About Nordic Ecolabelled
Indoor paint and varnishes



Version 3.7

Background to ecolabelling
23 June 2020

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 this version of the criteria more similar to the Nordic Ecolabel criteria for Chemical building products which contain outdoor paints, outdoor varnishes and products for Industrial applications .

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.

The main differences between version 2 and version 3 of the criteria for indoor paints and varnishes are the following:

- The definition of ingoing substances and residuals is more exact and stricter.
- A new weighted formula for calculate the total amounts of environmentally hazardous substances in the product. The formula weights the most environmentally hazardous substances harder, so that they are the most restricted in the product.
- New requirement regarding the total amount of preservatives and a limit for 2-Methyl-2H-isothiazol-3-one (MIT) (CAS# 2682-20-4). Preservatives are often classified as environmentally hazardous or/and have allergy effects. Especially MIT seems to be a problem, as people with MIT-allergy seems to rise. Therefore a special limit apply for MIT.
- New requirement to residual monomers in polymers. Residual monomers can have unwanted properties such as carciogenic or allergenic. There are techniques to limit the amount of residual monomers and the desire is to have so clean raw materials as possible.
- New method to calculate the amount of titanium dioxide.
- New requirement to handling of powdered substances to protect employees.
- New requirement to limit nanoparticles. Nanoparticles may have unknown effect of the health and in the environment. Nordic Ecolabel therefore use the precautionary princhip regarding nanoparticles.
- New requirements to substances excluded from use based on their health or environmentally effects.
- More stringent requirements on VOC (Volatile Organic Compounds) and inclusion of a requirement on SVOC (semi-Volatile Organic Compounds). VOC and SVOC are environmentally and health hazardous. They generally evaporate 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.

More detailed information about the changes in the new version of the criteria compared to the old version is found under the justification of each requirement.

In the hearing especially the definition of ingoing substances and residuals, classifications of residual monomers in polymers and the requirement to SVOC gave many responses.

This version of the criteria have been through two hearings. The first draft which was send to hearing in January 2015 was harmonization with the EU Ecolabel. The harmonization with the EU Ecolabel however proved to give several problems, which also several hearings responses pointed out. To proceed with the structure of the first draft of the criteria would therefore set three different types of requirements, one for EU Ecolabel, one for Nordic Ecolabel Chemical building products (which contains outdoor paint and varnishes) and one for Nordic Ecolabel Indoor paints and varnishes. This is not desirable and will complicate the application process for applicants who want both the Nordic Ecolabel Chemical building products (Outdoor paint and varnishes) and the Nordic Ecolabel Indoor paints and varnishes.

Therefore after the first hearing the criteria was changed and harmonized with the Nordic Ecolabel Chemical building products and send to a second hearing in May 2015.

Nordic Ecolabel paints are considered to have:

- Strict requirements for solvents (VOC and SVOC)
- Strict requirements for substances dangerous to the environment and for preservatives
- Does not contain softeners
- Quality requirements include coverage

In appendix 1 in this document there is a comparison between this criteria version 3 and the previous version 2. In appendix 2 in this document is there a comparison between this criteria version 3 and the EU Ecolabel criteria (2014). In addition 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. Appendix 3 shows where no additional documentation is needed if a product have the Nordic Ecolabel for chemical building products (version 2) or a raw material is approved in the criteria for chemical building products (version 2).

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

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

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.

Differences compared to the EU Ecolabel product group definition
The main difference in the product group definition between the Nordic Ecolabel and the EU Ecolabel is the fact that the Nordic Ecolabel criteria document is only covering 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 of indoor paint and varnishes

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.

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

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 often 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 preservatives 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, i.e. 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.

Potential (P)

Through active choices of raw materials 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 raw materials.

Even minor adjustments to the product formulation (such as replacing one raw material with one that is not is not classified with "harmful to the environment" and/or "health-risk", or one with less volatile organic compound (VOC)) can generate 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 liters[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 liters 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 liters[5] of paint were sold in Finland 2013. About 29 million liters 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.

[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)

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".

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 22 November 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 28 May 2014. The Nordic Ecolabelling version of the criteria expires 31 December 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.

