.
 - o <https://edlists.org/the-ed-lists/list-i-substances-identified-as-endocrine-disruptors-by-the-eu>
 - o <https://edlists.org/the-ed-lists/list-ii-substances-under-eu-investigation-endocrine-disruption>
 - o <https://edlists.org/the-ed-lists/list-iii-substances-identified-as-endocrine-disruptors-by-participating-national-authorities>

A substance which is transferred to one of the corresponding sublists called "Substances no longer on list", and no longer appears on any of List I-III, is no longer excluded. The exception is those substances on sublist II which were evaluated under a regulation or directive which doesn't have provisions for identifying EDs (e.g., the Cosmetics Regulation, etc.). For those substances, ED properties may still have been confirmed or suspected. Nordic Ecolabelling will evaluate the circumstances case-by-case, based on the background information indicated on sublist II.

- Substances categorized as Substances of Very High Concern (SVHC) and included on the Candidate List: <https://echa.europa.eu/candidate-list-table>.
- Substances that have been judged in the EU to be PBT (Persistent, Bioaccumulative and Toxic) or vPvB (very Persistent and very Bioaccumulative), in accordance with the criteria in Annex XIII of REACH, plus substances that have not yet been investigated but that meet these criteria.
- Triazoles

- ☒ Completed and signed declaration from the manufacturer of the product (Appendix 2).
- ☒ Completed and signed declaration from the raw material supplier (Appendix 3).

Background to requirement O10

This requirement generally prohibits substances that Nordic Ecolabelling knows, or suspects have negative effects on health and the environment. Some of the substances are also prohibited in other requirements but are included here for the sake of clarity and to minimize the risk of misunderstandings.

The requirement is new compared to generation 2 of the criteria.

Bisphenols

Several bisphenols with the general bisphenol structure and 'bisphenol derivatives' which have constituents with structural properties common to bisphenols are now prohibited. Based on the potential for widespread use and available information on potential endocrine disruptors, reproductive toxicity and PBT/vPvB properties, 34²² substances were identified in need for further regulatory risk management in EU²³.

EDTA and DTPA

EDTA (ethylenediaminetetraacetic acid and its salts) is not readily biodegradable, 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.²⁴ Today there are more environmentally aware alternatives that are degradable and that can replace EDTA, one example being MGDA (methyl glycine diacetic acid). EDTA is used as a complexing agent in many chemical-technical products. DTPA has similar characteristics to EDTA.

MI (methylisothiazolinone)

Allergies to preservatives, particularly MI (CAS no. 2682-20-4) have risen in recent years and Nordic Ecolabelling does not want to contribute towards unnecessary exposure.

Microplastics

Microplastics are very small fragments of plastic material, less than 5 mm. They can be harmful to health and the environment due to their size, surface properties and resistance to degradation. Currently, there are insufficient scientific knowledge and disagreement about the effects of microplastics, especially under natural conditions.

²² Assessment of regulatory needs: Bisphenols. ECHA – 16 December 2021: Section 2.1: Bisphenols for which further EU RRM is proposed – restriction <https://echa.europa.eu/documents/10162/c2a8b29d-0e2d-7df8-dac1-2433e2477b02>

²³ Annex XV restriction report <https://echa.europa.eu/documents/10162/450ca46b-493f-fd0c-afec-c3aea39de487>

²⁴ European Union (2004). Risk Assessment Tetrasodium Ethylenediaminetetraacetate, Final Report. <https://echa.europa.eu/documents/10162/415c121b-12cd-40a2-bd56-812c57c303ce> (Accessed on 11.09.2020).

Nordic Ecolabelling applies the precautionary principle and strives to limit the use of microplastics where possible. The [draft regulation](#) with the new definition of microplastics in EU is now under scrutiny by the EU Parliament and the EU Council before it will be officially adopted in the autumn of 2023. We implement the new definition now, but will update it if changes are made before adoption.

Nanomaterials and nanoparticles

Nanomaterials are a diverse group of materials under the size of 100 nm. Due to their small size and large surface area nanoparticles are often more reactive and may have other properties compared to larger particles of the same material. Further, different sizes, shapes, surface modifications and coatings can also change their physical and chemical properties. Nanoparticles can cross biological membranes and thus be taken up by cells and organs. One of the main concerns are linked to free nanoparticles, as some of these – when inhaled – can reach deep into the lungs, where the uptake into the blood is more likely.

