About Nordic Ecolabelled

Indoor paint and varnishes

Version 3.0

Background to ecolabelling
07 January 2015
For public consultation

Nordic Ecolabelling

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Addresses

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

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1 Summary

The Nordic Ecolabelling's criteria document for indoor paints and varnishes has until now been the exact same as the EU Ecolabel criteria. After the last revision of the EU Ecolabel criteria the Nordic Ecolabel decided to make some changes to the document to make it more readable but also to be able to make some requirements more stringent. The Nordic Ecolabel therefore saw the need of develop Nordic Ecolabel criteria for indoor paints and varnishes based on the EU Ecolabel.

The main goal of this updated version of the criteria is to make environmental gains by the more stringent requirements and to make it more readable to both applicants and to the licensing organisation within the Nordic Ecolabelling.

Nordic Ecolabel paints are considered to be:

- products with lower environmental impact along their life cycle
- products fulfilling stringent requirements with low environment and health impact
- products which have high quality, very good performance and long durability

The main differences between the EU Ecolabel and the Nordic Ecolabelling criteria documents are the following:

- This criteria document is only for indoor paints and varnishes (the EU Ecolabel also includes exterior products)
- The definition of an ingoing substance is stricter in the Nordic Ecolabel
- This criteria document gives less room for interpretations
- This criteria document has less exemptions from the requirements and the remaining exemptions are more narrow (tighter limits etc.)
- Modification of the requirement on wet scrub resistance
- More stringent requirements on preservatives/isothiazolinones in this document
- Addition of new requirements such as requirements on nanomaterials, quality system requirements and take-back systems

Compared to the last version of the criteria for indoor paints and varnishes the following have also been made more stringent or included as new requirements in both the EU Ecolabel and the Nordic Ecolabel:

- More stringent requirements on VOC (Volatile Organic Compounds) and inclusion of a requirement on sVOC (semi-Volatile Organic Compounds).
- Updates on the requirements regarding classification of ingoing substances and product classification
- New requirement regarding how to promote safe handling of exempted substances with health effects
- Inclusion of requirements excluding substances considered as SVHC (Substances of very high concern), vPvB (very Persistent, very bioaccumulable and toxic), PBT (Persistent, bioaccumulable and toxic) and endocrine disruptors.
- More stringent requirement on preservatives

- Phthalates were previous excluded by classifications, but in this version there is a list of excluded phthalates.
- A new requirement on rest monomers
- Updated requirement on consumer information

In appendices 1-2 in this document there are tables showing the differences between this Nordic Ecolabel criteria document and the EU Ecolabel criteria.

2 Basic facts about the criteria

Products that can be labelled

The product group of indoor paints and varnishes shall comprise indoor decorative paints and varnishes, woodstains and related products intended for use by consumers and professional users falling under the scope of Directive 2004/42/CE ("the paints directive")[1] of the European Parliament and of the Council (5).

The product group of indoor paints and varnishes shall comprise: floor coatings and floor paints; paint products which are tinted by distributors at the request of consumer (non-professional) or professional decorators, tinting systems, decorative paints in liquid or paste formulas which may have been pre-conditioned, tinted or prepared by the manufacturer to meet consumer's needs, including wood paints, wood and decking stains, masonry coatings and metal finishes primers and undercoats of such product systems as defined in Annex I to Directive 2004/42/CE for indoor usage.

The product group shall not comprise the following products:
Anti-fouling coatings, preservation products for wood impregnation, coatings for particular industrial and professional uses, including heavy-duty coatings, powder coatings, UV curable paint systems, paints primarily intended for vehicles, products which primary function is not to form a film over the substrate, e.g. oils and waxes, fillers as defined by EN ISO 4618 and road-marking paints.

The product group does not include anti-rust paints, products for exterior usage or products for industrial applications. Exterior products are covered by the Nordic Ecolabelling criteria for chemical building products.

In section 7 "terms and definitions" there is an explanation about what is meant by the separate product types listed above.

In appendices 1 and 2 in this document there are comparisons between this criteria document and the EU Ecolabel document. Appendix 2 shows where there is a need to send in supplementary information to fulfil the Nordic Ecolabel if a product first has been awarded the EU Ecolabel.

Differences compared to the EU Ecolabel product group definition

The main difference between the product group definition between the Nordic Ecolabel and the EU Ecolabel is the fact that the Nordic Ecolabel criteria document is only covering

1 Directive: 2004/42/C http://ec.europa.eu/environment/air/pollutants/stationary/paints/paints_legis.htm (visited 2014-10-10)

products for indoor usage. Outdoor products and products for industrial usage are in the Nordic Ecolabel covered by the criteria document called "Chemical building products".

The Nordic Ecolabelling has also chosen not to include anti-rust paints since they are mainly for outdoor usage and since the requirements in this document do not give room for all necessary components used in anti-rust paints.

2.1 Justification for Nordic Ecolabelling

2.1.1 Relevance, potential and steerability

To achieve environmental gains, each individual requirement must be relevant to the environmental objectives of Nordic Ecolabelling[2]. 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 a 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 Relevance-Potential-Steerability, RPS. Choosing the requirements that together have the greatest relevance, potential and steerability in terms of the product's life cycle achieves the greatest environmental gain.

Relevance (R)

The category of indoor paints and varnishes covers a wide range of different products such as wall and ceiling paints, floor coatings, decorative paints, primers and tinting systems. This means that the group of products that can be labelled by this document is large and it is relevant to set requirements on such a large group.

Indoor paints and varnishes can contain a number of subcategories for different functions and applications. The ingoing substances may be harmful to the environment and/or health, such as: binders, solvents, catalysts, hardeners, monomers, flame retardants and preservatives/ biocides. All the ingoing substances have different effects and issues when it comes to how they impact the environment and the health of the person using them and also the indoor environment where the walls/ceilings etc have been painted. For indoor paints it is important to secure a long shelflife for the products since they sometimes can be in the stores for a long time before being sold and also are kept at the consumer's house for a long time before being used completely. This makes it important to have a well functioning preservative system in the products. Preservatives are however a group of substances with harmful properties on both environmental toxicity and health issues such as sensibilisation. It is therefore important to keep the levels of such presservatives as low as possible but still make sure that the products can be stored, so that the consumer do not just discard half empty buckets.

Quality of the products is another important factor playing a key role when it comes to paints and varnishes. Different products have different lifespans, ie how soon a surface needs to be repainted dude to damages, scratches or other types of wear.

Further impact on the environment and/or health is described in the background for each relevant requirement under section 4 in this document.

[2] Nordic Ecolabelling's environmental objectives: http://www.nordic-ecolabel.org/about/the-mission/

Potential (P)

Through active choices of ingredients or the formulation/reformulation of their recipe, producers are often able to reduce the environmental/health impact of their products (although there are critical factors surrounding the choice of ingredients.

Even minor adjustments to the product formulation (such as replacing an ingredient with one that is not as harmful to the environment and/or health, or one with less VOC) can generate a real environmental gain, since the paints and varnishes are sold in large volumes. Information regarding the Nordic countries has been collected from different paint organisations in the Sweden, Finland and Denmark showing that large volumes of paint are sold in the Nordic region each year. The Swedish organisation SVEFF, estimates that about 35 million litres[3] of indoor paints and varnishes for professional and consumer usage per year. The Danish Coatings and Adhesives Association (Danmarks Farve- og Limindustri)[4] estimates that in 2013 about 23,5 million litres of indoor paints and varnishes for professional and consumer usage was sold in Denmark. The Finish association for the paint industry estimates that approximately 52-55 million litres[5] of paint were sold in Finland 2013. About 29 million litres of that was for consumer usage and covers indoor and outdoor paints, varnishes, wood protection and floor coatings.

The quality of the products also plays a major role in the fact that an increased lifespan for these products directly results in raw material and production savings. The quality requirements in this product group are important since paints and varnishes with longer lifespan means that the use of raw materials is lowered and also savings in production.

Steerability (S)

There are many large manufacturers of paints and varnishes, as well as numerous raw material suppliers for them to use. This creates a competitive situation which means that Nordic Ecolabelling can work well in stimulating the development of products with less environmentally impact.

Reports from public authorities and the industry itself indicate that ecolabelling can be a tool for steering development towards more environmentally aware products. The construction industry in general is highly competitive and price can often be a more important factor than the environment in procurement processes. However, there is an increasing demand for sustainable construction, which means that demand is also rising for products with a good environmental and health profile, giving them a stronger position in the market. There is also a demand for keeping indoor climate as clean as possible when it comes to constructions and repainting, ie the customers are interested in the products' impact on their indoor climate.

There is also a high demand for ecolabelled products on the consumer market in the Nordic region and there are currently around 490 indoor paint products ecolabelled (with the EU Ecolabel and/or the Nordic Ecolabel), see more under the section " The impact of the Nordic Ecolabel in the market".

[3] SVEFF, Sveriges Färgfabrikaters förening, personal contact with Anna Melvås, September 2014
[4] Danmarks Farve- og Limindustri, http://dfl.di.dk (2014-10-02)
[5] Färgindustriföreningen, Finland: http://www.variteollisuus.fi/fin/aineistot/tilastot/ (2014-10-02)

2.1.2 Version and validity of the criteria

The Nordic Ecolabel adopted the EU Ecolabel criteria for indoor paints and varnishes in 2009. The requirements have been identical to the EU Ecolabel since then. A lot of license holders have chosen to label their products with both the Nordic Ecolabel and the EU Ecolabel.

The first version of criteria for indoor paints and varnishes in the EU Ecolabel were published in 1998 and were revised to version 2 in 2002. In 2009 the first version of criteria for outdoor paints and varnishes, Commission decision 2009/543/EC, was published on the EU Ecolabel website. At the same time the third version of the criteria for indoor paints and varnishes, Commission decision 2009/55/EC, was published. The Commission decision 2009/55/EC for indoor paints and varnishes was adopted by the Nordic Ecolabel. This is one of very few documents were the Nordic Ecolabel has adopted a complete criteria document from the EU Ecolabel. The main reasons for opening up the possibilities to label indoor paints and varnishes with the Nordic Ecolabel were an interest from the market and a pre-study done on paint services, within the Nordic Ecolabel, which pointed out the lack of ecolabelled indoor paints.

EU Ecolabel decided on a revised criteria document on November 22nd 2013, which got the new name "Indoor and outdoor paints and varnishes". The document was published in the Official Journal of the European Union on May 28th 2014. The Nordic Ecolabelling version of the criteria expires June 30th 2016.

An evaluation of the new EU Ecolabel criteria by the end of 2013 and beginning of 2014 pointed out requirements where the Nordic Ecolabelling organization could not align with EU Ecolabelling mainly in terms of the requirements concerning wet scrub, the exemptions from the classifications, the risks for a lot of interpretations and the lack of a strict nano requirement. Therefore the Nordic Ecolabelling board in March 2014 decided to revise Nordic Ecolabelling's criteria for indoor paint and varnish to make their own criteria, however based on EU Ecolabelling.

The Nordic Market

In the product group indoor paints and varnishes there are many producers producing indoor paints but also other products, such as for example exterior paints and varnishes, fillers and other chemical building products. Some producers also produce industrial products used for furniture, windows etc.

The products on the Nordic market are produced both within the Nordic countries but also in the rest of Europe. There are big global companies as well as smaller more local producers on the market. Many of the products are sold in all or many of the Nordic countries and also to other countries worldwide.

The products are sold both to private consumers and through distributors like stores supplying paints and varnishes. They are also used by professional painters for painting of apartments, houses etc.

The impact of the Nordic Ecolabel in the market

The market interest has been large on ecolabelling indoor paints and varnishes and several companies sell their products with the Nordic Ecolabel in many countries.

There are currently (September 2014) 17 Nordic Ecolabel licenses for indoor paints and varnishes in the Nordic countries. The licenses are 12 in Sweden, 3 in Norway, 1 in Denmark and 1 in Finland. They totally comprise of more than 700 products.

There are currently (September 2014) 20 EU Ecolabel licenses for indoor paints and varnishes in the Nordic countries. The licenses are 12 in Sweden, 6 in Denmark and 2 in Norway and as a total they comprise almost 500 products.

2.2 Other labels

There are other labels on indoor paints besides the Nordic Ecolabel. Below is a description on some of the most common ones.

EU Ecolabel

The Nordic Ecolabel and the EU Ecolabel have until now had the same criteria document for ecolabelling of indoor paints. Under each specific requirement it is written what the difference is between the EU Ecolabel requirement and the Nordic Ecolabel requirement.

Asthma and Allergy Associations

In Sweden[6], Norway[7], Denmark[8] and Finland[9] the respective Asthma and Allergy Associations offer a label for products that meet their criteria, with a focus on asthma and allergies. When it comes to paints, their criteria focus on emissions (e.g. after 14 days, but it may vary from country to country).

Asthma and Allergy Denmark has criteria for indoor paints[10], the document covers indoor products for floor, walls and ceilings, panels and other wood based materials. The criteria document contains requirements on the ingoing substances in the products, which may cause sensitization either through skin contact or substances emitting after application on the substrate and thereby can come in contact with the skin.

Asthma and Allergy Norway has recently been revising their criteria for indoor paints and version 3 is now publishedThe criteria is very similar to the Danish Asthma and Allergy's document.

Dansk Inneklima Merke

In Denmark there is a label called "Dansk Indeklima Mærkning" (Danish indoor climate label) for paints. The label has three main areas included in the label, they are emissions, the particle distribution and indoor climate guidance[11].

Environmental Product Declarations

Environmental product declarations (EPDs) give detailed environmental information without setting specific requirements for the products. The benefit of the declarations depends entirely on the purchaser's knowledge of the environmental conditions surrounding the product they are buying. There is no international system for environmental product declarations as yet, but work on this is underway. In order to create an environmental

[6] Astma och Allergiförbundet Sverige: www.astmaoallergiforbundet.se (visited 2014-09-08)
[7] Norges Astma- og Allergiforbund: www.naaf.se (visited 2014-09-08)
[8] Astma-allergi Forbundet DK: www.astma-allergi.dk/ (visited 2014-09-08)
[9] Allergia-ja Astmaliitto (Fi): www.allergia.fi (visited 2014-09-08)
[10] Astma og allergi DK: http://www.astma-allergi.dk/den-bla-krans/producent/maling (visited 2014-09-08)
[11] Dansk indeklima merke: www. teknologisk.dk/DIM (visited 2014-09-08)

product declaration, relevant product category rules must first be drawn up/agreed. Although EPDs are quite common within the construction industry generally, a search for EPDs on the website where all issued EPDs are listed (www.environdec.com) shows that EPDs are not as common for chemical building products[12].

Der Blaue Engel/The Blue Angel

The Blue Angel is an ecolabel owned by The Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety[13] in Germany. Amongst products that can be awarded with The Blue Angel is paint for indoor walls and ceilings. There is requirements to VOC-content, substances classification, metals, plasticizer, preservations, formaldehyde and more[14].

3 About the criteria revision

Purpose of the criteria revision

The main purpose for revising the criteria document for indoor paints and varnishes is to propose a criteria document with more stringent environmental and health requirements than the previous version but also a document that is as harmonized as possible with the EU Ecolabel requirements in Commission Decision 2014/312/EU.

The focus of this revision has been to secure a criteria document which is easy to understand and which sets relevant requirements for indoor paints and varnishes.

To obtain a document that is easy to understand both for applicants and for the licensing personal one of the focus areas has been to reduce the number of substances with specific requirements through an evaluation of them, gathering texts concerning the same things in one place and separating different requirements that sometimes are put in one requirement in the EU Ecolabel.

3.1 Focus points

The main focus of this revision has been to go through the requirements and limits in the EU Ecolabel criteria from November 2013.

The following requirements have been in focus during the revision:

- Formulate the classification requirements, both product classification and ingoing substances, in an understandable way.
- Evaluate the risk for interpretations around the EU Ecolabel requirements concerning preservatives and to set a requirement that is well formulated and works for the applicant at a reasonable level. At the same time limits for isothiazolinones are to be evaluated with specific focus on Methylisothiazolinone (MI).
- Evaluate the possibility to have more stringent requirements on PFAS, PFOA and similar substances.
- Add a nano requirement.

[12] The International EPD® System, Available at: http://www.environdec.com/en/Site-search/?query=plaster (visited 25.05.2012)
[13] http://www.bmub.bund.de/en/
[14] The Blue Angel: http://www.blauer-engel.de/en/products/construction/low-emission-wall-paints/wall-paint

- Evaluate all the exemptions listed in annex 1 in the EU Ecolabel criteria to sort out which exemptions are necessary in production of well-functioning indoor paint products.
- Evaluate if there is a need to require all indoor paints to be able to claim wet scrub resistance.
- Evaluate the relevance of requiring membership in national take back systems.
- Write a background document based on the EU Ecolabel's Technical report with additions of a RPS (Relevance-Potential-Steerability) description and argumentation behind each requirement. The document should also describe differences between the EU Ecolabel document and the Nordic Ecolabel document.

About this criteria review/revision

The project was planned and run as a Nordic project. The revision started in June 2014 and is planned to be finalized in June 2015. External input has been collected from producers and other stakeholders during the project. The public hearing is planned to be sent out the 7th of January 2015.

Table A. Project participants

Roll	Person	Country
Nordic Product manager	Susanna Vesterlund	Sweden
Nordic Product Adviser	Lena Stenseng	Denmark
Product specialist	Pehr Hård	Sweden
Product specialist	Tove Bræin	Norway
Product specialist	Heidi Vaarala	Finland
Product specialist	Gitte Vestergaard	Denmark
Nano expert	Ingvild Kvien	Norway

4 Justification of the requirements

Definition on what is meant by ingoing substances

The Nordic Ecolabelling has as a standard in the chemical technical criteria documents a section explaining what is meant by ingoing substances and impurities. This is not exactly the same as what is stated in the EU Ecolabel criteria document for paints. The main difference is that the Nordic Ecolabel always includes all substances added with a purpose no matter what concentration they are in. It also includes known by-products and degradation substances. It is not completely clear what is meant in the EU Ecolabel when it comes to substances below 100ppm.