The first draft of this criteria that was in hearing from 7 January to 5 March 2015 was as harmonized as possible with the EU Ecolabel requirements in Commission Decision 2014/312/EU. The focus areas was 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. The harmonization with the EU Ecolabel however proved to give several problems, which also several hearings responses pointed out. Especially regarding difference in definition of ingoing substances and residuals where the construction of the EU Ecolabel with a list of classifications that are prohibited together with a list of derogations for specific substances can give complication if for example a substance changes classification. To proceed with the structure of the first draft of the criteria would therefore set three different types of requirements, one for EU Ecolabel, one for Nordic Ecolabel Chemical building products (which contains outdoor paint and varnishes) and one for Nordic Ecolabel Indoor paints and varnishes. This is not desirable and will complicate the application process for applicants who want both the Nordic Ecolabel Chemical building products and the Nordic Ecolabel Indoor paints and varnishes, as most of the requirements for the ingoing substances are the same in the two criterias.

After the first hearing Nordic Ecolabelling therefore decided to change the criteria and to harmonized as possible with the Nordic Ecolabel criteria for Chemical building products (version 2) instead. Because the criteria was changed a lot from the document sent to hearing 7 January to 5 March 2015, the criteria was send to a second hearing from 25 May to 26 June 2015.

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, 2 in Norway and 1 in Finland 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 published. The criteria is very similar to the Danish Asthma and Allergy's document.

Dansk Indeklima Mærkning

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. At this moment there is several national systems for environmental product declarations, which all are based on the same main standard for EPD, EN 15804. There is no international system for environmental product declarations as yet, but work on this is underway. In order to create an environmental product declaration, relevant product category rules must first be drawn up/agreed. Although EPDs are quite common within the construction industry generally,

[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)

a search for EPDs on the website where all issued EPDs are listed (www.environdec.com) shows that EPDs are not as common for indoor paints[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, SVOC, 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 Nordic Ecolabel criteria for Chemical Building Products. It was first the plan to harmonized as possible with the EU Ecolabel criteria for Indoor and outdoor paints and varnishes, but after the first hearing it was decided to harmonize with the Nordic Ecolabel criteria for Chemical Building Products instead.

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.

3.1 Focus points

The main focus of this revision has been to go through the Nordic Ecolabel criteria for chemical building products (version 2) and evaluate which requirements and limits for outdoor paint and varnishes that are relevant for this criteria. In addition requirements and limits in the EU Ecolabel (2014) were evaluated and decided if they should be include (maybe in a modified way) in this criteria.

The following requirements have been in focus during the revision:

- To harmonize the criteria with the Nordic Ecolabel criteria of chemical building products (outdoor paint and varnishes).
- The level for isothiazolinones are to be evaluated with specific focus on Methylisothiazolinone (CAS#: 2682-20-4) (MIT).
- Evaluate which requirements from the EU Ecolabel should be implemented.
- 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.

[12] The International EPD® System, Available at: http://www.environdec.com/en/Site-search/?query=paint (visited 22.04.2015)
[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

- 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 November 2015. External input has been collected from producers and other stakeholders during the project. The first public hearing was sent out 7 January 2015 and the second was send out 25 May 2015.

Table A. Project participants

Roll	Person	Country
Nordic Product manager	Susanna Vesterlund /Lena Stenseng	Sweden
Nordic Product Adviser	Lena Stenseng /Pehr Hård	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

4.1.1 Definition of ingoing substances, residuals and preservatives

The Nordic Ecolabelling has as a standard in the chemical technical criteria documents a section explaining what is meant by ingoing substances and residuals. 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 100 ppm.

The following text, which is a standard text in the Nordic Ecolabel, will therefore be included in the Nordic Ecolabel's criteria for indoor paints and varnishes version 3:

Ingoing substances/residuals

Ingoing substances are defined as, unless stated otherwise, all substances in the product – including additives (e.g. preservatives or stabilisers) in the raw materials/ingredients, but not residuals from production, incl. production of raw materials).

Residuals from production, incl. production of raw materials are defined as residuals, pollutants and contaminants derived from the production, incl. production of the raw materials, which are present in the final product in amounts less than 100 ppm (0,0100 w-%, 100 mg/kg), but not substances added to the raw materials or product intentionally and with a purpose – regardless of amount. Residuals in the raw materials

above 1,0 % are regarded as ingoing substances. Known substances released from the ingoing substances are also regarded as ingoing substances.

Raw material
A raw material may consist of one or more ingoing substances. A raw material may e.g. be a drying agent or a neutralising agent. The raw materials are the materials that are bought by the paint producer and mixed to together to generate the final product e.g. the paint.