There is concern among public authorities, scientists, environmental organisations, and others about the insufficient knowledge regarding the potential detrimental effects on health and the environment. Nordic Ecolabelling takes these concerns seriously and applies the precautionary principle to exclude potentially hazardous nanomaterials from products.

Nitroalkanes

ECHA have assessed nitroalkanes and have concluded that three of them should be followed up with regulation²⁵. They state that de-icers are one of the uses.

NTA (nitrilotriacetic acid) and its salts

NTA is classified as Carc cat. 2 (EU, 2008b) and is thus already prohibited in requirement O4 due to its classification. However, complexing agents that replace NTA (GLDA and MGDA) contain small quantities of NTA as residues from raw material production (as attested in various safety data sheets for the raw materials). To encourage a transition to MGDA and GLDA, they may contain NTA impurities in the raw material in concentrations of less than 0.2% if the concentration of NTA in the product is below 0.1%.

Per- and polyfluoroalkyl substances (PFAS)

Per- and polyfluoroalkyl substances (PFAS) 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

²⁵

https://echa.europa.eu/documents/10162/3448017/GMT_316_Nitroalkanes_report_public_25687_en.pdf/a6ed1da8-bfe9-05e0-7c86-abd63972ae21?t=1664347843043&utm_source=echa-weekly&utm_medium=email&utm_campaign=weekly&utm_content=20221005

easily absorbed by the body.²⁶ 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.²⁷ PFOA, APFO (ammonium pentadecene fluoro octanoate) and certain fluoro 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.²⁸ To ensure that these PFAS are not introduced in de-icers, Nordic Ecolabelling has chosen to place PFAS on the list of prohibited substances.

Potential or identified endocrine disruptors

Endocrine disruptors (EDs) are chemicals that alter the functioning of the endocrine (hormone) system and consequently cause adverse health effects. The term potential EDs is used for chemicals with properties that make them suspected to be EDs. The hormone system regulates many vital processes in living organisms and when normal signalling is disturbed, adverse effects may result. EDs raise high concern for their risk of causing serious negative impact on the environment as well as on human health specifically. Special concern is raised for effects on reproduction and development and about possible links to increases in public health diseases. While effects in wildlife populations have been confirmed, evidence is pointing to effects also in humans.

Currently, endocrine disrupting properties is not a hazard that is classified according to the CLP regulation. Also, harmonized scientific criteria for the identification of EDs are missing across different pieces of EU legislation. Few EDs have been identified in the legislation so far, compared to the numbers of potential EDs. Under these circumstances, the Nordic Swan Ecolabel excludes identified and potential EDs listed by the EU member state initiative “Endocrine Disruptor Lists” at www.edlists.org. The initiative is a voluntary collaboration, compiling and presenting a single repository of information about the status of substances identified as EDs or being under ED evaluation in the EU.

A substance listed on any of List I; II; and/or III is excluded. List I contains substances identified as EDs at EU legislative level; List II contains substances under EU legislative ED evaluation; and List III is for substances considered by a national authority to have ED properties. All listed substances are excluded from all raw materials and products unless otherwise specified in the requirement, meaning that substances listed with reference to e.g., the Cosmetics Regulation are not only excluded from cosmetics.

²⁶ 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

²⁷ 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, More Environmentally Friendly Alternatives to PFOS-compounds and PFOA, Danish Environmental Protection Agency, 2005.

²⁸ 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>

The requirement concerns the main lists (List I-III) and not the corresponding sublists called “Substances no longer on list”. A substance which is transferred to a sublist is thus no longer excluded unless it also appears on any of the other main lists I-III. However, special attention is needed concerning those List II substances which are evaluated under a regulation or directive which doesn't have provisions for identifying EDs, e.g., the Cosmetics Regulation. Nordic Ecolabelling will evaluate the circumstances for substances on sublist II case-by-case, based on the background information indicated on the sublist.

The lists are dynamic, and the companies are responsible for keeping track of updates, to keep labelled products compliant with the requirement throughout the validity of the licences. Nordic Ecolabelling acknowledges the challenges associated with new substances being introduced on particularly List II and III, and in some cases also List I. We will evaluate the circumstances and possibly decide on a transition period on a case-by-case basis.

By excluding both identified and prioritized potential EDs which are under evaluation, the Nordic Swan Ecolabel ensures a restrictive policy on EDs.