The following text, which is a standard text in the Nordic Ecolabel, will therefore be included in the Nordic Ecolabel's criteria for interior paints and varnishes:

The term constituent substance refers to all substances in the product, including additives in the ingredients (such as preservatives and stabilisers) but does not include impurities from primary production. Impurity refers to residues from primary production which may be found in the finished product at concentrations below 100 ppm (0.0100% w/w, 100 mg/kg), but not substances that have been added to a raw material or the product actively and for a particular purpose, irrespective of quantity.

Impurities of over 1.0% concentration in the primary product are, however, regarded as constituent substances. Substances known to be degradation products of the constituent substances are also themselves considered to be constituent substances.

General
Under each requirement below there is an argumentation to support the reason for the specific requirement and there is also a comparison to how the requirement is written in the EU Ecolabel. Some terms and definitions can be found under section 7 at the end of this document, describing and defining some terms etc.

4.1.1 EU Ecolabel requirement 1

O1 White pigment content (EU Ecolabel 1a and 1b)

Requirement:

Indoor wall and ceiling paints for which Class 1 and 2 wet scrub resistance* claims are made shall have a white pigment content (white inorganic pigments with a refractive index higher than 1.8) per m^2 of dry film equal to or lower than that described in Table 1i, with 98 % opacity.

All other paints shall have a white pigment content (white inorganic pigments with a refractive index higher than 1.8) per m^2 of dry film equal to or lower than that described in Table 1ii, with 98 % opacity.

For tinting systems this requirement only applies to the base paint.

** Wet scrub resistance is here defined in accordance with EN 13300 and EN ISO 11998, see requirement O2.*

Table 1i Relationship between wet scrub resistance and TiO_2 content for indoor paints with claims of wet scrub resistance

Wet scrub resistance	Indoor limit (g/m^2)
Class 1	40
Class 2	36

Table 1ii. Limits for white pigment content for products not covered by table 1i

Type of paint	Indoor limit (g/m^2) with 98% opacity
Wall and ceiling paints without claims	25
Other paints	36

☒ The applicant shall provide documentation showing that the content of white pigments is compliant with this requirement.

☒ For ceiling paints and indoor wall paints the labelling for the packaging, including the accompanying text, shall be provided as evidence regarding claims of wet scrub resistance

Background to this requirement
Pigments and Titanium dioxide in particular, are significant contributors to the environmental impact of paints. Pigments are important in enhancing the performance of the paints. To minimize the impact on environment but still maintain a high performing paint limits have been set on the amounts of white pigments.

Pigments have effect on the opacity of paint, therefore any reduction in use must be balanced against a reduction in the performance. Paint spreading performance is defined within the

Spreading Rate criterion (EU Ecolabel 3a, here requirement O4) and is directly linked to the amount of pigment added to the paint.

The definition of white inorganic pigment pigments with a refractive index higher than 1,8 is taken from the EU Ecolabel. This means that if the refractive index is below 1,8 they are not covered by this requirement.

The new requirement is similar to the way it was in the previous version of the criteria, but with the only difference being that the last version had an upper limit on 36g/m^2 for all types of products, whereas this requirement allows up to 40g/m^2 if the product fulfils the requirements for class 1 wet scrub resistance (O2).

The limit of 25g/m^2 is a new limit in this criteria version for wall and ceiling paints that do not have any claims on wet scrub resistance. In the previous version there was no requirement regarding class 1 in wet scrub, it was only related to class 2 in wet scrub.

The previous requirement on pigment content was not connected to the wet scrub.

Difference compared to the EU Ecolabel requirement 1a and b
Compared to the EU Ecolabel requirement 1a, this requirement has been modified to only cover indoor paints and it has also been modified to exclude anti-rust paints.

The EU Ecolabel requirement has a limit of 25g/m^2 for paints falling under the exemption in EU Ecolabel requirement 1b (here O1) for products exempted from fulfilling the requirement of wet scrub resistance. The limit of white pigment content is set at the same limit but in this Nordic Ecolabel requirement it is specifically stated that the wall and ceiling paints not claiming wet scrub has the limit of 25g/m^2.

If a product has been awarded the EU Ecolabel as an interior product (not including anti-rust paints) does not have to send in any further information on this requirement.

O2 Minimum requirement for claims of Wet Scrub Resistance (for indoor paints only) (EU Ecolabel 1b)

Requirement:

All indoor wall and ceiling paints (finishes) for which claims of class 1 or 2 in wet scrub is made shall achieve the claimed class according to class 1 or class 2 in wet scrub resistance (WSR) according to EN 13300 and EN ISO 11998. For tinting systems this requirement is only relevant for the tinting bases (base paints).

Only WSR class 1 and 2 ecolabelled paints may claim wet scrub resistance on the label or other marketing documentation.

☒ The applicant shall provide a test report according to EN 13300 using the method EN ISO 11998 (Test for cleanability and scrub resistance). For ceiling paints and indoor wall paints the labelling for the packaging, including the accompanying text, shall be provided as evidence regarding claims of wet scrub resistance

☒ The test laboratory must fulfil the requirements in appendix 4.

Background to this requirement
The Nordic Ecolabel finds it important that claims made on Nordic Ecolabelled products are supported by evidence of the claims. Therefore it is relevant to prove claims on wet scrub by tests. This is important for the final consumer of the product who uses the paint and wants to be able to rely on the fact that Nordic Ecolabelled products are good quality products and still have a low environmental impact.

The requirement in the previous version was only applicable to wall products with a claim of wet scrub resistance and it was only referred to class 2 or better, i.e. nothing was written about class 1. This new requirement proposed here refers to all indoor wall and ceiling paints with claims of wet scrub resistance. This is a difference compared to the previous version in which the requirement only referred to wall paints.

Difference compared to the EU Ecolabel requirement 1b
Compared to the EU Ecolabel requirement 1b, this requirement has been modified to only cover wall and ceiling paints with claims on wet scrub resistance. This is however similar to what has been stated in the user manual for the EU Ecolabel, i.e. it may be what was intended when this requirement was set.

The exemption in the requirement has been removed since the requirement now clearly states that it only is applicable for products with claims.

A product that has been awarded the EU Ecolabel for an indoor paint (excluding anti-rust) has already passed this requirement and do not need to send in any further information regarding this requirement.

4.1.2 EU Ecolabel requirement 2

O3 Titanium Dioxide pigment (EU Ecolabel 2)

Requirement:

If the product contains more than 3.0 % w/w of titanium dioxide, the emissions and discharges of wastes from the production of any titanium dioxide pigment used shall not exceed the following:

For the sulphate process:

SOx calculated as SO_2 : 7.0 kg/tonne TiO_2 pigment

Sulphate waste: 500 kg/tonne TiO_2 pigment

For the chloride process:

If natural rutile ore is used, 103 kg chloride waste/tonne TiO_2 pigment

If synthetic rutile ore is used: 179 kg chloride waste/tonne TiO_2 pigment

If slag ore is used: 329 kg chloride waste/tonne TiO_2 pigment

If more than one type of ore is used, the values will apply in proportion to the quantity of the individual ore types used.

Note:
SOx emissions only apply to the sulphate process.

The Waste Framework Directive 2008/98/EC of the European Parliament and of the Council (3) Article 3 shall be used for the definition of waste. If the TiO_2 producer can satisfy Article 5 (by-product production) of the Waste Framework Directive for its solid wastes then, the wastes shall be exempted.

☒ Declaration, see Appendices 1 and 2, from the manufacturer of the product and the manufacturer of each raw material.

☒ If the product contains more than 3% w/w of titanium dioxide, a description and calculation from the titanium dioxide producer is to be submitted, clearly showing that the requirement is fulfilled.

Background to this requirement
Titanium dioxide is a significant contributor to the environmental impact of paint. It is important in enhancing the performance of the paint. A carefully balanced approach is

needed in order to ensure that high quality paints are produced, whilst minimising the impact to the environment.

There has been some dispute, in the EU Ecolabel revision project, as to whether the intention of this criterion was to set limits on SOx emissions and sulphate wastes from the chloride process. The Titanium Dioxide Harmonisation Directive[15] does not stipulate limits for SOx emissions for chloride wastes. Furthermore, stakeholders have argued that the levels of SOx emissions from the chloride process are so low they can be excluded from the calculation. From data supplied by the Reference Document on Best Available Technology for the Manufacture of Large Volume Inorganic Chemicals (BREF)[16], sulphur dioxide emissions are released (albeit to a lesser extent) during production of titanium dioxide via the chloride route.

Indoor paints containing more than 3,0% w/w titanium dioxide may cause significant pollution, since the production of titanium dioxide has a major greenhouse effect counted per kg TiO_2[17] and is particularly associated with emissions of sulphates, SO_2 and chloride. For this reason Nordic Ecolabelling finds it important to set requirements concerning emissions from the production of titanium dioxide.

Focus has been set on emissions, since it is important that the requirement has potential, relevance and steerability. In this context, it should be clarified that the requirement applies to the titanium dioxide process, and not the titanium dioxide pigment process.

The requirement level has been calculated based on the 38 g TiO_2/m^2 with 98% opacity on a standard reference surface.

The final requirement aligns the SO_X emissions limits for the sulphate process with the large volume inorganic chemicals BREF. SO_X emissions are only of significance from this process of ore production and are not possible to verify for the chloride process. Moreover, sulphate waste may be exempted if it is used as a by-product.

The requirement is identical to the EU Ecolabel requirement. The limits are also identical to the ones in the Nordic Ecolabelling's criteria document for Chemical building products, version 2, requirement O9.

Compared to the previous version of the EU Ecolabel criteria for indoor paints and varnishes the requirement is set out differently. It was in the previous version a requirement on the amounts of emissions in mg per m^2 of dry film, whereas the new requirement relates to kg waste per tonne.

Difference compared to the EU Ecolabel requirement 2

The requirement is the same as EU Ecolabel requirement 2. The assessment and verification is updated to be more in line with the requirement in the criteria for Nordic Ecolabelled Chemical building products, version 2. The EU Ecolabel has a User manual instead of appendices in the criteria document.

An indoor product that fulfils the EU Ecolabel requirement does not need to send in further information on this requirement.

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[15] 92/112/EEC
[16] Best Available Technology for the Manufacture of Large Volume Inorganic Chemicals (BREF), EC, August 2007
[17] IVL Report B 1338-A

4.1.3 EU Ecolabel requirement 3

In order to demonstrate the efficiency in use of paints and varnishes the following tests per type of paint and/or varnish, as indicated in Table 2, shall be undertaken, see requirements O4-O8 below. See section 7 in this background document for explanations of the subcategories. The table has been adjusted to only include the sub categories relevant to indoor paints and varnishes, i.e. anti-rust and outdoor subgroups have been deleted from this table.

Table 2. Performance requirements for different kind of paints and varnishes

Criteria		Indoor paint (a, b)	Trim and cladding (d)	Thick decorative coating indoor and outdoor (l)	Varnish and woodstain (e, f)	One pack performance and floor covering paint (i)	Primer (g)	Undercoat and primer (h)
3(a)	Spreading rate (only for white and light coloured paints, including the white base paints used in tinting systems)) — ISO 6504/1	8 m^2/L	Indoor products 8 m^2/L	1 m^2/L	—	Indoor products 8 m^2/L	Without opacity: 6 m^2/L With opacity 8m^2/L	Without opacity: 6 m^2/L With opacity 8m^2/L
3(b)	Resistance to water — ISO 2812-3	—	—	—	Resistant to water	Resistant to water	—	—
3(c)	Adhesion — EN 24624		—	—	—	Score 2	1,5 MPa (masonry paint)	1,5 MPa (masonry paint)
3(d)	Abrasion — EN ISO 7784-2	—	—	—	—	70 mg weight loss	—	—

O4 Spreading rate (EU Ecolabel 3a)

Requirement:

The spreading rate requirement shall apply to white and light coloured paint products. For paints that are available in more colours the spreading rate shall apply to the lightest colour. The spreading rate should be at least at the levels presented in table 3 below.

Table 3. Spreading rate

	Opacity/hiding power	Spreading rate of at least the following
White paints and light-coloured paints (including finishes and intermediates)*	Hiding power 98%	8 m^2 per litre of product
Transparent and semi-transparent primers and undercoats	Without opacity With opacity	6 m^2 per litre of product 8 m^2 per litre of product
Opaque primers with specific blocking/sealing, penetrating/binding properties and primers with special adhesion properties	Opaque	6 m^2 per litre of product.
Thick decorative coatings (paints that are specially designed to give a three-dimensional decorative effect and are therefore characterised by a very thick coat)		1 m^2 per kg of product
Opaque elastomeric paints	Opaque	4 m^2 per litre of product

**Tinting systems*

- For tinting systems, this requirement applies only to the white base (the base containing the most TiO_2). In cases where the white base is unable to achieve this requirement, the requirement shall be met after tinting the white base to produce the standard colour RAL 9010.
- For paints that are a part of a tinting system, the applicant must advise the end-user on the product packaging and at the Point of Sale which shade or primer/undercoat (if possible bearing the Nordic Ecolabel/EU Ecolabel) should be used as a basecoat before applying the darker shade.

This requirement does not apply to varnishes, lasures, transparent adhesion primers or any other transparent coatings.

☒ The applicant shall provide a test report using one of the following:

- The method ISO 6504/1 (Paints and varnishes — determination of hiding power — Part 1: Kubelka-Munk method for white and light-coloured paints) **or**
- 6504/3 (Part 3: determination of contrast ratio (opacity) of light-coloured paints at a fixed spreading rate), or
- For paints specially designed to give a three-dimensional decorative effect and characterised by a very thick coat the method NF T 30 073.

☒ For bases used to produce tinted products not evaluated according to the abovementioned requirements, the applicant shall produce evidence of how the end-user will be advised to use a primer and/or grey (or other relevant shade) of undercoat before application of the product.

☒ The test laboratory must fulfil the requirements in appendix 4.

Background to this requirement
A key environmental consideration is the amount of paint used during application. Minimising the amount of paint used, whilst achieving a high quality finish can result in a significant environmental saving. The most appropriate criterion by which this can be monitored is through the paints spreading rate. The requirement is intended to recognise products that are more efficient. The requirement therefore varies according to the opacity of primers (and therefore also hiding power).

This is a criterion that also was included in the previous version of the EU Ecolabel Paints and Varnishes. The test protocols defined within the cited standards have not been modified since the previous revision and can be used for the updated criteria document.

The interplay between this requirement (spreading rate) and requirement 1 (here O1 - requirement for white pigment content) means that a variation in either has an impact on both.

For opaque paints based on non-white (low TiO_2) bases, a gap currently exists in the ability to test their spreading rates. A possible option is the French test standard NF T30-073:1989-08-01, although the standard's popularity and use is unknown. Although information was sought, no additional information was forthcoming on the applicability or use of this standard, therefore it is suggested that it is not included within this revision.

A suggestion was made, during the EU Ecolabel revision process, to differentiate the set limits for primers and undercoats. The reasoning behind this was that the main function of a primer is to prepare the medium and to homogenize the porosity of the medium in order to give to the final coat a good adhesion. The adhesion (O6) is moreover proved by the test reports which should be made on the undercoats. Therefore it was argued that for primers and undercoats the focus should be on strict limits for adhesion rather than spreading rate.

To encourage the correct usage of the products the applicant shall advice the end user of tinting systems on how to obtain the optimal result by using the correct shade or primer as a first layer before applying the darker shade, by information on the packaging and at the place where the product is sold (Point of Sale), see the requirements under the table stating information regarding "tinting systems".

This requirement has the same limits as in the previous version, but with an addition of the category "opaque elastomeric paints" with a limit of $4m^2$ per litre.

Difference compared to the EU Ecolabel requirement 3a
The only difference here is that the assessment part has been made a bit clearer with the text saying that only one of the listed tests is needed. This means that a product that has been awarded the EU Ecolabel also fulfils this requirement.

O5 Resistance to water (EU Ecolabel 3b)

Requirement:

All varnishes, floor coatings and floor paints shall have resistance to water, as determined by ISO 2812-3 such that after 24 hours' exposure and 16 hours' recovery no change of gloss or of colour occurs.

☒ The applicant shall provide a test report using the method ISO 2812-3.

☒ The test laboratory must fulfil the requirements in appendix 4.

Background to this requirement
This test is important to show that water resistant paints have the claimed functions. In addition to being resistant to abrasion, paints used on floors must also be resistant to water. Water resistance is tested in accordance with the method ISO 2812-3 Part 3: Method using an absorbent medium.

The current test protocol is the latest available version available. However, an international review of the ISO standard is under way and a document has been circulated through the technical committee for comment, it is not clear when this will be published. There was also a request to clarify that all varnishes, not just floor varnishes, shall meet this criterion.

The requirement is the same as in the previous version of the criteria.

Difference compared to the EU Ecolabel requirement 3b
The requirement is identical to the EU Ecolabel requirement.

O6 Adhesion (EU Ecolabel 3c)

Requirement:

- Pigmented masonry primers for interior uses shall score a pass in the EN 24624 (ISO 4624) pull-off test where the cohesive strength of the substrate is less than the adhesive strength of the paint, otherwise the adhesion of the paint must be in excess of a pass value of 1.5 MPa.
- Floor coatings, floor paints, floor undercoats, interior masonry primers, metal and wood undercoats shall score 2 or less in the EN 2409 test for adhesion.