Preservatives
With the term preservatives is meant all preservatives, biocides and biocidal active substances, including in-can preservatives and dry-film preservatives.

General
Under each requirement below there is an argumentation to support the reason for the specific requirement and there is also a comparison to the requirement in the previous version 2, the EU Ecolabel (2014) and to the Nordic Ecolabel criteria for chemical building products (version 2). The comparison to Nordic Ecolabel criteria for chemical building products is relevant as it covers outdoor paint and varnishes, and applicants may use some of the same raw materials in their indoor and outdoor products or may in some cases apply for licenses according to the two criteria for the same product.

Some terms and definitions can be found under section 7 at the end of this document, describing and defining some terms etc.

4.1.2 Requirements to environment, health and more

O1 Information about the product

Requirement:

The applicant must give detailed information on the indoor paint and varnish product to which the application relates. The following information is required:

- Describe the product and its application method and the way in which it fulfils the definition of a product that qualifies for a Nordic Ecolabel
- If the product forms part of a component system that jointly ensures the functioning of the product, the entire product must be Nordic Ecolabelled and not simply parts of it (e.g. a tinting system comprising a base and coloured tints or two-component varnishes comprising a base and a hardener). The requirement thus refers to the individual product and not to products in the same range (a range is here e.g. systems for exterior painting comprising primer, undercoat and paint).
- Formulation detailing complete composition with a specification of all ingoing substances (see definition of raw materials and ingoing substances in Chapter 1). The description must include:
    - The trade name of the raw materials
    - The function of each raw material
    - The chemical name and CAS# (if possible) of the ingoing substances
    - Content in % per ingoing substance in the product

✉ Description of the product in accordance with the definition of what may be Nordic Ecolabelled.

☒ Description of how the product is to be used to achieve functionality (as a single component, tinting system or part of a multi-component system) and what application method it is intended for.

☒ Formulation detailing complete composition with a specification of all raw materials and ingoing substances, as set out in Appendix 3.

Background to the requirement
The product is to be described such that it can be determined that the product falls within the product group definition. It is also important that Nordic Ecolabelling has good knowledge of the Nordic Ecolabelled indoor paints and varnishes products. Without this knowledge, it is not possible to determine which criteria are relevant and what requirements should be set for the product in the future. Nordic Ecolabelling would therefore like to have information on the formulation of the product and what application method it is intended for. In cases of a tinting system comprising a base and coloured tints, both the base and the coloured tints must fulfil the requirements as the base is only functional with the coloured tints.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The previous version did not have a specific requirement regarding information about the product, but similar information was needed when applying for the previous version.

Difference compared to the EU Ecolabel
EU Ecolabel do not have a specific requirement regarding information about the product, but similar information is needed when applying for the EU Ecolabel.

Difference compared to the Nordic Ecolabel Chemical building products requirement O1
The requirement is identical.

O2 Classification of the product

Requirement:

The final product shall not be classified and labelled according to table 1 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 1 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
Hazardous to the ozone layer	H420
Acute toxicity 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 1-2 STOT RE 1-2	H370, H371, H372, H373
Aspiration hazard 1	H304
Respiratory or skin sensitising Resp. Sens. 1/1A/1B Skin sens. 1/1A/1B	H334, H317 and the product must not contain ingoing 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, H351
Mutagenic Mut 1A/B/2	H340, H341
Toxic for reproduction Repr 1A/1B/2	H360, H361, H362
Explosive 1.1-1.6	H200, H201, H202, H203, H204, H205
Oxidizing Liquids and solids Ox. Liq. 1-3/Ox. Sol. 1-3	H271, H272
Self-reactive substances and mixtures and Organic PeroxidesHighly flammable Type A-EF Self-react. A-EF/Org. Perox. A-EF	H240, H241, H242
Extremely flammable aerosol and liquids Flam Liq 1 /Aerosol 1	H222, H224

Exemption

- *The statement "Contains (name of sensitising substance). May produce an allergic reaction" is excepted, if it is due to the content of preservatives. See also O5 concerning limits for preservatives.

Note that responsibility for correct classification lies with the manufacturer.

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

☒ A declaration of the concentration of the preservatives, if the above exemption for preservatives is used.

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 harmful, very toxic, toxic, harmful to health, corrosive, sensitising, carcinogenic, mutagenic, toxic for reproduction, explosive, oxidising and/or highly flammable cannot be ecolabelled.

Classifications are to be given in accordance only with the CLP Regulation EC (No) 1272/2008.