SVHC, Substances of Very High Concern and Candidate List

SVHC, Substances of Very High Concern, is a term to describe the substances which fulfil the criteria in article 57 of the REACH Regulation. These are 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 in the Approval List. This means that the substance is subject to regulation (prohibition, phasing-out or other type of restriction). Due to these undesirable properties, substances on the Candidate List cannot be Nordic Swan Ecolabelled. Other SVHC substances are addressed via bans on the use of PBT and vPvB substances, plus classification requirements and a ban on endocrine disruptors.

Substances that have been judged in the EU to be PBT (Persistent, Bioaccumulative and Toxic) or vPvB (very Persistent and very Bioaccumulative)

PBT (Persistent, Bioaccumulative and Toxic) and vPvB (very Persistent and very Bioaccumulative) are organic substances as defined in Annex XIII to REACH (Directive 1907/2006/EC).²⁹ Nordic Ecolabelling generally does not want these substances to be used. According to the requirement, substances that have not yet been investigated but that meet the criteria for PBT and vPvB are also prohibited. The prohibition thus also applies to PBT and vPvB substances on the SIN list that are not yet on the SVHC list.

Triazoles

Triazoles are effective anti-corrosion inhibitors. The prevalence of azole compounds in the natural environment and its accumulation in fish raises questions about its impact on aquatic organisms and to date, there have not been

²⁹ 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>

any reports of wastewater treatment alternatives that completely degrade the toxic triazoles.^{30, 31}

O11 Corrosion

The de-icer must not cause corrosion damage more than the following values. Test method ASTM F 483 is to be used.

- On aluminium (AMS 4041 or equivalent test): 0.3 mg / cm² for 24 hours.
- On carbon steel (AMS 5045 or equivalent test): 0.8 mg / cm² for 24 hours.

Test report and results according to the requirement.

Background to requirement O11

When using de-icers, corrosion damage occurs on buildings and metal structures. All de-icers cause some corrosion, but de-icers based on chlorides are many times worse than formates and acetates, which can be Nordic Swan Ecolabelled.³² The limit values are taken directly from AMS 1435³³.

The requirement is unchanged compared to generation 2 of the criteria.

2.3 Efficiency

O12 Efficiency

The de-icer must comply with the applicable requirements for its fitness for use and safety. The de-icing effect must be experimentally proven in a standard process.

Products intended for airports:

The applicant shall submit a declaration that the technical requirements for the product in accordance with SAE, the latest version of AMS 1435 for liquid de-icers or the latest version of AMS 1431 for solid de-icers have been observed and shall also submit the relevant reports. The experimental data for the de-icing effect of the product should be determined under specified temperature conditions (-2°C, -10°C) after 5, 10 and 30 minutes in accordance with the latest version of SAE AS 6170 test method. (SAE - International Engineering Society for Advancing Mobility Land, Sea, Air and Space; AMS - Aerospace Material Specification; AIR - Aerospace Information Report).

Declaration and test report in accordance with the requirement.

Products intended for other areas than airports:

The experimental data for the de-icing effect of the product should be determined under specified temperature conditions (-2°C, -10°C) after 5, 10 and 30 minutes in accordance with the latest version of SAE AS 6170 test method. shall be submitted.

Test report in accordance with the requirement.

³⁰ Bhagat, J. m.fl., A comprehensive review on environmental toxicity of azole compounds to fish, Chemosphere Volume 261, 2021.

³¹ Castro, S. m.fl., Natural, cost-effective, and sustainable alternatives for treatment of aircraft de-icing fluid waste, Environmental Progress, 2004.

³² Colorado Department of Transportation Research Branch, The SeaCrest Group 2001, Evaluation of selected de-icers based on a review of the literature.

³³ Aerospace Material Specification.

Background to requirement O12

The efficiency of a product is important from a circular economy perspective since products with satisfactory efficiency reduce the risk of over-dosing and ensure efficient use of resources. Documentation of efficiency is also crucial for the credibility of the Nordic Swan Ecolabel. Therefore, Nordic Ecolabelling sets information requirements on ice melting capacity, ice undercutting area and ice penetration depth for the de-icer according to SAE³⁴ standards.

The requirement has been changed compared to generation 2 of the criteria regarding the following:

- It is no longer possible to perform user tests.
- There are no limits for efficiency results, but they have to be reported.
- The testing of products intended for airports should follow the standards in accordance with SAE, AMS 1435 for liquid de-icers or AMS 1431 for solid de-icers. The experimental data for the de-icing effect in accordance with the latest version of SAE AS 6170 test method.

The testing of the de-icing effect of products not intended for airports have to be done in accordance with the latest version of SAE AS 6170.