Transparent primers are not included in this requirement.

The applicant shall evaluate the primer and/or finish alone or both applied together. When testing the finish alone this shall be considered the worst case scenario concerning adhesion.

☒ The applicant shall provide a test report using the method EN ISO 2409 or EN 24624 (ISO 4624) as applicable.

☒ The test laboratory must fulfil the requirements in appendix 4.

Background to this requirement
Adhesion is an important parameter for paints which shows that the products (primers, undercoats, one-pack performance and floor coatings) have good adhesion to the substrate/paint as a quality check of the product.

For primers for interior walls good adhesion properties (e.g. on plaster) are the main attribute of these products and something that the consumer will find very important when using the product.

The protocol has not been updated since the previous revision of the Ecolabel and there is consensus that this is appropriate for continued use in the EU Ecolabel. It is recommended that the test should be reused without revision.

According to the EN 2409 best result is 0 and worst is 5 therefore in the revised draft criteria adhesion inferior or equal to 2 is required.

The requirement is the same as in the previous version of the criteria, besides the fact that both masonry primers and pigmented masonry primers are included in this. In the last version it was only the pigmented masonry primers.

Difference compared to the EU Ecolabel requirement 3c
EU Ecolabel only has this requirements on masonry primers for exterior usage, whereas Nordic Ecolabelling has decided that this requirement above is for interior pigmented masonry primers in this criteria document. The requirement in the last version of EU Ecolabel criteria had this requirement also for interior pigmented masonry primers. The requirement for floor coatings is identical to the EU Ecolabel requirement. A floor product fulfilling the EU Ecolabel fulfils this requirement as well. A pigmented masonry primer for indoor usage, with the EU Ecolabel, needs to show fulfilment of this requirement as a compliment to the EU Ecolabel.

O7 Abrasion (EU Ecolabel 3d)

Requirement:

Floor coatings and floor paints shall have an abrasion resistance not exceeding 70 mg weight loss after 1000 test cycles with a 1000 g load and a CS10 wheel according to EN ISO 7784-2.

Alternatively a test according to ISO 5470-1 with 1000 test cycles with 1000 gram load and the H22 wheel where the weight loss is maximum 3000 mg.

☒ The applicant shall provide a test report showing compliance with this requirement using the method EN ISO 7784-2 or ISO 5470-1.

☒ The test laboratory must fulfil the requirements in appendix 4.

Background to this requirement
Surfaces subject to heavy wear, e.g. floors, need to be painted/coated with paints or varnishes that are highly resistant to abrasion to give the floor coating a longer life span. One way of testing wear resistance of paints is by performing an abrasion resistance test according to EN ISO 7784-2:2006.

If a product (paint or varnish) fulfils the requirement of abrasion it needs to have an abrasion resistance not exceeding 70 mg weight loss after 1000 test cycles with a 1000 g load and a CS10 wheel.

This requirement has not been updated since the previous version of the EU Ecolabel criteria. In this Nordic Ecolabel version an alternative test method has been added in the same way as it was in the Nordic Ecolabelling criteria for chemical building products (version 2). This addition gives the paint producers one more test method to choose from which makes it a little bit more flexible for them.

Difference compared to the EU Ecolabel requirement 3d
The requirement is identical to the EU Ecolabel requirement 3d but with an addition of an alternative test method (ISO 5470-1). If an interior floor coating has been awarded the EU Ecolabel this requirement has been fulfilled.

4.1.4 EU Ecolabel requirement 4

O8 Content of Volatile and Semi-volatile Organic Compounds (VOCs, SVOCs) (EU Ecolabel 4)

Requirement:

The maximum content of Volatile Organic Compounds (VOCs) and Semi-Volatile Organic Compounds (SVOCs) shall not exceed the limits given in Table 4a-b.

The content of VOCs and SVOCs shall be determined for the ready to use product and shall include any recommended additions prior to application such as colourants and/or thinners.

The VOC content shall be determined either by calculation based on the ingredients and raw materials or by using the methods given in ISO 11890-2 or, alternatively for products with a VOC content of less than 1.0 g/l, the methods given in ISO 17895.

The SVOC content shall be determined using the method given in ISO 11890-2. The markers given in Table 4b shall be used as the basis for delimiting the Gas Chromatography results for SVOC's.

Definitions of VOC and SVOC

Volatile organic compounds' (VOC) means any organic compounds having an initial boiling point less than or equal to 250 °C measured at a standard pressure of 101.3 kPa as defined in Directive 2004/42/EC and which, in a capillary column, are eluting up to and including tetradecane ($C1_4H_{30}$) for non-polar systems or diethyl adipate ($C_{10}H_{18}O_4$) for polar systems.

Semi volatile organic compounds' (SVOCs) means any organic compound having a boiling point of greater than 250 °C and which, in a capillary column 8 are eluting with a retention range between n-tetradecane ($C_{14}H_{30}$) and n-docosane ($C_{22}H_{46}$) for non-polar systems and diethyl adipate ($C_{10}H_{18}O_4$) and methyl palmitate ($C_{17}H_{34}O_2$) for polar systems.

Products with the Nordic Ecolabel may display the text 'reduced VOC content' and the VOC content in g/l next to the Ecolabel if they wish.

Table 4a. VOC and SVOC content limits

Product description (with subcategory denotation according to Directive 2004/42/EC)	VOC limits (g/l including water)	SVOC limits (g/l including water)	
		White paints and varnishes	Tinted paints and varnishes
a. Interior matt walls and ceilings (Gloss < 25@60°)	10	30	40
b. Interior glossy walls and ceilings (Gloss > 25@60°)	40	30	40
d. Interior/Exterior trim and cladding paints for wood and metal	80	50	60
e. Interior trim varnishes and woodstains, including opaque woodstains	65	30	30
f. Interior and Exterior minimal build woodstains	50	30	40
g. Primers	15	30	40
h. Binding primers	15	30	40
i. One-pack performance coatings	80	50	60
j. Two-pack reactive performance coatings for specific end use such as floors	80	50	60
l. Decorative effect coatings	80	50	60

Table 4b. Marker compounds to be used in the determination of SVOC content

	Polar systems (water-borne coating products)	Non-polar systems (solvent-borne coating products)
SVOC	Diethyl adipate (C10H18O4) to methylpalmitate (C17H34O2)	n-Tetradecane (C14H30) to n-Docosan (C22H46)

- ☒ The applicant shall provide for the VOC content of the ready to use product either a test report using the methods given in ISO 11890-2 or ISO 17895 that demonstrates compliance or a declaration of compliance supported by calculations based on the paint ingredients and raw materials.
- ☒ The applicant shall provide for the SVOC content of the ready to use product a test report using the method given in ISO 11890-2. The test should be carried out with reference to the markers specified in Table 4 and appendix 3 in this criteria document.
- ☒ The test laboratory must fulfil the requirements in appendix 4.
- ☒ Declaration in line with Appendices 1 and 2 from the manufacturer of the product and the manufacturer of each raw material.

Background to this requirement

VOC – Volatile Organic Compounds

Volatile Organic Compounds (VOCs) are used as solvents within paints to help keep it stable prior to use and aid in spreading and delivery of the paint to the substrate. VOCs encompass a wide variety of compounds and are generally classed as organic substances with a boiling point less than 250 °C (Directive 2004/42/EC). VOCs generally evaporate or sublimate from the paint during and after application. The release of these emissions can cause eye, nose, and throat irritation along with headaches and loss of coordination. Due to the wide diversity of compounds encompassed by this classification, more extreme reactions can also present, in particular: damage to liver, kidney, and central nervous system and some are suspected or known to cause cancer in humans[18].

VOC content was identified as an environmental hot spot in the preliminary LCA study done during the revision of the EU Ecolabel criteria. The updated requirement on the VOC content limits are based on a review of data from EU Ecolabel license holders. It seeks to set content values that improve upon the 2010 requirements under the Paints Directive by between 43% and 67%. A recast of the Directive is underway but no change on the limits is proposed[19].

The lowest content levels are set for matt interior wall and ceiling paints, with a further reduction from 15 to 10g/l proposed, supported by the consensus of feedback from manufacturers and data from existing license holders.

Nordic Ecolabel recognises the technical potential to reduce VOC content further. Some manufacturers use private labels on packaging to indicate low VOC. Taken this into account the Nordic Ecolabel has decided to keep the idea of the text from the EU Ecolabel that the text next to the Ecolabel can be used to differentiate 'reduced VOC' products from 'low VOC' products. The Nordic Ecolabel has chosen to modify the text a little bit concerning this, but the idea is the same, i.e. to say that it is ok to write "reduced VOC" on the label.

SVOC – semi Volatile Organic Compounds

Semi volatile organic compounds (SVOCs) means any organic compound having a boiling point of greater than 250 °C. The definition of SVOCs given in the prCEN/TS 16516 is as follows: "SVOCs are all organic compounds which, in a capillary column as specified in

[18] http://www.epa.gov/iaq/voc.html
[19] http://ec.europa.eu/environment/air/pollutants/stationary/paints/paints_review.htm

8.2.2[20], are eluting with a retention range between n-hexadecane (excluded) and n-docosane (included)".

The decline in use of VOCs has led to an increase in the use of Semi Volatile Organic Compounds (SVOC's). SVOCs have been found in adhesives for floors and wall covering materials. To a certain extent, the restrictions on SVOCs have been covered by VAH's and phthalates. Both the Austrian Ecolabel[21] and the German Blau Engel (Blue Angel)[22] specifically limit their use in paints, so inclusion in the EU Ecolabel will harmonise criteria.

Construction and building products are a major source of SVOCs and the Construction Products Directive[23] has an optional criterion[24] that SVOCs need to be avoided within the sector[25]. The major issue is that SVOC's can redistribute themselves from one surface, such as paints, onto other surfaces, from which they can be inhaled and ingested[26].

Binders were also identified as an environmental hot spot from LCA evidence, in the EU Ecolabel revision. The proposed introduction of sub-criteria addressing Semi-Volatile Organic Compounds (SVOC's) will in part address binder content. The criteria is based on initially conservative content values and a simplified approach to verification based on the use of ISO 11880-2 as the test method. It is envisaged that this will require license holders to become familiar with measuring SVOC content. Moreover, SVOC's are increasingly being addressed as an indoor air quality issue. This requirement seeks to address the issue at source.

Specifying the test method
Calculation of SVOC content would not be applicable because of the complexity of identifying SVOC compounds within the paint formulation. It is understood that information available from raw material suppliers may not be of sufficient detail for this to be workable. A test method is therefore proposed in accordance with the potential difficulties raised.

An approach based on the use of Gas Chromatography and ISO 11890-2 was the consensus from industry stakeholders, during the EU Ecolabel revision process. It is understood from industry stakeholders, including a major testing body, that this would be suitable for use in the interim as the verification method. It is therefore proposed that ISO 11890-2 is used as the basis for verification of sVOC. This will allow for experience to be gained with its application to SVOC's. A stakeholder highlighted the need for some additional guidance on modifications to the methodology in ISO 11890-2. This included, indicatively:

- Analytical details (expansion of the time for the VOC scan in the chromatogram),
- Specification of how to quantify unidentified VOCs and SVOCs,
- Lowering of the detection limit.

[20] Of FprCEN/TS 16516 (this technical specification will be adopted in July 2013).
[21] Austrian Ecolabel: http://www.ecolabelindex.com/ecolabel/osterreichisches-umweltzeichen-austrian-ecolabel (2014-10-03)
[22] Blue Angel http://www.blauer-engel.de
[23] Construction products directive 89/106/EEC
[24] European Collaborative Action. Urban air, indoor environment and human exposure. Report No 27; Harmonisation framework for indoor material labelling schemes in the EU (2010)
[25] CEN/TC 351 Construction products: Assessment of the release of dangerous substances.
[26] EnVIE; Coordination Action on Indoor air Quality and Health Effects

Test methods and instructions
Note that ISO 17895 has now been superseded by ISO 11890-2. This new standard should be used.

The ISO 11890-2 test method for VOCs has been specified in the criterion for use also to quantify SVOC content. In order to do this and improve reproducibility of test results between laboratories a number of modifications to the test procedure are suggested:

- Polar and non-polar columns: It is recommended to use in all cases a non-polar column, or a slightly polar column for the chromatography;
- Detector selection: Only a Flame Ionisation Detector is recommended to be used.
- Calibration: It is recommended as being based on toluene equivalent.
- Test conditions: The temperature conditions and retention time will need to be increased to reflect the marker compound range.

During the validity period of the criteria it is likely that ISO 11890-2 will be revised to also provide a test method for SVOC's. These modifications shall therefore be referred to as an interim guidance until the standard is revised, at which time it should be used as the sole reference point for SVOC testing.

This text above has been included in the criteria appendix 3.

VOC-limits
The asthma and allergy association in Denmark has in their criteria document a requirement to TSVOC and also TVOC. It is however hard to compare their requirement to this, since their requirement is referring to how much VOC and sVOC that is emitted from the surface, whereas this requirement refers to the sVOC and VOC in the paint bucket.

The limits on VOC have been made more stringent in this version of the indoor paints and varnishes criteria for all categories in table 4a besides primers and binding primers (categories g and h), which have been kept at the same limit as before.

Difference compared to the EU Ecolabel requirement 4
The main difference compared to the EU Ecolabel requirement is that the categories in this requirement are just the ones relevant for indoor application, i.e. product categories as anti-rust paint and other exterior paints are not in the table. The limits are the same as in the EU Ecolabel. An additional text in the requirement saying that a calculation of sVOC is acceptable as an alternative to a test. In the EU Ecolabel document this is only stated in the assessment and verification part. This means that the requirement is the same in this regard. The requirement has also been updated with a definition of VOC and sVOC. The definitions are from Article 1 in the EU Ecolabel criteria document.

The Nordic Ecolabel has chosen to modify the text a little bit concerning the text on the label saying "reduced VOC". The idea of this is however the same as in the EU Ecolabel.

An indoor paint product within the categories above, with the EU Ecolabel, does not need to send in any further information regarding this requirement.

4.1.5 EU Ecolabel requirement 5

The EU Ecolabel requirement 5 covers several different classifications. The Nordic Ecolabel has however chosen to split this into 3 different requirements. The 3 requirements have also been supplemented with the corresponding exemptions.

O9 Restrictions to hazard classifications and risk phrases on constituent substances (EU Ecolabel 5a)

Requirement:

Substances in the product or in the raw materials that make up the product must not be classified as shown in Table 5 below.

The most recent classification rules adopted by the EU shall take precedence over the listed hazard classifications and risk phrases. In accordance with Article 15 of Regulation (EC) No 1272/2008 applicants shall therefore ensure that classifications are based on the most recent rules on the classification, labelling and packaging of substances and mixtures.

Table 5. Restricted hazard classifications and their categorisation for constituent substances

Acute toxicity	
Category 1 and 2	Category 3
H300 Fatal if swallowed (R28)	H301 Toxic if swallowed (R25)
H310 Fatal in contact with skin (R27)	H311 Toxic in contact with skin (R24)
H330 Fatal if inhaled (R23/26)	H331 Toxic if inhaled (R23)
H304 May be fatal if swallowed and enters airways (R65)	EUH070 Toxic by eye contact (R39/41)
Specific target organ toxicity	
Category 1	Category 2
H370 Causes damage to organs (R39/23, R39/24, R39/25, R39/26, R39/27, R39/28)	H371 May cause damage to organs (R68/20, R68/21, R68/22)
H372 Causes damage to organs through prolonged or repeated exposure (R48/25, R48/24, R48/23)	H373 May cause damage to organs through prolonged or repeated exposure (R48/20, R48/21, R48/22)
Respiratory and skin sensitisation	
Category 1/1A	Category 1/1B
H317: May cause allergic skin reaction (R43)	H317: May cause allergic skin reaction (R43)
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled (R42)	H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled (R42)

Exemptions

- Respirable crystalline silica/quartz is exempted from the classification as STOT RE 1 with H372. Respirable crystalline silica can be up to 1% in the raw material.
- In can preservatives that are used to preserve the product are exempted from the requirement of classification as acute toxic with H301, H311 and H331 and skin sensitising with H317. The in-can preservatives are exempted up to a maximum of 0,060% w/w totally in the final product. See further requirements concerning preservatives are stated in O14.
- Film preservatives used to preserve the final film in products to be used in high humidity areas, such as kitchens, bathrooms and other wet rooms, are exempted from classifications with category 1/1A/1B with H317 up to 0.10% w/w totally in the final product.
- Neutralizing agents are exempted from classifications with H311 and H331 up to maximum 0.50% w/w totally in the final product.

- ☒ Declaration in line with Appendices 1 and 2 from the manufacturer of the product and the manufacturer of each raw material. Documentation of exemptions for each substance is done on appendix 1 and 2 together with a statement why the substance is present in the product/raw material.
- ☒ Safety data sheet for all constituent substances in line with Annex II to REACH (Regulation (EC) No 1907/2006).
- ☒ Documentation of content of above exemptions as a declaration of the concentrations and the function of the raw materials.

Background to the requirement

Nordic Ecolabelling strives to ensure that the health and environmental impact of the products are as low as possible. The requirements therefore make it clear that constituent substances classified as acute toxic, have specific target organ toxicity or sensitising cannot be ecolabelled.

Classifications are to be given in accordance with the prevailing CLP Regulation EC (No) 1272/2008. Classification according to the Dangerous Preparations Directive only can be used until 31 May 2015 and is therefore not included in this version of the criteria.