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."*

* Exemptions for the risk phrase "Contains (name of sensitising substance), may cause an allergic reaction":

The criteria document exempts preservatives such as for example isothiazolinones, which require the warning phrase "Contains xxx, may cause an allergic reaction", as these substances are considered necessary preservatives for this type of product, see more about preservatives under requirement O5.

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 mixture of 5-Chloro-2-Methyl-2H-Isothiazol-3-one/2-Methyl-2HIsothiazol-3-one (CAS#: 55965-84-9) (CMIT/MIT) will cause the risk phrase on the final products from amounts ≥ 1.5 ppm and 1,2-benzisothiazol-3(2H)-one (CAS#: 2634-33-5) (BIT) in amounts ≥ 50 ppm. These levels are well below the amounts allowed in requirement O5.

This requirement was updated on June 1 2016 to be more accurate in how the classifications are stated in the table.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The definition of ingoing substances is different.

The classification rules have changed from Dangerous Preparations Directive 1999/45/EC to CLP Regulation EC (No) 1272/2008.

Classifications "hazardous to the ozone layer", "aspiration hazard", "explosive", "oxidising" and "highly flammable" have been added. In this version there is no exception for R43 (H317) as there was in in the previous version.

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, to make the criteria easier to understand, and has therefore chosen to do so here.

The EU Ecolabel requirement seems to exclude only hazardous to the environment classifications H400 (R50), H410 (R50/53) and H0411 (R51/53). The Nordic Ecolabel requirement goes further than that. Nordic Ecolabellings requirement limits also paints and varnishes classified as environmentally hazardous classified with H412 (R52/53) and H413 (R53).

Furthermore classifications as Hazardous to the ozone layer, Aspiration hazard, Explosive Category 1.1-1.6, Oxidising and Highly flammable is added.

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.

Difference compared to the Nordic Ecolabel Chemical building products requirement O2
The requirement is identical, except that classification H317 due to the content of film preservatives is also exempted in chemical building products. As film preservatives is primarily used in outdoor paint and varnishes, there is no exception in this criteria.

Also there is no exception for H412 in this criteria. The main reason for the exception in the criteria for chemical building products is the classifications of preservatives. The amount of preservatives is higher for outdoor paints and varnishes compared with indoor paints and varnishes, and an exception is therefore not need for indoor paint and varnishes.

In November 2016, the Nordic Ecolabelling Board decided to allow classification of acute tox: Different Nordic Ecolabel criteria for chemical products are very different in terms of the classifications that are allowed on the ingredients. Classification of acute toxicity is only prohibited in chemical construction products and indoor paints. This has led to many exemption as several substances used in these products classifies with acute tox. The requirement O3 has been adjusted so that it is in line with other chemical products criteria. Several exemptions have also been removed from the requirement. The requirement on acute toxicity at the product level is retained.

O3 Classification of ingoing chemical substances

Requirement:
The product must not contain ingoing substances that are classified according to table 2. Classification shall be according to CLP Regulation (No) 1272/2008.

Table 2 Classification of ingoing substances

Classification according to CLP Regulation 1272/2008	
Hazard class and category	**H-phrase**
Carcinogenic Carc 1A/1B/2	H350, H351
Mutagenic Mut 1A/B/2	H340, H341
Toxic for reproduction Repr 1A/1B/2	H360, H361, H362
Respiratory sensitising 1/1A/1B	H334
Specific target organ toxicity with single exposure STOT SE 1	H370
Specific target organ toxicity with repeated exposure STOT RE 1	H372

Exemptions:

- Preservatives classified with specific target organ toxicity with single or repeated exposure (H370, H372) (further requirements concerning preservatives are stated in O5).
- Formaldehyde (CAS#: 50-00-0) as a residual, maximum content of 10 ppm (0.0010% by weight) in the final product, see separate requirement O6.
- Respirable crystalline silica/quartz classified with STOT RE 1 with H372. Respirable crystalline silica can be less than 1% in the raw material, see requirement O10 regarding powder raw materials.
- Glyoxal (CAS#: 107-22-2), if the pH in the final product is above 8.
- The dispersant trimethylol propane (CAS #: 77-99-6) self-classified as H361 in up to 1% in pigments. Time-limited exception valid until 2022-05-31.
- Titanium dioxide (TiO2) which is added in powder form during raw material production (additional requirements for TiO2 is stated in O9).