2.4 User information

O13 User information

This requirement does not apply to products intended for airports. The product's label or accompanying product sheet must include information about what dosage that is recommended to provide the most satisfactory result under various weather conditions (including variations in temperature and precipitations) and surrounding environment (parks, forests, harbours, airports, bridges, car parks etc.).

Further, for products classified with health hazard, the product sheet must include an instruction on the use of security equipment (e.g. gloves and protection glasses).

- For products not intended for airports: copy of label and/or product sheet.

Background to requirement O13

For the user to achieve the most effective use of the products not intended for airports, it is important with information about what dosage that is recommended to provide the most satisfactory result. Information about dosage does also reduce the risk of overdosing which is not beneficial for the environment.

For products intended for airports, the producer normally has a close dialogue with the user, to secure safe and efficient use. This because there are specific needs for each specific airport. Therefore, giving general information are not relevant.

³⁴ International Engineering Society for Advancing Mobility Land, Sea, Air and Space.

The requirement has been changed compared to generation 2 of the criteria regarding the following:

- This requirement does not apply to products intended for airports.
- The instruction of use of security equipment is only mandatory for products classified with health hazard.

2.5 Licence maintenance

The purpose of the licence maintenance is to ensure that fundamental quality assurance is dealt with appropriately.

O14 Customer complaints

The licensee must guarantee that the quality of the Nordic Swan Ecolabelled product does not deteriorate during the validity period of the licence. Therefore, the licensee must keep an archive over customer complaints.

Note that the original routine must be in one Nordic language or in English.

- ☒ The company's routine for handling and archiving customer complaints.

Background to requirement O14

Nordic Ecolabelling requires that your company has implemented a customer complaint handling system. To document your company's customer complaint handling, you must upload your company's routine describing these activities. The routine should be dated and signed and will normally be part of your company's quality management system.

If your company does not have a routine for customer complaint handling, it is possible to upload a description of how your company perform these activities. During the on-site visit, Nordic Ecolabelling will check that the customer complaint handling is implemented in your company as described. The customer complaints archive will also be checked during the visit.

O15 Traceability

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

You can upload your company's routine or a description of the actions to ensure traceability in your company.

- ☒ A routine or a description.

Background to requirement O15

Nordic Ecolabelling requires that your company has implemented a traceability system. To document your company's product traceability, you must upload your company's routine describing these activities. The routine should be dated and signed and will normally be part of your company's quality management system.

If your company does not have a routine for product traceability, it is possible to upload a description of how your company perform these activities. During the

on-site visit, Nordic Ecolabelling will check that the product traceability is implemented in your company as described.

3 Changes compared to previous generation of the criteria

The table below shows the changes compared with previous generation 2.

Table 4 Overview of changes compared to previous generation of the criteria

Requirement generation 3	Requirement generation 2	Same requirement	Change	New requirement	Comment
O1 Description of the product	R1 Information about the product	X			
O2 Formulation	R6 Information on chemical content	X			
O3 Classification of the product	R2 Classification of the product		X		The requirement is changed to be in line with Nordic Ecolabelling's other criteria for chemical technical products.
O4 Classification of ingoing substances				X	
O5 Biodegradability	R3 Biodegradability		X		The requirement has been changed compared to generation 2 of the criteria to be in line with Nordic Ecolabelling's other criteria for chemical technical products.
O6 Oxygen demand	R4 Declaration of the oxygen demand and R5 Oxygen consumption during degradation		X		The requirement is a merging of two earlier requirements. The limit value is changed and related to /g product instead of /m ² compared to the previous criteria generation.
O7 Ecotoxicity	R7 Ecotoxicity		X		The requirement is tightened by removing the exception for substances in the range between 1 and 100 mg/l if they are readily degradable. The cut off limits for individual substances and the total product, are also removed.

O8 Limitations on nitrogen, phosphorous, and chlorine	R7 Chloride ions and R10 Nutrients		X		The requirement is a merging of two earlier requirements. The limit values are tightened for all the substances covered by the requirement.
O9 Heavy metals	R9 Heavy metals		X		The limit values for heavy metals are tightened.
O10 Prohibited substances	-			X	
O11 Corrosion	R11 Corrosion	X			
O12 Efficiency	R12 Efficiency		X		The efficiency requirement is updated with new test standards. The efficiency must be reported, but there are no limits set. It is no longer possible to perform user tests.
O13 User information	R13 Instructions for use		X		
O14 Customer complaints				X	
O15 Traceability				X	