The exemption for crystalline silica has been modified compared to the EU Ecolabel to only allow up to 1% and that the exemption is from classification with H372 not H373 as in the EU Ecolabel. The requirement 5(a)(ii) in the EU Ecolabel criteria have extra safety issues when handling exemptions for powdered raw materials with classification like H372. These requirements are not in the Nordic Ecolabelling criteria for indoor paints and varnishes, because it is expected that most production sites already handle these raw materials according to the EU Ecolabel requirements.

Neutralizing agents are here consider as and pH-adjusters such as ammonia, sodium hydroxide, acrylates and amines.

In-can preservatives such as isothiazolinones do not yet have harmonized classifications according to CLP. They are however sent in to ECHA as being classified with different combinations of acute toxicity and skin sensitizers. Since in can preservatives are considered to be relevant for indoor paints (see further under requirement O14) an exemption has been made for them from the classifications with acute toxicity and skin sensitising effects. This exemption differs a bit from the one in the EU Ecolabel, but the changes have been made to make it possible to use the needed in can preservatives, which also are limited by requirement O14. For example 2-methyl-2H-isothiazol-3-one (MI or MIT), CASnr 2682-20-4 has been classified by a large part of producers as H301, H311, H314, H317, H335 and H400. Others have classified it as acute toxicity 4 with H302 and H332 instead of acute toxicity 3 with H301 and H311. Another example is 1,2-benzisothiazol-3(2H)-one (BIT) has harmonized classification and is classified as H302, H315, H317, H318 and H400.

Difference compared to the EU Ecolabel requirement 5a and the related exemptions

The category respiratory and skin sensitizing has been updated to also include category 1 not just category 1A and 1B, this has been done to ensure that substances classified as just category 1 are limited by this requirement as well.

The exemptions for driers from the classifications H301 and H373 have been deleted here, since contacts with producers has indicated that the driers used in indoor paints are not classified with these classifications.

The exemption for crystalline silica has been modified compared to the EU Ecolabel to only allow up to 1% and that the exemption is from classification with H372 not H373 as in the EU Ecolabel.

The exemption for in can preservative differs from the EU Ecolabel requirement since additional exemption for classifications as acute toxic cat 3 has been added to ensure that in-can preservatives such as isothiazolinones can be included in the preservative system, see more concerning preservatives under O14.

The exemption for solvents that exempts 2% H304-classified solvents has been deleted from this document after discussions concerning the relevance of it when it comes to waterborne products.

The exemption for neutralizing agents has here been limited to 0,5% for all types of products, whereas the EU Ecolabel has different limits depending on what type of product it is meant to be used in.

This requirement has a lot of differences compared to the EU Ecolabel requirement due to the different lists of exemptions and due to the difference in definition of constituent substances. This means that some products with the EU Ecolabel do not fulfil this requirement.

O10 Restrictions to substances classified as Carcinogenic, mutagenic or toxic for reproduction on constituent substances (EU Ecolabel 5a)

Requirement:

Substances in the product or in the raw materials that make up the product must not be classified as shown in Table 6 below.

The most recent classification rules adopted by the Union shall take precedence over the listed hazard classifications and risk phrases. In accordance with Article 15 of Regulation (EC) No 1272/2008 applicants shall therefore ensure that classifications are based on the most recent rules on the classification, labelling and packaging of substances and mixtures.

Table 6 Restricted CMR classifications and their categorisation on constituent substances

Carcinogenic, mutagenic or toxic for reproduction	
Category 1A and 1B	**Category 2**
H340 May cause genetic defects (R46)	H341 Suspected of causing genetic defects (R68)
H350 May cause cancer (R45)	H351 Suspected of causing cancer (R40)
H350i May cause cancer by inhalation (R49)	
H360F May damage fertility (R60)	H361f Suspected of damaging fertility (R62)
H360D May damage the unborn child (R61)	H361d Suspected of damaging the unborn child (R63)
H360FD May damage fertility. May damage the unborn child (R60, R60/61)	H361fd Suspected of damaging fertility. Suspected of damaging the unborn child (R62/63)
H360Fd May damage fertility. Suspected of damaging the unborn child (R60/63)	H362 May cause harm to breast fed children (R64)
H360Df May damage the unborn child. Suspected of damaging fertility (R61/62)	

Exemption

- Formaldehyde as an impurity in newly produced polymers and from formaldehyde donors maximum content of 0.0010 % w/w (10 ppm) in the final product, see separate requirement O20.

☒ Declaration in line with Appendices 1 and 2 from the manufacturer of the product and the manufacturer of each raw material. Documentation of exemptions for each substance is done on appendix 1 and 2 together with a statement why the substance is present in the product/raw material.

☒ Safety data sheet for all constituent substances in line with Annex II to REACH (Regulation (EC) No 1907/2006).

Background to the requirement

For the same reasons described under requirement O9, there is a requirement that none of the constituent substances are classified as carcinogenic, mutagenic or toxic for reproduction. Formaldehyde is exempted from this requirement, with special requirements stated in O20 – the reason for the exemption is described under "formaldehyde".

Nordic Ecolabelling wishes to limit the health effects of chemical building products and therefore excludes from use any constituent substances that are classified as acutely toxic, airway sensitising and/or having specific target organ toxicity. Classifications are to be given in accordance with the prevailing CLP Regulation EC (No) 1272/2008 and in accordance with Dangerous Preparations Directive 1999/45/EC (as amended).

Glyoxal

Glyoxal (CAS 107-22-2) is classified as mutagenic cat 2 (H341). Glyoxal is often present in cellulose based products. As far as the Nordic Ecolabelling knows there are alternative ways to make technical adaptions to the process which makes it possible to use cellulose without glyoxal and the Nordic Ecolabelling has therefore decided not to make an exemption for glyoxal in this version of the criteria document.

Cobalt driers

In the EU Ecolabel criteria there is an exemption for cobalt driers classified as hazardous to the environment, but since cobalt driers now are classified as H361 the Nordic Ecolabelling has decided not to make an exemption for cobalt driers in indoor paints. The cobalt driers are mainly used for alkyd paints and as far as the Nordic Ecolabelling has understood it is mainly relevant for exterior products and is something that the producers of exterior products currently are trying to exclude from their products.

Difference compared to the EU Ecolabel requirement 5a and the related exemptions

The requirement limits the same classifications as in the EU Ecolabel requirement. The text regarding formaldehyde differs from the EU Ecolabel and is referring to O20. The fact that the definition of constituent substances differ also makes the requirements different. The Nordic Ecolabel has also chosen not to make exceptions for cobalt driers in this requirement.

An indoor product labelled with the EU Ecolabel will have to send in documentation of fulfilment of this requirement.

O11 Restrictions to constituent substances classified as hazardous to the aquatic environment and hazardous to the ozone layer (EU Ecolabel 5a)

Requirement:

Substances in the product or in the raw materials that make up the product must not be classified as shown in Table 7 below.

The most recent classification rules adopted by the Union shall take precedence over the listed hazard classifications and risk phrases. In accordance with Article 15 of Regulation (EC) No 1272/2008 applicants shall therefore ensure that classifications are based on the most recent rules on the classification, labelling and packaging of substances and mixtures.

Table 7. Restricted classifications for constituent substances as hazardous to the environment and their categorisation

Hazardous to the aquatic environment	
Category 1 and 2	**Category 3 and 4**
H400 Very toxic to aquatic life (R50)	H412 Harmful to aquatic life with long-lasting effects (R52/53)
H410 Very toxic to aquatic life with long-lasting effects (R50/53)	H413 May cause long-lasting effects to aquatic life (R53)
H411 Toxic to aquatic life with long-lasting effects (R51/53)	
Hazardous to the ozone layer	
EUH059 Hazardous to the ozone layer (R59)	

Exemptions

- In can preservatives that are used to preserve the product are exempted from the requirement of classification as hazardous to the aquatic environment category 1-4 up to maximum 0,060% w/w total in the final product. See specific limits in requirement O14.
- Film preservatives used to preserve the final film in products to be used in high humidity areas, such as kitchens, bathrooms and wet rooms, are exempted from classifications as hazardous to the aquatic environment category 1-4 up to 0.10% totally in the final product. Zinc oxide used to stabilize dry film preservatives is exempted from classifications with H400 and H410 up to 0.050% w/w in the final product. See requirement O14 for further requirements on preservatives.
- Driers in alkyd paints classified with H410, H412, and H413 up to 0.050% w/w totally in the final product.
- Anti-skinning agents are exempted from classification H412 and H413 up to a maximum of 0.040% w/w totally in the final product.
- Surfactants classified as hazardous to the aquatic environment with H411, H412 and H413 up to 1.0% totally in the final product.
- Silicon resin emulsions in white paints, tinting bases and colourants are exempted from classifications with H412 and H413 up to 2.0% w/w totally in the final product.
- Neutralizing agents are exempted from classifications as hazardous to the aquatic environment category 1-4 with H400, H410, H411, and H413 up to maximum 0.50% w/w totally in the final product.

☒ Declaration in line with Appendices 1 and 2 from the manufacturer of the product and the manufacturer of each raw material.

☒ Safety data sheet for all constituent substances in line with Annex II to REACH (Regulation (EC) No 1907/2006).

☒ Documentation of content of above exemptions as a declaration of the concentrations and the function of the raw materials.

Background to the requirement
Many indoor paints and varnishes contain substances that are classified as toxic to aquatic organisms – H410, H411 and/or H412. Such substances are restricted and may only appear in small quantities in ecolabelled products. The purpose of restricting environmentally harmful substances is to reduce the ability for such substances to be emitted to water, for example when washing brushes and tools.

In the previous version of the criteria there was a limit of the total amount of environmentally hazardous substances in the products. That requirement does not exist in the latest version of the EU Ecolabel requirement. The Nordic Ecolabelling will be looking at the possibility to include a weighted formula to limit the total amounts of environmentally hazardous substances in the next version of the criteria for indoor paints and varnishes.

All substances exempted in the requirement above has been exempted only for specific amounts, which leads to a limit of the total amount in the products.

Difference compared to the EU Ecolabel requirement 5a and the related exemptions
The exemption regarding in-can preservatives has been modified in the way that there is a limit of 0.060%, which is also the limit in the EU Ecolabel criteria when looking at the specific preservative requirement. The preservative requirement in this Nordic Ecolabel document can be found under O14.

The exemption regarding anti-corrosion pigments has been removed, since anti-corrosion paints are not included in this product group.

Optical brighteners are not considered to be used in the ecolabelled products and the exemption has therefore been removed from this criteria document.

The exemption for cobalt driers is not included in this criteria version, since cobalt driers also are classified as CMR, see more regarding this under O10.

The limits of the allowed amounts of environmentally hazardous substances in the exemptions above has been set to the lowest limit in the EU Ecolabel for each specific substance group. This means that when the EU Ecolabel has two different limits for a substance group the Nordic Ecolabel has chosen the most restrictive one. The EU Ecolabel has an exemption for surfactants up to 1% for white and light coloured paints and up to 3% for others, the Nordic Ecolabel limit is set at the lowest level of the two.

An indoor product with the EU Ecolabel will have to send in information of fulfilment of this requirement due to the differences in exemptions and the definition of constituent substances.

O12 Restrictions to classification of the final product (EU Ecolabel 5a)

Requirement:

> The final product shall not be classified and labelled as being acutely toxic, a specific target organ toxicant, a respiratory or skin sensitizer, or carcinogenic, mutagenic or toxic for reproduction hazardous to the environment according to table 8 below.
>
> Applicants are required to calculate the hazard classification of the final paint product in order to demonstrate compliance. This shall be in accordance with the methodologies for the classification of mixtures contained in Regulation (EC) No 1272/2008 and all amending legislation.

The most recent classification rules adopted by the Union shall take precedence over the listed hazard classifications and risk phrases. In accordance with Article 15 of Regulation (EC) No 1272/2008 applicants shall therefore ensure that classifications are based on the most recent rules on the classification, labelling and packaging of substances and mixtures.

Table 8. Classification of the product

Classification according to CLP Regulation 1272/2008	
Hazard class and category	**H-phrase**
Toxic to aquatic organisms Category acute 1 Chronic 1-4	H400, H410, H411, H412, H413
Acute toxicity Category 1-4	H300, H310, H330, H301, H311, H331, H302, H312, H332, H370, H372
Specific target organ toxicity (STOT) with single and repeated exposure STOT SE category 1-2 STOT RE category 1-2	H370, H371, H372, H373
Airway or skin sensitising Category 1	H334, H317 and the product must not contain constituent substances in quantities that result in the label "Contains (name of sensitising substance), may cause an allergic reaction"*
Skin corrosion or irritation Skin corr. 1A/1B/C	H314
Carcinogenic Carc 1A/1B/2	H350, H350i, H351
Mutagenic Mut 1A/B/2	H340, H341
Toxic for reproduction Repr 1A/1B/2	H360, H361, H362

Exemption

- *In-can preservatives causing the risk phrase "Contains (name of sensitising substance), may cause an allergic reaction" to appear on the package of the final paint or varnish are exempted. See also O14 concerning limits for preservatives.

Note that responsibility for correct classification lies with the manufacturer.

☒ Safety data sheet in accordance with Annex II of REACH (Directive 1907/2006) for each product in the application.

☒ Documentation of content of above exemption for preservatives as a declaration of the concentration of the preservative and if it has been added as an in-can or film-preservative.

Background to the requirement

Nordic Ecolabelling strives to ensure that the health and environmental impact of the products are as low as possible. The requirements therefore make it clear that products classified as toxic, harmful to health or environment, sensitising, carcinogenic, mutagenic or toxic for reproduction cannot be ecolabelled.

Classifications are to be given in accordance only with the CLP Regulation EC (No) 1272/2008 since classification according to the Dangerous Preparations Directive only can be used until 31 May 2015 and therefore will not be relevant when this criteria document has been published.

*This requirement excludes products that are classified as sensitising with the following classification:

- Resp sens category 1; H334
- Skin sens category 1; H317

and/or

- Products that contain substances in quantities that result in being labelled "Contains (name of sensitising substance), may cause an allergic reaction."

This last point is new compared with the previous version of the criteria.

The Nordic Ecolabelling requirement excludes products classified as environmentally hazardous category 1-4 which is a stricter requirement than the EU Ecolabel's requirement.

Exemptions
The criteria document exempts in-can preservatives such as for example isothiazolinones, which are classified as H317 or require the warning phrase "Contains xxx, may cause an allergic reaction", as these substances are considered necessary preservatives for this type of product.

According to ATP2 (2nd Adaption to Technical Process) of CLP all sensitising substances with a specific concentration limit for classification has to put the risk phrase ("Contains (name of sensitising substance), may cause an allergic reaction") on the packaging from 1/10 of the classification limit. This means that for example the preservatives CMIT/MIT will cause the risk phrase on the final products from amounts ≥ 1.5 ppm and BIT in amounts ≥ 50 ppm. These levels are well below the amounts allowed in requirement O14.

Difference compared to the EU Ecolabel requirement 5a and the related exemptions
This requirement is a little bit different from the one in the EU Ecolabel, but covers more or less the same classifications. The EU Ecolabel has not stated which H-phrases that are limited by the requirement and has instead just written for example "acute toxicity". The Nordic Ecolabelling usually states all the H-phrases that are limited by each requirement and has therefore chosen to do so here. This requirement limits paints and varnishes classified as environmentally hazardous which also includes a restriction of paints classified with H412 and H413. The EU Ecolabel requirement seems to exclude only the old classifications such as R50, R50/53 and R51/53 from the old classification system, this would then correspond to classification with H400, H410 and H411. The Nordic Ecolabel requirement goes further than that. The Nordic Ecolabel has a similar requirement for outdoor paints and varnishes in the document chemical building products and considers it to be relevant to keep the same requirement for indoor paints.

The exemption concerning the warning phrase "Contains xxx, may cause an allergic reaction" has been added to this requirement as in the criteria document for chemical building products, since the limits for when this phrases needs to be placed on the packages has been changed with the update of CLP (see above). The EU Ecolabel does not state anything concerning this warning phrase.

A product with the EU Ecolabel will need to show fulfilment of this requirement when applying for the Nordic Ecolabel.

4.1.6 EU Ecolabel requirement 5

O13 Other substances excluded from use (EU Ecolabel 5b)

Requirement:

The constituent substances must not contain:

- Substances on the Candidate List for Substances of Very High Concern*.
- Substances evaluated by EU as PBT (Persistent, bioaccumulable and toxic) or vPvB (very persistent and very bioaccumulable), in accordance with the criteria in appendix XIII in REACH.
- Substances considered being potential endocrine disruptors in category 1 or 2 on the EU's priority list of substances that are to be investigated further for endocrine disruptive effects. See link: http://ec.europa.eu/environment/chemicals/endocrine/strategy/being_en.htm

** Identified according to Article 59(1) of the REACH Regulation which establishes the Candidate List for Substances of Very High Concern. The Candidate List can be found on the ECHA website at: http://echa.europa.eu/candidate-list-table*

☒ Declaration in line with Appendices 1 and 2 from the manufacturer of the product and the manufacturer of each raw material.

Background to the requirement

This requirement excludes Substances on the candidate list, PBT, vPvB and endocrine disrupters. The reason behind each one of them can be found below.

Substances of Very High Concern and the Candidate List

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

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

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

"Persistent, bioaccumulative and toxic (PBT) organic substances" and "Very persistent and very bioaccumulative (vPvB) organic substances" are substances whose inherent properties are not desirable in Nordic Ecolabelled chemical building products. PBT and vPvB are defined in Annex XIII of REACH (Regulation (EC) No 1907/2006).

Substances "deferred" or substances "under evaluation" are assumed not to have PBT or vPvB properties.