☒ 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 in appendix 1 and 2, together with a statement why the substance is present in the product/raw material and other documentation if appropriate.

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

Background to the requirement

For the same reasons described under requirement O2, there is a requirement that none of the ingoing substances are classified as carcinogenic, mutagenic or toxic for reproduction.

Nordic Ecolabelling wishes to limit the health effects of indoor paints and varnishes and therefore excludes from use ingoing substances that are classified as acutely toxic, respiratory sensitising and/or having specific target organ toxicity, with some specified exception, see below.

Classifications are to be given in accordance with the prevailing CLP Regulation EC (No) 1272/2008.

Here is examples on some of the possible ingoing substances in a paint that is exluded through this requirement:

Naphtha[15]
Naphthas are refined from crude oil, coal tar or other primary sources[16.] Naphtha cannot be defined with a unique CAS number, since there are many variants under the same CAS no. Nordic Ecolabelling has no separate requirement excluding naphtha from use, as most naphthas are excluded by this requirement, since they are very toxic, toxic or harmful to health/classified as Acute Tox. Cat. 1-3. Naphtha can also be carcinogenic and may contain various residuals that are harmful to the environment and/or health. The raw material producer, or the manufacturer of the indoor paints and varnishes based on the raw material producer's information, must certify that there is no naphtha classified as Acute Tox. Cat. 1-3 in the product. Naphtha is used in paints and varnishes.

Naphthas are largely excluded by requirements concerning classification of ingoing substances and restricted by the VOC requirement (boiling point lies between 20 ºC and 75 ºC).

Toluene
Nordic Ecolabelling has chosen not to set a separate requirement excluding toluene from use in raw materials or products, since toluene is excluded in this requirement due to its classification. Toluene CAS#: 108-88-3 is classified as H225 (R10), H361d (R63), H304 (R65), H373 (R33, R48), H315 (Xi R38) and H336 (R67). Toluene must therefore not be added to indoor paints and varnishes.

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 (reproduction toxic) 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.

Concerning the exemptions in the requirement, there is the following explanations:

Preservatives
Preservatives are used in the products to avoid microorganisms growing in the product and also later to protect the finished surface. Protecting products and surfacesfrom microbial growth is one way of ensuring that the products have a long lifetime both on the shelf and later on a wall.

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, and some producers are already classifying the products. For example 2-methyl-2H-isothiazol-3-one CAS# 2682-20-4

[15] Wikipedia.org - http://en.wikipedia.org/wiki/Naphtha
[16] http://en.wikipedia.org/wiki/Naphtha

(MI or MIT), 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 CAS#: 2634-33-5 (BIT) has harmonized classification and is classified as H302, H315, H317, H318 and H400.

Since in-can preservatives are considered to be relevant for indoor paints (see further under requirement O5) an exemption has been made for them from the classifications with acute toxic 1-3 (H300, H301, H310, H311, H330, H331) and specific target organ toxicity with repeated exposure (H370, H371, H372, H373). Further requirements concerning preservatives are stated in O5

Formaldehyde (CAS# 50-00-0)
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. Formaldehyde is banned in general in the requirement, but is exempted from the requirement where the formaldehyde appears in the form of impurities.The reason for this is that, in Nordic Ecolabelling's experience, e.g. newly produced polymers may contain impurities in the form of formaldehyde. The level of formaldehyde is limited in requirement O6. Products must not, however, have actively added formaldehyde, see more under O6.

Respirable crystalline silica/quartz
Respirable crystalline silica/quartz is present as an impurity in most mineral fillers and contribute to the amounts in the final product to be above 100 ppm, which is the general impurity limit. Respirable silica is classified as STOT RE 1 (H372)[17]. When the respirable silica has been mixed into the wet paint it is no longer respirable (i.e. do not have the properties as STOT RE 1) neither in the dry paint film, since the silica is bound to larger particles. Silica does not cause health issues in the final product, since it isn't in dry powder form. To make it possible for the producers of paint to produce products containing these fillers, an exemption is made from the classification with H372 for respirable silica less than 1% in the raw materials. The powder raw material also needs to fulfil requirement O10 regarding constituent powder substances, where the producer has to take on action to limit the dust in the production.