Potential endocrine disruptors are substances that may affect the hormone balance in humans and animals. Hormones control a number of vital processes in the body and are particularly important for development and growth in humans, animals and plants. Changes in the hormone balance can have unwanted effects and here there is an extra focus on hormones that affect sexual development and reproduction. Several studies have shown effects on animals that have been traced to changes in hormone balance. Emissions to the

aquatic environment are one of the greatest sources for the spread of endocrine disruptors . Nordic Ecolabelling bans the use of substances that are considered to be potential endocrine disruptors, category 1 (there is evidence of a change in endocrine activity in at least one animal species) or category 2 (there is evidence of biological activity related to changes in hormone balance), in line with the EU's original report on "Endocrine disruptors" or later studies.

This entails a ban on substances such as bisphenol A, several phthalates and certain alkylphenols.

Difference compared to the EU Ecolabel requirement 5b

The EU Ecolabel states that substances with the following properties cannot be used:

- Meet the criteria in Article 57 of the REACH Regulation;
- Have been identified according to the procedure described in Article 59(1) of the REACH Regulation which establishes the Candidate List for Substances of Very High Concern.

Article 57 includes substances listed as follows:

- Cancerogenic (cat 1-2), mutagenic (cat 1-2) or toxic for reproduction (cat 1-2) according to Directive 67/548/EEC
- Substances which are persistent, bioaccumulative and toxic in accordance with the criteria set out in Annex XIII of this Regulation
- Substances which are very persistent and very bioaccumulative in accordance with the criteria set out in Annex XIII of this Regulation
- Substances such as those having endocrine disrupting properties

This requirement has been written differently to make it easier for the applicant and the competent body handling the application. The requirement covers the same areas as the EU Ecolabel requirement, but is stricter since the Nordic Ecolabel has the definition at the start of the document regarding constituent substances and impurities.

In the Nordic Ecolabel's requirement all substances actively added are included in the calculations and the limit for when something can be considered as an impurity is 100ppm, whereas the EU requirement has this statement added to this specific requirement: "No derogation shall be given concerning substances that meet one or both of these conditions, and which are present in a paint or varnish product at concentrations higher than 0.10% (weight w/w)."

This means that information needs to be sent in for indoor paints and varnishes with the EU Ecolabel.

O14 Preservatives (EU Ecolabel 5c i-iv, appendix 1)

Requirement:

a) Only preservatives authorized by Directive 98/8/EC of the European Parliament and of the Council and Regulation (EU) No 528/2012 can be used.

b) No preservatives added to the product or its ingredients may be bioaccumulative.

The bioaccumulative properties of a substance can be tested on fish in line with OECD test method 305 A-E. If the bioconcentration factor (BCF) is ≥ 100, the substance is considered to be bioaccumulative. If there is no BCF for a substance, that substance is considered to be bioaccumulative if logKow ≥ 3.2 under the OECD's guidelines 107 or 117 or equivalent.

Note that if there is a measured BCF value and a logKow value, it is always the highest measured BCF that is used, rather than the logKow value.

c) The amounts of preservatives added to the products must not exceed the limit values in Table 9a and 9b below:

Table 9a Concentration limits for preservatives

Preservation type	Concentration limit
Preservatives for high humidity areas*	0,10% w/w
Preservatives in colourants/tinting pastes dispensed from tinting machines	0,10% w/w
In-can preservatives totally (paints, varnishes, base paints etc.)	0,060% w/w

** High humidity areas are here described as kitchens, bathrooms and other wet rooms.*

Table 9b Specific restrictions on isothiazolinones, zinc pyrithione and N-(3-aminopropyl)-N-dodecylpropane-1,3-diamine

Preservative	Concentration limit
Total amounts of isothiazolinones	0,0400% w/w
2-Methyl-2H-isothiazol-3-one	0,0100% w/w
1,2-Benzisothiazol-2(2H)-one	0,0400% w/w
2-Octyl-2H-Isothiazol-3-one	0,0400% w/w
5-chloro-2-methyl-4-isothiazolin-3-one/2-methyl-4-isothiazolin-3-one	0,0015% w/w
Zinc pyrithione	0,0500% w/w
N-(3-aminopropyl)-N-dodecylpropane-1,3-diamine	0,0500% w/w

Note that Dithio-2,2'-bis-benzmethylamide (DTBMA) is to be included in the total amount of isothiazolinones.

✉ Documentation that none of the added preservatives are bioaccumulative, cf. OECD test method no. 305 A-E or 107, 117.

✉ Declaration in line with Appendices 1 and 2 from the manufacturer of the product and the manufacturer of each raw material.

✉ Calculation clearly showing that the requirement concerning preservatives is fulfilled.

Background to the requirement

Preservatives are added to liquid products to prevent bacterial growth in the products, in-can preservatives. The composition of the product may also affect the need for preservatives. In some products preservatives are also added as film preservatives, i.e. to avoid attacks of algae, mould and similar on the film.

Levels of preservatives such as MIT (methyl-isothiazolinone) and other isothiazolinones are largely driven by the kind of preservation the unique raw materials in the product require. In

this product group, the preservation of binders has proven to have a crucial effect on the concentration of preservatives in the end product. Quantities of preservatives depend on the type of binder that is needed for the specific product.

Preservatives are generally toxic to aquatic organisms and can cause hypersensitivity and allergies. Preservatives may be used in the products and in constituent substances only if they are not bioaccumulative.

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

Substances are considered to be bioaccumulative (according to GHS) if:

- logKow ≥ 4.0, in line with the OECD's guidelines 107 or 117 or equivalent.
- If the substance has a biological concentration factor (BCF) ≥ 500, when tested according to OECD 305 A-E

To keep this criteria document harmonized with the EU Ecolabel, the Nordic Ecolabelling has however decided to keep the logKow ≥ 3,2 and the BCF ≥ 100. In most of the other Nordic Ecolabelling documents the limits are according to the GHS, so this may be revised in the next version of the criteria document.

The amounts of preservatives needed in colourants to be used in tinting machines tend to be higher than in the base paints etc. as these are stored under specific conditions in tinting machines. The EU Ecolabel has a limit at 0.20% for in can preservatives but the Nordic Ecolabel considers 0.10% to be a more relevant limit.

High humidity areas are here considered areas such as kitchens, bathroom, laundry rooms and other wet rooms where the humidity is a lot higher on a regular basis than in the rest of the indoor environment. The limit for preservatives is higher for high humidity areas since the need of having preservatives in paints for such application is often higher than other indoor areas.

All preservatives used in the products need to be authorized by Directive 98/8/EC of the European Parliament and of the Council and Regulation (EU) No 528/2012. To make sure that this is fulfilled this has been added as point a in the requirement and added to the appendix 1 in the criteria document.

Isothiazolinone compounds
Isothiazolinones are used as a preservative in many products, where they act as fungicides, biocides and algal growth inhibitors. They are, however, toxic to aquatic organisms and they have varying degrees of sensitising effect. Nordic Ecolabelling wishes to limit the use of isothiazolinones on the grounds of their environmental and health profile. It has earlier been common to preserve chemical building products using formaldehyde and/or formaldehyde-releasing substances. From this perspective, MIT (2-Methyl-2H-isothiazol-3-one) and other isothiazolinones are more part of the solution than they are a problem, since the sensitising risks of isothiazolinones are considerably less than the risks of using carcinogenic formaldehyde and formaldehyde-releasing substances. However have recent evidence shown

that MI (methylisothiazolinone) can be airborne allergenic[27,28] even in small amounts. It is therefore important to limit the amount of MI as much as possible.

MIT does not have a harmonised classification but is self-classified by the industry. The majority of the companies in EU have classified MIT as Skin sens 1 with H317. Harmonised product classification is expected (ECHA website, Registry of Intention of classification and labelling). If MIT is present in a mixture in concentrations between 0.1% up to 1% the final product is required to be labelled with "Contains isothiazolinone, may cause an allergic reaction".

There is an ongoing discussion on preservatives with focus on MIT. Many of the discussions refer to the risks of allergies with MIT. Nordic Ecolabelling has in this version chosen to limit all isothiazolinones as a group, and not just MIT, since they are known to have sensitising effects and that isothiazolinones often occur in combinations in the products. In addition to this there is also a specific limit to MIT, BIT (1,2-Benzisothiazol-2(2H)-one) and OIT (2-Octyl-2H-Isothiazol-3-one). These specific isothiazolinones have been included here to align with the EU Ecolabel and to maintain a low amount of each one of them in the final product.

The requirement limits on isothiazolinones are set stricter for the Nordic Ecolabel than for the EU Ecolabel after discussions with producers of indoor paints and what amounts they consider to be reasonable for production of well performing products.

Dithio-2,2'-bis-benzmethylamide (DTBMA) shall be included in calculations of the total amount of isothiazolinones, since it has been stated that the biocide active component in DTBMA is 2-Methyl-1, 2-Benzisothiazol-3(2H)-one (Methyl-BIT or simply MBIT, CAS N° 2527-66-4)[29].

The limits for Zinc pyrithione and N-(3-aminopropyl)-N-dodecylpropane-1,3-diamine are kept at the same level as in the EU Ecolabel.

The requirement set by the Nordic Ecolabel is stricter for isothiazolinones than in the previous version of the EU Ecolabel requirement. The new requirement here is set to a total of 400ppm isothiazolinonens, in the previous version that limit was 500ppm.

The limits for MIT, BIT and OIT are new in this version.

Difference compared to the EU Ecolabel requirement 5c i-iv, appendix 1 and the related exemptions

The requirement is very similar to the EU Ecolabel requirement. The limits for isothiazolinones are however made a bit more stringent. The EU Ecolabel limit for the total amount of isothiazolinones is 0.050% and the limit in this document is set to 0.040%. This stricter limit has been set in combinations with stricter limit on specific isothiazolinones (MIT, BIT and OIT The same isothizolinones have limits in the EU Ecolabel as well, but the Nordic Ecolabelling limits are tighter than the EU Ecolabel, ie 100ppm for MIT compared to 200ppm in the EU Ecolabel and the other two have been limited to 400ppm each compared

[27] National Allergy Research Centre (Videncenter for Allergi): http://www.videncenterforallergi.dk/?site=1&side=7&id=125&pub=606
[28] DR (Danish Broadcasting Corporation): http://www.dr.dk/Nyheder/Indland/2014/05/20/104956.htm
[29] Dow information on DTBMA http://www.dow.com/microbial/pdfs/mbit/European_Coatings_Congress_Nuremberg_New_solutions_for_in-can_preservation_in_the_making_for_Europe.pdf (visited 2014-10-09)

to 500ppm each in the EU Ecolabel. The new limits have been set after discussions with paint producers.

The requirement has also been updated with an additional explanation stating that if both a measured BCF and a logKow-value are available the highest BCF-value is to be used. This is a standard writing in the Nordic Ecolabelling's requirements.

A stricter limit has been set for colourants in this requirement compared to the EU Ecolabel where the limit is 0.20% in-can preservative compared to 0.10% in-can preservatives here.

An additional text stating that DTBMA is to be included in the total amount of isothiazolinones has been added to highlight that both to applicants and to the people handling the application. This is not stated in the EU Ecolabel.

A product with the EU Ecolabel has to show fulfilment of the stricter limits of isothiazolinones and also a stricter limit on colourants/tinting pastes dispensed from tinting machines, but the documentation is the same as in the EU Ecolabel.

O15 Alkylphenolethoxylates (APEOs) surfactants (EU Ecolabel Appendix 4b)

Requirement:

Alkylphenolethoxylates (APEOs) and their derivatives shall not be present in the product or in its constituent substances.

☒ Declaration in line with Appendices 1 and 2 from the manufacturer of the product and the manufacturer of each raw material.

Background to this requirement

APEOs are non-ionic surfactants, which have an emulsifying and dispersing effect when processing paints, and in binders, dispersion aids, thickeners, driers, anti-foam agents and pigment pastes[30].

APEOs are produced in large volumes, with uses that lead to widespread release to the aquatic environment. They are highly toxic to aquatic organisms, and in the environment degrade to more environmentally persistent compounds. These chemicals have been detected in human breast milk, blood, and urine and are associated with reproductive and developmental effects in rodents[31].

Compared with the previous criteria the requirement is the same.

Difference compared to the EU Ecolabel requirement Appendix 4b

Requirement is identical to the EU Ecolabel requirement Appendix 4b, besides the fact that the definition of constituent substances differ between the Nordic Ecolabel and the EU Ecolabel. The EU Ecolabel has a different set of appendices than this Nordic Ecolabel document.

A product with an EU Ecolabel will need to send in a declaration regarding this requirement to show fulfilment.

O16 Perfluorinated substances and polyperfluorinated alkylated substances (EU Ecolabel Appendix 4c)

[30] Paints and how they affect the environment, Tommi Nurmi and Konsta Kanniainen, 2008
[31] http://www.epa.gov/oppt/existingchemicals/pubs/actionplans/RIN2070-ZA09_NP-NPEs%20Action%20Plan_Final_2010-08-09.pdf

Requirement:

Perfluorinated substances and polyperfluorinated alkylated substances (PFAS) including PFOA and PFOS are not allowed in the product or in its constituent substances.

Note the national legislations concerning PFOA in the Nordic countries. In Norway PFOA is regulated in «Forskrift om begrensning i bruk av helse- og miljøfarlige kjemikalier og andre produkter (produktforskriften)», §2-32.Declaration of non-use from applicant and raw material suppliers.

☒ Declaration in line with Appendices 1 and 2 from the manufacturer of the product and the manufacturer of each raw material.

Background to this requirement

Perfluorinated and polyfluorinated alkylated substances (PFAS) are a group of substances with undesirable properties. Fluorinated surfactants and other similar substances with fluorinated carbon chains longer than six decompose to the very stable forms PFOS and PFOA (perfluorooctanoic acid) and similar compounds. The substances are persistent and are readily absorbed by the body. The substances in this substance group affect the biological processes in the body and are suspected to be endocrine disruptive[32,33]. PFOA and PFOS compounds are a collection of substances that all potentially decompose to perfluorooctane sulphonate, which is persistent and can be found in the blood of humans and animals.

Compared with the previous criteria the requirement is changed. In the previous criteria halogenated organic solvents with classifications R26/27, R45, R48/20/22, R50, R51, R52, R53, R50/53, R51/53, R52/53 or R59 was not permitted. In this criteria it is specified that perfluorinated substances and polyperfluorinated alkylated substances (PFAS) are not permitted.

Difference compared to the EU Ecolabel requirement Appendix 4c

Nordic Ecolabelling wants to exclude all perfluorinated and polyfluorinated alkylated substances (PFAS) and the requriment therefor covers more substances than in the EU Ecolabel where it is only including surfactants. The definition of constituent substances also makes the requirements different. This means that a product with the EU Ecolabel will need to show fulfilment of this requirement.

O17 Metals and their compounds (EU Ecolabel Appendix 5b)

Requirement:

The following metals or metal compounds must not be present in the product or in its constituent substances:

- Cadmium
- Lead
- Chromium VI
- Mercury
- Arsenic
- Barium
- Selenium
- Antimony
- Cobalt

[32] Hazardous Substances Series, Perfluorooctane Sulphonate (PFOS), OSPAR Commission, 2005 (2006 Update).
[33] Miljøprojekt nr. 1013, 2005, More Environmentally Friendly Alternatives to PFOScompounds and PFOA, Danish Ministry of the Environment, 2005.

Traces from impurities can be included up to 100 ppm (100 mg/kg, 0.010% w/w) per single metal in the raw material and up to 100 ppm in the final product.

Exemption:

- Metals in pigments shall fulfil requirement O18.

✉ Declaration in line with Appendices 1 and 2 from the manufacturer of the product and the manufacturer of each raw material.

Background to this requirement

Mercury, cadmium, arsenic and lead are toxic to the human nervous system and kidneys, amongst other things, and the metals can accumulate in living organisms[34].

Chromium VI is classified as: very toxic, CMR and harmful to the environment.

Cobalt compounds can be classified as: Respiratory and skin sensitizing (H317, H334), CMR (H350, H361) and harmful to the environment (H413).

The metals and their compounds – cadmium, lead, chromiumVI, mercury, arsenic, barium (with the exception of barium sulphate, and other equally insoluble barium compounds), selenium, antimony and cobalt – must therefore not be included in the product or in its constituent substances. It is, however, accepted that constituent substances may contain traces of the substances in the form of impurities. Trace amounts of each metal must not exceed 100 ppm (100 mg/kg, 0.010% w/w) in the raw material. In the final product the maximum is also 100 ppm of each of the listed metals to ensure that the amount in the final product is limited. This means that the requirement for traces in the raw materials is stricter than the general limit for impurities specified in section 4 "Definition on what is meant by ingoing substances". The requirement has been set by the Nordic Ecolabel to steer toward natural raw materials with lower amounts of impurities.

Barium sulphate (and other equally insoluble barium compounds) are used as filler in paints and are exempted from this requirement since there are not many other alternatives available with the same function.

Note that selenium is not a metal, but it interacts with many metals and behaves in the same way in the environment, and has therefore been included in the requirement. Arsenic is included in the requirement due to its status as a semi-metal.

Compared with the previous criteria the requirement is changed a little regarding cobalt and metals in pigments.

In the previous criteria there was an exception for cobalt in driers. This exceptions is not in this criteria.

In the previous criteria there was no exception for metals in pigments, except cobalt. In this criteria metals in pigments are accepted if they fulfil requirement O18.

Difference compared to the EU Ecolabel requirement Appendix 5b

The requirement is different to the EU Ecolabel in that the EU Ecolabel requirements allow up to 100 ppm per listed metal, whereas this requirement only allows the listed metals if they are in the product as traces from impurities in the raw material.