Glyoxal
Glyoxal CAS#: 107-22-2 is classified as mutagenic cat 2 (H341). Glyoxal is often present in cellulose based products. There are alternative ways to make technical adaptions to the process which makes it possible to use cellulose without glyoxal, but unfortunately it is difficult to obtain enough of these alternative raw materials, at least at the present time. Therefore an exemption has been made to allow the use of glyoxal, if the pH of the final product is above 8. When the pH is above 8 in an aqueous solution the glyoxal reacts to irreversibly form glycolic acid CAS#: 79-14-1. Glycolic acid is not classified with H341, but is classified H332 and H314. Therefore allowing the use of glyoxal will not generate substance classified with H341 in the final product.

[17]Crystalline silica: http://www.crystallinesilica.eu/content/classification-and-labelling-rcs#rcs

Driers
Driers are used in oxidative drying paints, such as alkyde based paints for both indoor and outdoor usage. Driers are needed to make the paint dry quickly and to avoid it to be sticky and sensitive to touch. Driers work as catalysts, ie they start a reaction but are not consumed in the reaction. There are driers classified with STOT RE 2: H373 and/or Acute Tox 3: H301 and they are now exempted if the total amount is < 0,10% in the final product. Cobalt driers have been used earlier in the same types of paints, but since they have been classified as Rep tox cat 2 they are no longer accepted in the Nordic Ecolabelled indoor paints.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The definition of ingoing substances is different.

The classification rules have changed from Dangerous Preparations Directive 1999/45/EC to CLP Regulation EC (No) 1272/2008.

The previous version covered the same classifications.

Exemptions in the previous version allowed up to 0.1% in the finish product of preservatives classified with (or combinations thereof) H331 (R23), H311 (R24), H301 (R25), H330 (R26), H310 (R27), H300 (R28), H370 (R39), H351 (R40) or H372/H373 (R48). In the new version the exemptions is similar, except there is no special limit in the final product, H351 (R40) is not excepted, instead H371 (R68) are exempted.

In the previous version Methyl Ethyl Ketoxime in alkyd paints was allowed up to a limit of 0,3 % in the finish product. In the new version Methyl Ethyl Ketoxime is not exempted.

In the new version exemptions for respirable crystalline silica/quartz is exempted from the classification as STOT RE 1 with H372. Respirable crystalline silica can be less than 1% in the raw material. This is new to the criteria.

In the new version glyoxal is permitted, if the pH in the final product is above 8.

> In the new version exemptions for sodium nitrite (CAS#: 7632-00-0) below 0.1% by weight totally in the final product is added.

Difference compared to the EU Ecolabel requirement 5a and the related exemptions
The EU Ecolabel exempt driers from the classifications H301 and H373. There is no exceptions for driers in this criteria, 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 less than 1% and that the exemption is from classification with H372 not H373 as in the EU Ecolabel.

The exemption for preservative differs a little from the EU Ecolabel requirement since EU Ecolable except only H331, but Nordic Ecolabel except Acute toxicity cat. 1-3. A

broader exception is made for Nordic Ecolabel because many preservatives may change classification when classified according to CLP Regulation EC (No) 1272/2008. See more concerning preservatives under O5.

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.

In the EU Ecolabel has exemption for neutralizing agents and different limits depending on what type of product it is meant to be used in. In this criteria there is only one limit no matter what type of product.

Requirement O3 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 ingoing substances. This means that some products with the EU Ecolabel do not fulfil this requirement.

The requirement limits the same classifications as in the EU Ecolabel requirement, except H304, EUH070 and H317 which is not in this criteria. The text regarding formaldehyde differs from the EU Ecolabel and is referring to O6. The fact that the definition of ingoing substances differ also makes the requirements different. Nordic Ecolabelling has also chosen not to make exceptions for cobalt driers in this requirement.

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O3
The requirement is identical, except exceptions for glyoxal and sodium nitrite is added and there is no exceptions for methanol (CAS#: 67-56-1) and bisphenol A (CAS#: 80-05-7), as they do not seem relevant for indoor paint and varnishes.

Adjustments made to the criteria generation

In November 2016, the Nordic Ecolabelling Board decided to allow classification of acute tox: Different Nordic Ecolabel criteria for chemical products are very different in terms of the classifications that are allowed on the ingredients. Classification of acute toxicity is only prohibited in chemical construction products and indoor paints. This has led to many exemption as several substances used in these products classifies with acute tox. The requirement O3 has been adjusted so that it is in line with other chemical products criteria. Several exemptions have also been removed from the requirement. The requirement on acute toxicity at the product level is retained.