[34] Ahlstedt, 1999

The EU Ecolabel has an exemption for cobalt in driers. Cobalt driers are often classified as H361 and there is therefore no exemptions in this requirements as it does not fulfil requirement O10. There are alternative driers on the market, for example iron driers.This requirement differs from the EU Ecolabel requirement on the way it is written concerning metal content and also the fact that the definition of constituent substances differs, which means that a product with the EU Ecolabel will need to send in updated information to show fulfilment of this requirement.

O18 Pigments (EU Ecolabel Appendix 5f)

Requirement:

Pigments containing the metals cadmium, lead, chromium VI, mercury, arsenic, barium, selenium or antimony shall only be used where laboratory testing of the pigment shows that the metal chromophore is bonded within a crystal lattice and is insoluble.

Exemptions
The following metal containing pigments are exempted for use without the need for testing:

- Barium sulphate
- Antimony nickel within an insoluble TiO_2 lattice

☒ Test results demonstrating that the pigment chromophore is bonded within a crystal lattice and is insoluble. Test method: DIN 53770-1 or equivalent.

☒ Declaration in line with Appendices 1 and 2 from the manufacturer of the product and the manufacturer of each raw material.

Background to this requirement
Regarding background for restrictions of cadmium, lead, chromium VI, mercury, arsenic, barium, selenium or antimony see background text under O17.

Pigments containing the listed metals shall only be used where laboratory testing of the pigment shows that the metal chromophore is bonded within a crystal lattice and is insoluble and the metal is therefor of limited risk. The test method used was DIN 53770-1 Pigments and extenders - Determination of matter soluble in hydrochloric acid - Part 1: Preparation of acid extracts. This could therefore be suitable with the potential to also specify testing under alkaline conditions.

Barium sulphate is derogated for use without the need for testing, because this substance is not classified and test results demonstrate that is relatively insoluble under acid, neutral and alkaline conditions.

Antimony nickel within an insoluble TiO_2 lattice is accepted for use without the need for testing on the basis that they are essentially non-toxic.

Compared with the previous criteria the requirement is changed. In the previous criteria only cobalt in pigments was allowed. Now other metals in pigments are allowed if they fulfil requirement O18.

Difference compared to the EU Ecolabel requirement Appendix 5f
Compared to the EU Ecolabel requirement Appendix 5f, this requirement has been modified by:

- Specifying that the requirement is only regarding the metals listed in requirement O17, ie Cadmium, lead, chromium VI, mercury, arsenic, barium, selenium and antimony.

- Cobalt in pigments are not exempted it is therefore no exception for use without the need for testing for Cobalt aluminate blue spinel and Cobalt chromite blue-green spinel. There is no exception for cobalt in this criteria as some cobalt compounds are classified as CMR and cobalt in pigments is primarily used in outdoor paint.

These points in combination with the differences between the definition of constituent substances between the EU Ecolabel and the Nordic Ecolabel makes it necessary to update information on this requirement for products already labelled with the EU Ecolabel.

O19 Phthalates (EU Ecolabel Appendix 6b)

Requirement:

The following phthalates must not be present in the product or in its constituent substances:

- DEHP (Bis-(2-ethylhexyl)-phthalate)
- BBP (Butylbenzylphthalate)
- DBP (Dibutylphthalate)
- DMEP (Bis2-methoxyethyl) phthalate
- DIBP (Diisobutylphthalate)
- DIHP (Di-C6-8-branched alkyphthalates)
- DHNUP (Di-C7-11-branched alkylphthalates)
- DHP (Di-n-hexylphthalate)
- DNOP (di-n-octylphthalate)
- DINP (diisononylphthalate),
- DIDP(diisodecylphthalate)
- DPP (dipentylphtalate)
- DiPP (diisopentylphtalate)
- N-pentyl-isopentyl phatlate
- Bis(2-methoxyethyl)phtalate

☒ Declaration in line with Appendices 1 and 2 from the manufacturer of the product and the manufacturer of each raw material.

Background to this requirement

Phthalates are used as plasticisers in PVC giving the plastic desired physical properties. They can also be used in paints to alter the overall finish of the paint. The requirement therefore covers the listed phthalates no matter which function they have.

Many phthalates have negative effects on health and the environment. Some phthalates are inscribed on the EU's priority list of substances that should be investigated more closely for endocrine disruption – and some have already been identified as endocrine disruptors. Phthalates have also received a great deal of coverage in the media, due to their properties. Phthalates are for several reasons not desirable in ecolabelled products. Some phthalates can be found on the Danish "Listen over Uønskede Stoffer" (List of undesirable substances). These are Diethylhexyl phthalate (DEHP), dibutyl phthalate (DBP), butyl benzyl phthalate (BBP) and dimethoxyethyl phthalate (DMEP).

DEHP, DBP and BBP are also inscribed on the EU's priority list of substances that should be investigated more closely for endocrine disruption. Some phthalate compounds are also listed on the Candidate List of Substances of Very High Concern, these are: DEHP (bis-(2-ethylhexyl)phtalate), DBP (dibutylphtalate), BBP (benzylbutylphtalate), DIBP (diisobutylphtalate), DPP (dipentylphtalate), DiPP (diisopentylphtalate), N-pentyl-isopentyl phatlate and bis(2-methoxyethyl)phtalate. All are on the list due to their classification a toxic for reproduction.

DPP (dipentylphtalate), DiPP (diisopentylphtalate), N-pentyl-isopentyl phatlate and bis(2-methoxyethyl)phtalate is added to the EU Ecolabel list of excluded phthalates even though they are also restricted in criterion 5 in the EU Ecolabel criteria regarding Substances of Very High Concern. This is because Nordic Ecolabel want to clarify that no phthalates on the Candidate List is allow no matter in what quantity.

The limitation of the use of DEHP, DBP, BBP, DINP (diisononylphthalate), DIDP (diisodecylphthalate) and DNOP (di-n-octylphthalate) are also regulated by REACH Appendix XVII.

The DINP (diisononylphthalate), DIDP (diisodecylphthalate) and DNOP (di-n-octylphthalate) are added to the EU Ecolabel list of phthalates not allowed because they are regulated by REACH Appendix XVII and the EU Commissions conclusions from 15th of January 2014 regarding review of status on REACH Appendix XVII[35]. The conclusion in the EU Commissions review of status on REACH Appendix XVII is that DINP, DIDP and DNOP shall remain their status: Toys and childcare articles containing these phthalates in a concentration higher than 0.1% by mass of the plasticised material shall not be placed on the market.

With this background DINP, DIDP and DNOP are added to the list of excluded phthalates in this requirement.

DIHP is in ECHA's register listed to be classified as CMR substances and can be added to the list of Substances for Very High Concern. DHP is listed in ECHA as an "intermediate" which can be classified as for example aquatic toxicity with H412. DHNUP can be found in a report from ECHA[36], where it is noted to have properties such as toxic to reproduction category 1B, 2 and 3 and therefore evaluated as a no desirable phthalate in Nordic Ecolabelling.

Compared with the previous criteria the requirement is changed a little. In the previous criteria phthalates with specified classifications and DNOP, DINP and DIDP was not allowed. In this criteria the list of specified phthalates not allowed is longer and no specified classifications is mentioned, but is covered by requirement O9, O10 and O11.

Difference compared to the EU Ecolabel requirement Appendix 6b
Compared to the EU Ecolabel requirement Appendix 6b, this requirement has been modified by:

- The requirement covers phthalates with all functions, not only with the function as plasticisers.

[35] http://ec.europa.eu/enterprise/sectors/chemicals/files/reach/entry-52_en.pdf
[36] ECHAs rapport om DHNUP:
http://echa.europa.eu/documents/10162/13638/supdoc_dhnup_c7_11_20110526_en.pdf

- The formulation "intentionally added" and the concentration limit is removed because definition of constituent substances (se section 4 in this document) applies in this criteria.
- The phthalates DINP (diisononylphthalate), DIDP (diisodecylphthalate), DNOP (di-n-octylphthalate), DPP (dipentylphtalate), DiPP (diisopentylphtalate), N-pentyl-isopentyl phatlate and bis(2-methoxyethyl)phtalate is added to the list of phthalates not allowed.
- There is a different set of appendices.

The differences between the EU Ecolabel and the Nordic Ecolabel requirements on phthalates make it necessary for products with the EU Ecolabel to show fulfilment of this requirement.

O20 Formaldehyde (EU Ecolabel Appendix 7a)

Requirement:

Free formaldehyde shall not be intentionally added to the final product.

Formaldehyde donors and residual levels of formaldehyde from polymer dispersions (binders) is allowed, as long as the content of free formaldehyde do not exceeds 10ppm (0,0010%) in the final product.

The final product shall be tested in order to determine its free formaldehyde content. The sampling requirements for testing shall reflect the product range.

The free formaldehyde content shall be determined for the white base or transparent tinting base predicted to contain the highest theoretical amount of formaldehyde. The content of the colour tint which is predicted to contain the highest theoretical amount of formaldehyde shall also be determined. When colour tint is used the limit values applies for the base with the colour tint with highest theoretical amount of formaldehyde.

☒ Declaration in line with Appendices 1 and 2 from the manufacturer of the product and the manufacturer of each raw material.

☒ Determination of the in-can formaldehyde concentration by means of analysis using VdL-RL 03 or high-performance liquid chromatography (HPLC).

☒ The test laboratory must fulfil the requirements in appendix 4.

Background to this requirement

Formaldehyde is a toxic and allergenic substance (H317/Xi with R43) that has carcinogenic effects (H351/R40) and should therefore be avoided as far as possible.

The main comments received during the EU Ecolabel revision process related to the potential for the free formaldehyde content of the paint product to be higher than 10ppm if preservatives or polymer binders that are formaldehyde donors are used. Evidence was submitted of the range of preservatives that this encompasses[37] and it was also noted that in many cases this group of preservatives represents an important alternative to isothiazolinones, including Bronopol-2-bromo-2-nitropropane 1,3 diol (52-51-7) and Dodecyldipropylene triamine (BDA) (2372-82-9).

Polymer dispersions (binders) can have residual concentration of formaldehyde. Therefore residual levels of formaldehyde from polymer dispersions (binders) is allowed, as long as the content of free formaldehyde do not exceeds 10ppm in the final product. The testing method

[37] de Groot A C, Flyvholm M, Lensen G, Menn´e T and P Coenraads, Formaldehyde-releasers: relationship to formaldehyde contact allergy. Contact allergy to formaldehyde and inventory of formaldehyde-releasers, Contact Dermatitis 2009: 61: 63–85, John Wiley & Son

also raised significant points of discussion in the EU Ecolabel criteria work. The VdL-RL 03 method was highlighted as not being accurate enough at low concentrations. This is because it picks up other aldehydes that may be present as residuals from polymers, which can then indicate a much higher, and therefore inaccurate concentration in the product. Alternative proposals were put forward based on the more accurate HPLC method.

To minimising the costs to applicants the free formaldehyde content shall be determined for the white base or transparent tinting base predicted to contain the highest theoretical amount of formaldehyde. The content of the colour tint which is predicted to contain the highest theoretical amount of formaldehyde (worst case) shall also be determined.

Compared to the previous criteria the limit of 10 ppm formaldehyde in the final products is the same.

Difference compared to the EU Ecolabel requirement Appendix 7a

Compared to the EU Ecolabel requirement Appendix 7a, this requirement has been modified by:

- The requirement is simplified by not having specified request regarding exceptions to use formaldehyde donors and have residual formaldehyde from polymers instead of preservatives.
- It is specified that the limit values applies for the base together with the colour tint with highest theoretical amount of formaldehyde.
- In all cases the limit in the final product is 10 ppm of free formaldehyde, whereas the EU Ecolabel has a limit of 10 ppm from formaldehyde donors and 100 ppm from polymer dispersions.

The differences between the EU Ecolabel and the Nordic Ecolabel on this requirement as described in combination with the definition of constituent substances makes it necessary for products with the EU Ecolabel to show fulfilment of this requirement.

O21 Monomers (EU Ecolabel Appendix 7c)

Requirement:

The total level of residual monomers in polymers may be no more than 100ppm (0.010% w/w), where they are very toxic, toxic or harmful to health and classified as Acute Tox. Cat. 1-4, classified in accordance with the prevailing CLP Regulation EC (No) 1272/2008.

The quantity of residual monomers is to be stated for newly produced polymers.

☒ The Declaration in line with Appendix 2 from the manufacturer of each raw material.

Background to this requirement

Residual monomers in polymers can cause negative health effects, for example due to the allergic and carcinogenic properties of the monomers. This risk is considered so great that it necessitates a separate requirement to limit the total level of residual monomers in the polymer. The requirement states that newly produced polymers may contain a maximum of 100 ppm residual monomers if these have properties that are very toxic, toxic or harmful to health, and are classified as Acute Tox. Cat. 1-4. Monomers tend to reduce over time, as many monomers are volatile compounds. The requirement relates to the newly produced polymer since it is important to reduce the impact at source and to this end it is most practical for the polymer manufacturer to perform the analysis.

This requirement is new and was not in the previous version of the criteria in the EU Ecolabel. The Nordic Ecolabel requirement has been aligned with the requirement in chemical building products.

Difference compared to the EU Ecolabel requirement appendix 7c
The EU Ecolabel requirement excludes all unreacted monomers (including acrylic acids) if the content exceeds 500ppm. The Nordic Ecolabel requirement focuses on the monomers that are classified as acute toxic. The limits differ as well, since the Nordic Ecolabel requirement's limit is set on each monomer in the polymer. The EU Ecolabel limit states that the limit is 500ppm totally for all rest monomers regardless of classification.

The differences between the EU Ecolabel requirement and this Nordic Ecolabel requirement makes it necessary for products with the EU Ecolabel to show fulfilment of this requirement.

O22 Volatile Aromatic Hydrocarbons - VAH (EU Ecolabel 5x, appendix 7d)

Requirement:

Volatile aromatic hydrocarbons (VAH) and halogenated solvents must not be actively added to the product, but may occur as residues or impurities to a maximum of 100 ppm (0.01% w/w, 100 mg/kg) in the final product.

Volatile aromatic hydrocarbons are volatile organic compounds where one or more benzene rings are contained within the molecule.

☒ Declaration in line with Appendices 1 and 2 from the manufacturer of the product and the manufacturer of each raw material.

☒ Specification of the level of volatile aromatic hydrocarbons in the product (based on data for all ingoing ingredients).

Background to this requirement
VAHs have specific environmental and human health impacts including DNA damage[38]. Exposure to these products should be minimised and any way to mandate a reduction in their use encouraged. The current criterion prevents their addition, with all stakeholders reporting their approval but allows their presence from impurities.

A minimum threshold rather than a complete prohibition is important because VAHs are widely used monomers in production of binders for paints, particularly styrene in vinyllic emulsions. Under normal chemical synthesis, total conversion of styrene into a polymer is impossible and trace amounts of monomer will be present in the final product.

Volatile aromatic compounds (VAH) must not be actively added to indoor paints, but may occur as a residue or impurity at a maximum of 100 ppm (0.01% w/w, 100 mg/kg). This applies to all volatile aromatic compounds, e.g. toluene.

Halogenated organic substances include many substances that are harmful to health and the environment, in that they are very toxic to aquatic organisms, carcinogenic or harmful to health in some other way. Halogenated organic substances persist in the environment, which means they pose a risk of having harmful effects. Halogenated solvents shall therefore not be present in Nordic Ecolabelled products.

The requirement has been made stricter than in the previous version of the EU Ecolabel requirements for indoor paints, where the maximum impurity amount was 0.1% which now

[38] Environ Health Perspect. 2002 June; 110(Suppl 3): 451–488.

has been changed to 0.010%. The limit of 0.010% is also the same as in the criteria document for chemical building products.

Difference compared to the EU Ecolabel requirement
The requirement is the same as the EU Ecolabel requirement in not allowing VAH that are deliberately added and allowing residues/impurities up to 100ppm. The requirement is just stated a little different to also be in line with the requirement in chemical building products.

The differences between the EU Ecolabel's and the Nordic Ecolabel's definitions of constituent substances makes it necessary for products with the EU Ecolabel to show fulfilment of this requirement.

O23 Nanoparticles (no equivalence in the EU Ecolabel document)

Requirement:

a) Nanoparticles (from nanomaterials*) are not permitted in the product.

The following are exempted from the requirement:

- Pigments**
- Naturally occurring inorganic fillers - this applies to fillers covered by appendix V point 7 in REACH.
- Synthetic amorphous silica***
- Polymer dispersions

b) The producer must declare any nanomaterials present in the product.

** The definition of nanomaterials follows the European Commission's definition from 18 October 2011 (2011/696/EU): "A nanomaterial is a natural, incidental or purposely manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for at least 50% of the particles in the number size distribution, one or more external dimensions is in the size range 1-100 nm."*

*** Nano-titanium dioxide (nano-TiO_2) is not considered a pigment and is therefore covered by this requirement.*

****This applies to traditional synthetic amorphous silica. Chemically modified colloidal silica can be included in the products as long as the silica particles form aggregates in the final product. The surface treatment of surface-treated nanoparticles must fulfil requirement O9-11 (classification of constituent chemical substances) and requirement O14 (Other substances excluded from use).*

☒ Declaration in line with Appendices 1 and 2 from the manufacturer of the product and the manufacturer of each raw material.

Background to this requirement
There remains a great deal of uncertainty about how nanoparticles affect health and the environment[39]. Based on the precautionary principle, Nordic Ecolabelling wishes to adopt a restrictive stance on the use of nanoparticles in Nordic Ecolabelled products.

The nano definition in chemical building products is according to the European Commission's definition of nanoparticles[40]: "A nanomaterial is a natural, incidental or purposely manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for at least 50% of the particles in the number size distribution, one or more external dimensions is in the size range 1-100 nm."

[39] European Council, Recommendation 2017 (2013), Provisional version, Nanotechnology: balancing benefits and risks to public health and the environment. Available at the address: http://assembly.coe.int/ASP/Doc/XrefViewPDF.asp?FileID=19730&Language=EN (21.05.13)
[40] COMMISSION RECOMMENDATION of 18 October 2011 on the definition of nanomaterial (2011/696/EU)

A summary of the Nordic Ecolabelling's evaluation of nanomaterials in chemical building products is presented below. For more detailed information about specific nanoparticles the Nordic Ecolabelling can be contacted.

In the product group of chemical building products it is hard to formulate requirements to the content of nano particles. Chemical building products consist of many ingoing ingredients and it is difficult to keep an overview of all ingoing components and the size distributions of them. Many of the traditional ingredients used in chemical building products consists of particles in nano size which are referred to as nano materials according to the EU commission's definition. There are also examples of traditional ingredients containing a small fraction of nanoparticles that are produced with an even larger fraction of ultrafine particles than earlier and that the particles in many cases have a surface treatment.

In chemical building products it may be useful to differentiate between traditional and new nanomaterials. The traditional nanomaterials are widely used in chemical building products have been in use for decades. In a memo from the EU commission from 2012[41] carbon black (furnace black, lamp black) and amorphous silica (SiO2) are given as examples of traditional nano materials. According to the memo, new nanomaterials include nano-titanium dioxide, nano-zinc oxide, fullerenes, carbon nanotubes and nanosilver. The new nanomaterials are used to give the products new properties depending on particle size.

The particles are more often surface treated to avoid agglomeration when added to a product. This can be found in the report "Nanoteknologiske overflader og nye kvalifikationskrav" (nanotechnological surfaces and new quality requirements) from 2010, Danish Technological Institute[42] (Teknologisk Institut in Denmark). According to the report it is necessary to modify the surfaces of the nanoparticles to stabilize and disperse the particles in water, polymer or other solutions. The stabilization and the dispersing of the nanoparticles is reached by different chemical modifications (particle coatings) which ranges from hydrocarbon compounds, alkoxysilane compounds, phosphate compounds, sulphonate compounds and quaternary ammonium compounds.

Nanoparticle exposure in paint products
Various studies have been conducted on nanoparticles in building products and their effects.

Many different risk assessments on nanoparticles in paint, varnishes and sealants have been done, by for example NANOKEM and NanoHouse. "NANOKEM - Nanopartikler i farve- og lakindustrien. Eksponering og toksiske egenskaber" is a Danish project supported by the "Arbejdsmiljøforskningsfonden"[43]. The timeframe for the project was 2007-2011, but there have also been articles published within this project in 2013. The project is mainly focusing on release of nanoparticles and health aspects when sanding paints and varnishes. NanoHouse collaborative project is financed by the EU Comission through the framework program FP7 "Activities towards the development of appropriate solutions for the use, recycling and/or final treatment of nanotechnology-based products"[44]. The project started in January 2010 and is now finalized (January 2014). This project has studied release of particles from nanoparticles after both mechanic wear and wear from weathering exposure.

[41] EUROPEAN COMMISSION, MEMO, Nanomaterials: Commission proposes case by case approach to assessment, Brussels, 3 October 2012
[42] H. V. Kristensen et al, Nanoteknologiske overflader og nye kvalifikationskrav, Teknologisk Institut, 2010
[43] Website for the project NanoKem: http://www.arbejdsmiljoforskning.dk/da/projekter/nanopartikler-i-farve-og-lakindustrien---nanokem (6/1-14)
[44] Website for the project NanoHouse: http://www-nanohouse.cea.fr/scripts/home/publigen/content/templates/show.asp?P=55&L=EN&ITEMID=2 (6/1-14)

Both the Nanokem and the NanoHouse projects have shown that wear of paints do not result in release of nanoparticles, but that the nanoparticles are locked in the free paint particles.

Another study of nano-TiO_2 as a coating on windows has shown that the photocatalytic effect is reduced and that TiO_2 is released from the surface into the environment when subjected to ageing tests (water, salt, UV light)[45]. It is, however, not entirely clear whether it is nano- TiO_2 that is released or larger TiO_2 particles. The study shows that the photocatalytic effect is reduced by ageing without being concluded with what the cause is.

A European Commission report from 2012[46] states that there is an ongoing debate on whether leaching from outdoor paints and/or the waste phase can lead to a significant quantity of nanoparticles.

Pigment
In this context, paint pigments are considered to be pigments produced as a more or less finely ground powder, where the powder particles comprise individual crystals up to aggregates of multiple crystals[47]. In paint it is generally more effective to use pigments with smaller particles than larger ones to achieve the same colour.

Inorganic pigments used in the paint industry that may occur in nano size include carbon black, iron oxides and titanium dioxide[48]. The carbon black used in paint is very finely ground and has a particle size of around 10-30 nm[49]. Iron oxide pigment may entirely comprise particles of nano size, or only a fraction of the particles may be nano.

A discussion with Kronos International[50], a producer of titanium dioxide (TiO_2), established that none of their regular grade TiO_2 counts as a nanomaterial under the EU's definition of nanomaterials (where at least 50% of the particles should be in nanosize to be considered a nanomaterial). According to Kronos, around 25% of the particles in their regular grades are less than 100 nm.

Nano-titanium dioxide is not considered a pigment, but a new nanomaterial that is added to give the products new properties, such as a self-cleaning effect in paints. These are not exempted from the requirement and therefore must not be used in Nordic Ecolabelled paint and varnishes.

There are many organic pigments that may comprise or contain fractions of nanoparticles. Examples of such pigments are: pigment yellow 1, 13 and 83, pigment orange 5 and 34 and pigment red 3[51].

Pigments are exempted from the requirements concerning nanoparticles, since they are necessary in chemical building products and no other suitable replacement is available to fulfil their function.

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[45] J. Olabarrieta et al, Aging of photocatalytic coatings under a water flow: Long run performance and TiO2 nanoparticles release, Applied Catalysis B: Environmental, Volumes 123-124, 23 July 2012
[46] European commission, COMMISSION STAFF WORKING PAPER, Types and uses of nanomaterials, including safety aspects, Accompanying […] {COM(2012) 572 final}, 3. Oktober 2012
[47] Coatings Handbook; Thomas Brock, Michael Groteklaes, Peter Mischke; 2000
[48] Industrial Organic Pigments; W. Herbst, K. Hunger; Third edition 2004; pp 120-124
[49] Coatings Handbook; Thomas Brock, Michael Groteklaes, Peter Mischke; 2000; p 128
[50] Email correspondence with the SHE Director at Kronos International, INC, 12.11.12
[51] W. Herbst, K. Hunger, Industrial Organic Pigments, Third edition 2004

Amorphous silica (SiO_2)
As mentioned above, synthetic amorphous silica is considered a traditional ingredient in paint. Since amorphous silica is a nanomaterial, under the European Commission definetion, synthetic amorphous silica is exempted from the requirement concerning nanomaterials.

It is possible for surface treated colloidal silica to be part of a paint as long as it forms aggregates in the final product. There are requirements on the surface treatment; O9-11 (Classification of ingoing chemical substances) and O13 (Other excluded substances). What is meant by aggregates is described in the EU Commission's recommendation to nano-definition (see reference above): "aggregate": a particle comprising of strongly bound or fused particles.

Consequences of the requirement
The requirement means that nanomaterials produced with the intention of containing nanoparticles in the final product must not be used. Examples of such nanoparticles are fullerenes, carbon nanotubes, nanosilver, nanogold and nanocopper. Traditional fillers on the other hand are permitted. Pigments are exempted from the requirement, such that TiO_2 may be used in pigment form.

It may be problematic to receive information regarding particle sizes for inorganic fillers from the raw material producers. Naturally occurring fillers from for example chalk, marble, dolomite and lime are exempted from registration according to appendix V, point 7 in REACH, see below, as long as these fillers only are physically processed (milled, sieved and so on) and not chemically modified. They are also exempted from registration in the Danish Environmental Protection Agency's draft to the Order on a register of mixtures and articles that contain nanomaterials and the requirement for producers and importers to report to the register52.

In REACH directive (1907/2006/EF53) it is in article 2, point 2, point 7b:
"The following shall be exempted from Titles II, V and VI:
(Title II covers the registration of substances, Title V covers downstream user and Title VI covers evaluation)
(b) substances covered by Annex V, as registration is deemed inappropriate or unnecessary for these substances and their exemption from these Titles does not prejudice the objectives of this Regulation;"

Annex V Exemptions from the obligation to register in accordance with article 2(7)(b):
"The following substances which occur in nature, if they are not chemically modified. Minerals, ores, ore concentrates, cement clinker, natural gas, liquefied petroleum gas, natural gas condensate, process gases and components thereof, crude oil, coal, coke."

An exemption has been added for inorganic fillers as long as they are covered by appendix V, point 7 in REACH.

Polymer dispersions have also been exempted from the requirement. In the follow up report from the EU Commission[54] to the second "Regulatory Review on Nanomaterials" from

[52] Link to Miljøstyrelsens consultation: http://hoeringsportalen.dk/Hearing/Details/16910 (visited 20/1-14)
[53] Link to REACH-directive: http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_396/l_39620061230en00010849.pdf
[54] European commission, COMMISSION STAFF WORKING PAPER, Types and uses of nanomaterials, including safety aspects, Accompanying the [..] second regulatory review of nanomaterials, SWD(2012) 288 final

2012[55] it is stated that the solid nanomaterials dispersed in a liquid phase (colloidal) shall be considered as nanomaterials according to the EU Commissions recommendation. Nano emulsions are however not covered by the definition. Polymers/monomers can occur in different phases and sizes and it is therefore chosen to explicitly mention that polymers are exempted from the definition in paint and varnishes.

A requirement has also been included regarding information of what nanomaterials that is included in the product. The purpose is to gain more knowledge about what types of nano-particles that is in the products.

Difference compared to the EU Ecolabel requirement
There is no equivalent requirement to this in the EU Ecolabel criteria document. The EU Ecolabel mentions under requirement 5a, ii at the bottom of the page that the producers need to identify nano particles, but there is no restriction of the nanoparticles.

4.1.7 EU Ecolabel requirement 6

O24 Consumer information (EU Ecolabel 6a-c)

Requirement:

1. **The following texts shall appear on or be attached to the packaging:**
   - 'Minimise paint wastage by estimating how much paint you will need'
   - 'Recover unused paint for re-use'.
   - 'Reuse of paint can effectively minimise the products' life cycle environmental impact'
2. **The following general information and advice shall be provided on or be attached to the packaging:**
   - How to estimate the amount of paint needed prior to purchase in order to minimise paint wastage and a recommended amount as a guideline (e.g. for 1 m^2 of wall x litres of paint is needed).
   - How to deal with the 'unused paint' together with, where available, a web-link or contact details from which the consumer can find more detailed information.
3. **The following advice and recommendations on how to handle the paint shall be provided on or be attached to the packaging:**
   - Safety measures for the user. This shall include basic recommendation on personal protective equipment that should be worn. It shall also include additional measures that should be taken when using spray equipment.
   - The use of cleaning equipment and appropriate waste management (in order to limit water and soil pollution). For example, text advising that unused paint requires specialist handling for safe environmental disposal and therefore it should not be thrown away with household or commercial waste (e.g. 'Do not put residual paint down the kitchen sink or toilet, or into a waste bin').
   - Storage of the paint in appropriate conditions (before and after opening), including, where appropriate, safety advice.

✉ The applicant shall declare that the product complies with the requirement and provide the artwork or samples of the user information and/or a link to a manufacturer's website containing this information as part of the application. The recommended amount of paint given as a guideline shall be provided.

[55] Communication from the commission to the European parliament, the council and the European economic and social committee, Second Regulatory Review on Nanomaterials, COM(2012) 572 final
Webpage for DaNa: http://nanopartikel.info/cms

Background to this requirement
The requirement is different than the previous version. The previous version had requirements mainly on how to use the product. How to clean equipment and what to do with paint rests. This new requirement has a focus on giving the consumer information on making sure that the consumer estimates usage, that they close the packaging correctly etc.

Difference compared to the EU Ecolabel requirement 6
This requirement is identical to the EU Ecolabel requirement.

O25 Take-back systems

Requirement text:

Relevant national regulations, legislation and agreements within the sector regarding take-back systems for products and packaging shall be complied with in all the Nordic countries where the Nordic Ecolabelled products are marketed. Relevant take-back systems are PYR (Fi), Grønt punkt (No) and FTi AB (Sw).

✉ Declaration from the applicant regarding affiliation to existing recycling/processing agreements.

Background to this requirement
The recovery of packaging is a key stage in the ecocycle of materials. Some Nordic countries have well developed take-back systems for used packaging, which Nordic Ecolabelling wishes to support in order to ensure greater recycling of packaging.

Relevant national regulations, legislation and agreements within the sector regarding take-back systems for products and packaging shall be complied with in all the Nordic countries where the Nordic Ecolabelled products are marketed. The relevant take-back systems in the Nordic region are:

- PYR in Finland
- Grønt punkt in Norway
- FTi AB (formerly REPA) in Sweden

Difference compared to the EU Ecolabel requirement
This requirement does not have an equivalence in the EU Ecolabel criteria, but since it is included in most Nordic Ecolabelling criteria it has been considered relevant to include it in this document as well.

This means that a product with the EU Ecolabel will need to send in information of fulfilment of this requirement.

4.2 Quality management, regulatory requirements and marketing (no equivalence in the EU Ecolabel criteria)

O26-O32

Nordic Ecolabelling sets these general requirements concerning quality management to ensure that the products always fulfil the set ecolabelling requirements. If the manufacturer has an environmental management system that is certified under ISO 14 001 or EMAS and the following procedures are applied, it is sufficient if the accredited auditor certifies compliance with the requirements.

The requirements below (O26-O32) do not have equivalent requirements in the EU Ecolabel, but they are standard requirements in the Nordic Ecolabelling and are therefore added here as well. This means that a product labelled with the EU Ecolabel will need to send in information showing fulfilment of these requirements.

O26 Laws and regulations

Requirement:

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

✉ Declaration from the licensee (signed application form) that the requirement is fulfilled, plus a report to the regulatory authority.

Background to this requirement

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

O27 Licence administrators

Requirement:

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

✉ Organisational chart showing who is responsible for the above.

Background to this requirement

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

O28 Documentation

Requirement:

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

🔎 On-site inspection.

Background to this requirement

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

O29 Product quality

Requirement:

The licensee must guarantee that the quality of the Nordic Ecolabelled product is maintained throughout the validity period of the licence.

☒ Procedures for collating and, where necessary, dealing with claims and complaints regarding the quality of the Nordic Ecolabelled product.

Background to this requirement

To ensure that the ecolabelled products maintain an even quality routines on dealing with complaints and claims are necessary.

O30 Planned changes

Requirement:

Written notice of planned product and marketing changes that affect the Nordic Ecolabelling requirements must be given to Nordic Ecolabelling.

☒ Procedures detailing how planned product and marketing changes are dealt with.

Background to this requirement

A Nordic Ecolabelled building product is ecolabelled on the understanding that the formulation is exactly as approved by Nordic Ecolabelling. Any changes must therefore be reviewed and assessed by Nordic Ecolabelling before they are incorporated into the production. The licensee must have procedures in place to ensure that Nordic Ecolabelling is informed of any planned changes that have a bearing on the requirements.

O31 Unforeseen non-conformities

Requirement:

Unforeseen non-conformities that affect Nordic Ecolabelling requirements must be reported to Nordic Ecolabelling in writing and logged.

☒ Procedures detailing how unforeseen non-conformities are handled.

Background to this requirement

Unforeseen non-conformities that affect the Nordic Ecolabelled product must be reported to Nordic Ecolabelling, and procedures for this must be in place at the factory to ensure that non-conformities are dealt with and that Nordic Ecolabelling is informed about them.

O32 Traceability

Requirement:

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

☒ Description of/procedures for fulfilment of the requirement.

Background to this requirement

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

5 Changes compared to previous version and compared to the EU Ecolabel

This document has been compared to the previous version of the criteria document for indoor paints and varnishes. The main differences between this and the previous version are the following:

- Semi-Volatile organic substances (sVOC) is a new requirement in this version (O8)
- The requirement on VOC (O8) has been made more stringent than in the previous version
- Update of the requirements regarding classification (O9-12) in combination with a new set of exemptions with specific limits for each exemption. The specific limit for the total amount of environmentally hazardous substances has been replaced by specific limits on different types of raw materials.
- Exclusion of substances on the candidate list, vPvB, PBT and endocrine disruptors (O13)
- More stringent requirement on preservatives (O14)
- Phthalates were previous excluded based on classification, now they are excluded by a list of several specific phthalates (O19)
- A new requirement limiting the classified rest monomers (O21)
- A new requirement excluding nanoparticles (O23)
- Updated and changed requirement on consumer information (O24)
- New requirements regarding take-back systems and quality management systems (O25-O32)

In appendix 1 there is a more complete list of differences when comparing the requirements in this document to the previous version and to the new version of the EU Ecolabel criteria document.

The main differences between this version of the criteria and the EU Ecolabel criteria document are the following:

- The Nordic Ecolabel's product group only covers indoor paints and varnishes and excludes anti-rust paints.
- The definition of constituent substances and impurities differs between the documents where the Nordic Ecolabel has the most stringent definition. This has an impact of several of the requirements.
- The requirements have been made more readable, concerning exemptions, since they are included in each requirement.
- Exemptions have been kept at the most stringent limit for all product types where the EU Ecolabel have multiple limits.
- Several exemptions have been removed.
- More stringent requirements on preservatives.
- A nanomaterial requirement has been added.
- The wet scrub resistance requirement has been modified to make only require paints with claims on wet scrub.

- The new requirement in the EU Ecolabel criteria regarding how to promote safe handling of exempted substances with health effects (5(a)(ii)) is not included in the Nordic Ecolabel.
- Appendices to be filled out by raw material suppliers and paint producers have been included in the criteria document.

6 New criteria

- Evaluate the possibility to include a requirement on the total weighted sum of environmentally hazardous substances as in for example chemical building products.
- Evaluate the limits on preservatives.

7 Terms and definitions

For the purpose of this document, the following definitions shall apply (from article 2 in the EU Ecolabel criteria document):

(1) **'Paint'** means a pigmented coating material, supplied in a liquid paste or powder form, which, when applied to a substrate, forms an opaque film having protective, decorative or specific technical properties and after application dries to a solid, adherent and protective coating;

(2) '**Varnish'** means a clear coating material which, when applied to a substrate forms a solid transparent film having protective, decorative or specific technical properties and after application dries to a solid, adherent and protective coating;

(3) **'Decorative paints and varnishes'** means paints and varnishes that are applied in-situ to buildings, their trim and fittings, for decorative and protective purposes;

(4) '**Lasure**' means coatings producing a transparent or semi-transparent film for decoration and protection of wood against weathering, which enables maintenance to be carried out easily;

(5) '**Tinting system'** means a method for preparing coloured paints by mixing a 'base' with coloured tints;

(6) '**Masonry coating'** means a coating that produces a decorative and protective film for use on concrete, paintable brickwork, blockwork, rendering, calcium silicate board or fibre-reinforced cement;

(7) **'Binding primers'** means coatings designed to stabilise loose substrate particles or impact hydrophobic properties;

(8) '**UV curable paint system'** means the hardening of coating materials by exposure to artificial ultra-violet radiation;

(9) '**Powder coating'** means protective or decorative coating formed by the application of a coating powder to a substrate and fusion to give a continuous film;

(10) **'In-can preservatives'** are products used for the preservation of manufactured products during storage by the control of microbial deterioration to ensure their shelf life;

(11)'**Dry-film preservatives**' are products used for the preservation of films or coatings by the control of microbial deterioration or algal growth in order to protect the initial properties of the surface of materials or objects;

(12)'**Anti-skinning substances**' are additives that are added to the coating materials to prevent skinning during production or storage of the coating material;

(13) '**Volatile organic compounds**' (VOC) means any organic compounds having an initial boiling point less than or equal to 250 °C measured at a standard pressure of 101.3 kPa as defined in Directive 2004/42/EC and which, in a capillary column, are eluting up to and including Tetradecane ($C_{14}H_{30}$) for non-polar systems or Diethyl adipate ($C_{10}H_{18}O_4$) for polar systems;

(14) '**Semi volatile organic compounds**' (SVOCs) means any organic compound having a boiling point of greater than 250 °C and which, in a capillary column (1) are eluting with a retention range between n-Tetradecane ($C_{14}H_{30}$) and n-Docosane ($C_{22}H_{46}$) for non-polar systems and diethyl adipate ($C_{10}H_{18}O_4$) and methyl palmitate ($C_{17}H_{34}O_2$) for polar systems;

(15) '**White and light coloured'** paints are those with a tri-stimulus (Y-value) > 70%;

(16) '**Gloss paints**' are those which at an angle of incidence of 60° show a reflectance of ≥ 60;

(17) '**Mid sheen paints**' (also referred to as semi-gloss, satin, semi matt) are those which at an angle of incidence of 60° or at 85° show a reflectance of < 60 and ≥ 10;

(18) '**Matt paints**' are those which at an angle of incidence of 85° show a reflectance of < 10;

(19) '**Dead matt paints**' are those which at an angle of incidence of 85° show a reflectance of < 5;

(20) '**Transparent**' and 'semi-transparent' means a film with a contrast ratio of < 98% at 120μ wet film thickness;

(21) '**Opaque**' means a film with a contrast ratio of > 98% at 120μ wet film thickness.

Additional definitions

High humidity areas are here considered areas such as kitchens, bathroom, laundry rooms and other wet rooms where the humidity on a regular basis is a lot higher than in the rest of the indoor environment.

Appendix 1 Differences between this version and the previous version plus the EU Ecolabel's latest version of indoor paint requirements

Table Appendix1. The table shows the differences between this Nordic Ecolabel criteria compared to the old version of the criteria and the new EU Ecolabel document

Requirement	Comparison between this version and the previous	Comparison with EU Ecolabel	Comments
Product group definition		The EU Ecolabel criteria covers the same indoor product categories but also exterior categories and anti-rust products.	The Nordic Ecolabel only has the indoor categories included in the document since the exterior paints are covered by the criteria document Chemical building products.
O1 – White pigments (EU requirement 1a)	The new requirement is as it was in the previous version of the criteria, but with the only difference being that the last version had an upper limit on 36g/m^2 for all types of products, whereas this requirement allows up to 40g/m^2 if the product fulfils the requirements for class 1 wet scrub resistance.	The same as the EU Ecolabel	The requirement allows extra TiO_2 got products fulfilling a higher class of wet scrub than previously.
O2 – wet scrub (EU requirement 1b)	The requirement is similar to the previous with the difference that it now covers all wall and ceiling paints with claims on wet scrub whereas the previous version only covered wall paints with claims.	The EU Ecolabel requires all paints to fulfil wet scrub regardless if there are claims or not.	
O3 Titanium dioxide (EU Ecolabel requirement 2)	It was in the previous version a requirement on the amounts of emissions in mg per m^2 of dry film, whereas the new requirement relates to kg waste per tonne.	The requirements are the same, but the assessment part differs in that the Nordic Ecolabel has appendices to fill out on this, whereas the EU Ecolabel will have this in application pack.	
O4 Spreading rate (EU Ecolabel 3a)	The same requirement as in the previous version, but with an additional category for ”opaque elastomeric paints”.	The same as the EU Ecolabel but with a slightly differently formulated assessment part	The requirement has been made a bit more readable with inserting the different limits in a table.
O5 resistance to water (EU Ecolabel 3b)	The same as in the previous version	Identical to the EU Ecolabel requirement	
O6 Adhesion (EU Ecolabel 3c)	The requirement is the same as the previous, but it has been made more clear that in the test EN 2409 it is required to score 2 or less to pass.	Interior masonry primers are not included in the EU Ecolabel, but included in the Nordic Ecolabel’s requirement since it was included in the previous version.	

O7 Abrasion (EU Ecolabel 3d)	The requirement is the same as the previous version but with a Nordic Ecolabel addition of an alternative test method.	The requirement is the same as the EU Ecolabel but with a Nordic Ecolabel addition of an alternative test method.	The reason for including an alternative test method is that the new method was added into the criteria for chemical building products after the public hearing on that document.
O8 VOC and sVOC (EU Ecolabel requirement 4)	The previous version only had limits on VOC, so sVOC is new to this version. The limits on VOC has been made more stringent than previous.	The requirements are the same, but the Nordic Ecolabelling requirement does not have the exterior paint categories.	The new requirement regarding sVOC will be important to gather more stakeholder knowledge on to be able to consider if the limits and test methods are stated at a reasonable level.
O9-O11 Classification on constituent substances (EU Ecolabel requirement 5a)	There are differences in what classified substances that are allowed in this version and the old. There are also differences when it comes to the exemptions. The requirement regarding environmentally hazardous substances had a max level of 4% in the previous version, whereas this version has limits on specific types of substances instead.	The definition of substances is different than in the EU Ecolabel. The EU Ecolabel requirements on what classification that are not allowed has been adapted by the Nordic Ecolabel. The exemptions from the classifications has been decreased and made more narrow in the EU Ecolabel.	The exemptions in the Nordic Ecolabel are only to cover products for indoor usage and have also in several cases been made more stringent than the EU Ecolabel limits after stakeholder discussions.
O12 Classification of the final product (EU Ecolabel 5a)	This requirement is slightly different to the previous version and has been updated to CLP classifications.	The requirements are almost the same. The Nordic Ecolabel has added an exemption for in-can preservatives concerning the warning phrase for sensitizers. In the Nordic Ecolabel classifications as environmentally hazardous H412 and H413 is added and not allowed.	The Nordic Ecolabel has added and exemption to make it possible to use the levels of for example isothiazolinones under O14.
		EU Ecolabel requirement 5a, ii Production site requirements for exemptions. This is a new requirement and is not included in the Nordic Ecolabel criteria.	
O13 Other excluded substances (EU Ecolabel 5c)	This was not included in the previous version	This requirement is almost the same as the EU Ecolabel's 5c but written in a different way. Due to the difference in what is meant by an impurity this Nordic Ecolabel requirement is also more stringent.	
O14 Preservatives (EU Ecolabel 5c, i-v, appendix 1)	The total sum of isothiazolinones is more stringent than in the previous version. There are also more limits of specific isothiazolinones	More stringent requirement on the isothiazolinones than the EU Ecolabel requirement.	

	than in the previous version.		
O15 APEO	Identical to the previous version's requirement	The requirement is the same as the EU Ecolabel.	Due to the difference in definition of the constituent substances between the EU Ecolabel and the Nordic Ecolabel new information will need to be collected
O16 Perfluorinated substances (EU Ecolabel requirement appendix 4c)	The description on what is covered under perfluorinated is a bit different than previous.	The Nordic Ecolabel requirement excludes all perfluorinated substances and all polyperfluorinated substances whereas the EU Ecolabel excludes substances grouped into different chain lengths.	
O17 Metals (EU Ecolabel appendix 5b)	The requirement is similar to the previous version	The difference is that the Nordic Ecolabel only allows metals as traces of impurities, this is stated differently in the EU Ecolabel requirement.	
O18 Pigments (EU Ecolabel appendix 5f)	A new requirement compared to the previous version where pigments are not specifically mentioned under the requirement regarding metals.	The requirements are the same with some minor adjustments like that the metals are specified in the requirement and that the removal of the exemptions for cobalt spinels.	The removal of the exemptions for cobalt spinels has been done since they are considered to mainly be used in exterior products.
O19 Phthalates (EU Ecolabel appendix 6b)	The old requirement excluded phthalates based on their classification, this requirement excludes a list of phthalates.	The requirements are the same with addition of 6 extra phthalates and it covers all phthalates no matter what functions.	
O20 formaldehyde (EU Ecolabel appendix 7a)	The requirement is similar to the previous version.	The requirements differ in the sense that the Nordic Ecolabel has not specified conditions for when the formaldehyde donors are allowed. The limits for formaldehyde have been set more stringent.	The Nordic Ecolabelling's requirement has a limit of 10ppm whereas the EU Ecolabel has one limit on 10 ppm and one on 100ppm.
O21 Monomers (EU Ecolabel appendix 7c)	A new requirement to this version	The EU Ecolabel has a limit on 500ppm for all rest monomers whereas the Nordic Ecolabelling focus is on the classified monomers and therefore limit them to 100ppm per monomer.	
O22 VAH (EU Ecolabel 5x, appendix 7d)	The limit of VAHs has been made more stringent compared to the previous version	The same as in the EU Ecolabel	
O23 nanoparticles (no EU Ecolabel equivalence)	A new requirement	A new requirement for the Nordic Ecolabel. The EU Ecolabel does not have such a requirement but has a	The Nordic Ecolabel has included a requirement on nanoparticles in the same manner as for chemical building products.

		statement saying that the producer has to identify any nanoparticles.	
O24 Consumer information (EU Ecolabel 6)	The requirement has been changed compared to the previous version with a focus more on estimations on the usage of paints, closing the packages etc.	Identical to the EU Ecolabel requirement	
O25-O32	New requirements in the Nordic Ecolabel	No equivalence	The Nordic Ecolabel has as standard requirements on take back systems and quality control, so such requirements have been included in this document as well.

Appendix 2 Differences between this version and EU Ecolabel's latest version of indoor paint requirements

The table below shows where extra information needs to be sent in for each specific requirement if the product already has the EU Ecolabel.

Table Appendix 2. Comparison between this Nordic Ecolabel criteria and the EU Ecolabel concerning documentation

Requirement	Comparison with EU Ecolabel	Extra documentation
Product group definition	No extra documentation needed. All indoor paints in the EU Ecolabel except anti-rust products can be labelled with the Nordic Ecolabel.	No
Constituent substance	The main difference is that the Nordic Ecolabel includes all substances added with a purpose no matter what concentration they are in. It also includes known by-products and degradation substances. It is not completely clear what is meant in the EU Ecolabel when it comes to substances below 100ppm.	Leads to extra information requested in other requirements below.
O1 – White pigments (EU requirement 1a)	The same requirement.	No
O2 – wet scrub (EU requirement 1b)	No extra documentation needed. The EU Ecolabel requires all paints to fulfil wet scrub regardless if there are claims or not. The Nordic Ecolabel only asks for tests for products with claims.	No
O3 Titanium dioxide (EU Ecolabel requirement 2)	The applicant needs to send in appendices 1 and 2 to show fulfilment, due to the difference in definition of constituent substance.	Yes, appendices 1-2
O4 Spreading rate (EU Ecolabel 3a)	The same requirement.	No
O5 resistance to water (EU Ecolabel 3b)	The same requirement.	No
O6 Adhesion (EU Ecolabel 3c)	The same requirement. But for masonry primers there is a need for documentation.	Yes, for masonry primers. Other products do not need additionnal information.
O7 Abrasion (Eu Ecolabel 3d)	The same requirement. , but with a Nordic Ecolabel addition of an alternative test method.	No
O8 VOC and sVOC (EU Ecolabel requirement 4)	The same requirement	No
O9-O11 Classification on constituent substances (EU Ecolabel requirement 5a)	The exemptions in the Nordic Ecolabel are only to cover products for indoor usage and have also in several cases been made more stringent than the EU Ecolabel limits. The definition of constituent substances also differ between the EU Ecolabel and the Nordic Ecolabel which is relevant in this requirement.	Yes, appendices 1 and 2
O12 Classification of the final product (EU Ecolabel 5a)	The Nordic Ecolabel has added an exemption to make it possible to use the levels of for example isothiazolinones under O15. The requirements for classifications as environmentally hazardous classification is more stringent in the Nordic Ecolabel.	Yes, SDS showing fulfilment of the classifications
O13 Other excluded	The applicant needs to send in appendices 1 and 2 to show fulfilment, due to the difference in definition of	Yes, appendices 1-2

substances (EU Ecolabel 5c)	constituent substance.	
O14 Preservatives (EU Ecolabel 5c, i-v, appendix 1)	A calculation showing fulfilment of the more stringent limits in this requirement is needed. The applicant also needs to send in appendices 1 and 2 to show fulfilment, due to the difference in definition of constituent substance.	Yes, calculation and appendices 1-2
O15 APEO (EU Ecolabel appendix 4b)	The applicant needs to send in appendices 1 and 2 to show fulfilment, due to the difference in definition of constituent substance.	Yes, appendices 1-2
O16 Perfluori-nated substances (EU Ecolabel requirement appendix 4c)	The Nordic Ecolabel covers all types of perfluorinated and polyperfluorinated substances, which in combination with the difference in definition of constituent substances requires extra information to be collected for the Nordic Ecolabel.	Yes, appendices 1-2
O17 Metals (EU Ecolabel appendix 5b)	The difference in definition of constituent substances and the statement regarding impurities in this requirement makes it necessary to collect extra information in this requirement.	Yes, appendices 1-2
O18 Pigments (EU Ecolabel appendix 5f)	The differences in exemptions and the differences in definition of constituent substances make it necessary to collect extra information in this requirement.	Yes, appendices 1-2
O19 Phthalates (EU Ecolabel appendix 6b)	The addition of 6 phtalates in combination with the difference in definition of constituent substances makes it necessary to collect extra information in this requirement.	Yes, appendices 1-2
O20 Formaldehyde (EU Ecolabel appendix 7a)	The Nordic Ecolabelling's requirement has a limit of 10ppm for all types of products is more stringent for some products (EU Ecolabel has one limit on 10ppm and one on 100ppm). This in combination with the difference in definition of constituent substances make necessary to collect extra information in this requirement.	Yes, appendices 1-2
O21 Monomers (EU Ecolabel appendix 7c)	The difference in what monomers that are covered by the requirements and the limits in combination with the difference in definition of constituent substances make necessary to collect extra information in this requirement.	Yes, appendix 2
O22 VAH (EU Ecolabel 5x, appendix 7d)	The applicant needs to send in appendices 1 and 2 to show fulfilment, due to the difference in definition of constituent substance.	Yes, appendices 1-2
O23 nanoparticles (no EU Ecolabel equivalence)	The Nordic Ecolabel has included a requirement on nanoparticles in the same manner as for chemical building products.	New requirement. Yes, needs appendices 1-2.
O24 Consumer information (EU Ecolabel 6)	The same requirement.	No
O25-O32 (no EU Ecolabel equivalence)	The Nordic Ecolabel has as standard requirements on take back systems and quality control, so such requirements have been included in this document as well.	New requirements. Yes, needs extra documentation to be sent in.

If a product has the Nordic Ecolabel on an indoor paint or varnish and the applicant also wants the EU Ecolabel on the product, the applicant does not need to send in complete new application documentation. They would need to check EU Ecolabel requirements regarding formaldehyde (EU Ecolabel appendix 7a) regarding the number of tests required and the requirement regarding monomers (EU Ecolabel appendix 7c) since it is stated differently. The EU Ecolabel requirement 7 regarding the text appearing on the EU Ecolabel will also need to be documented.