In March 2017, the Nordic Ecolabelling Board decided to allow classification of acute tox: As for classification with acute toxicity, specific target organ toxicity is only prohibited in chemical construction products and indoor paints. The requirement O3 has been adjusted so that it is more in line with other chemical products criteria. One exemption was also been removed from the requirement. The requirement on specific target organ toxicity at the product level is retained.

In May 2020, the Nordic Ecolabelling Board decided to allow the use of the dispersant trimethylol propane (TMP) classified as H361fd. TMP was self-classified by the

manufacturer after a compliance review in accordance with REACH and is valid from April 2020. The purpose of the substance is to increase the spreadability of pigments and counteract lumps, and can be correlated to the fact that less paint needs to be used to cover a surface and provide a decorative layer. As TMP does not have an official harmonized classification, it was decided in May 2020 to introduce a time-limited exemption of up to 1% in pigments until 2022-05-31 to give raw material producers and licensees time to look for alternative dispersants.

On February 18, 2020, the European Commission published the decision that TiO2 will be classified as a suspected carcinogen (Category 2) upon inhalation under the CLP Regulation. The classification has been met with criticism because the risk that gives rise to the hazardous property according to CLP concerns inhalation and powder form and not the substance itself.

The classification of titanium dioxide as carcinogenic by inhalation is only applicable to mixtures in the form of powders containing at least 1% of titanium dioxide particles which are in the form of or incorporated into particles having an aerodynamic diameter of ≤ 10 μm. This means that if TiO2 or TiO2 mixtures are not in this specific form, the classification does not apply. The classification means that the use of TiO2 as a raw material goes against the Ecolabel's definition of constituent substances.

Liquid and certain solid mixtures are not classified, which is why Nordic Ecolabelling has made an exception for the use of titanium dioxide in wet products. The criteria already have a requirement regarding handling and exposure of powdered raw materials at the manufacturer. As a result of the classification, specific warning instructions and labels must be applied to the products containing more than 1% TiO2. Nordic Ecolabelling has therefore introduced an additional requirement in requirement O9 Titanium dioxide to ensure that the TiO2 risks that give rise to its classification are controlled and also documented from the raw material producer.

O4 Environmentally harmful substances

Requirement:

Ingoing substances classified as environmentally harmful with risk phrases H410, H411 and/or H412, according to CLP Regulation (No) 1272/2008, are limited in the product according to the following formula (calculation model taken from current classification rules, except that here the limit value is tougher):

M*100*H410 + 10*H411 + H412 ≤ 9.0%

Where:

H410 is the concentration of substances classified with H410 in percent

H411 is the concentration of substances classified with H411 in percent

H412 is the concentration of substances classified with H412 in percent

Where M is the multiplying factor for H410 linked to the substance's LC50, EC50 or NOEC value and biodegradable read in accordance with Table 3 below (from the CLP classification rules).

Table 3 Concentration limits and multiplying factors for substances classified as H410

Acute toxicity	Chronic toxicity

L(E)C50 value (mg/l)	M-factor	NOEC value (mg/l)	M-factor non readily biodegradable substances	M-factor readily biodegradable substances
0,1 < L(E)C50 ≤ 1	1	0,01 < NOEC ≤ 0,1	1	-
0,01 < L(E) C50 ≤ 0,1	10	0,001 < NOEC ≤ 0,01	10	1
0,001 < L(E) C50 ≤ 0,01	100	0,0001 < NOEC ≤ 0,001	100	10
0,0001 < L(E) C50 ≤ 0,001	1000	0,00001 < NOEC ≤ 0,0001	1000	100
0,00001 < L(E) C50 ≤ 0,0001	10 000	0,000001 < NOEC ≤ 0,00001	10 000	1000
Continues with factor 10 intervals		Continues with factor 10 intervals		

If information about a substance's harmfulness to the environment (in the form of data concerning toxicity and biodegradability or toxicity and bioaccumulation) is not available, the substance is treated as a worst case, i.e. as environmentally harmful – H410, and multiplication factor 1000.

For tinting systems a worst case calculation is done with the colour with most tinting paste and the base paint with most environmentally hazardous substances.

Exemptions:

Preservatives are exempted from the requirement. However, requirement O2 and O5 must still be fulfilled.

✉ 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 raw materials in line with Annex II to REACH (Regulation (EC) No 1907/2006).

✉ Calculation clearly showing that the requirement is fulfilled.

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. Nordic Ecolabelling have chosen to have a weighted formula to limit the total amounts of environmentally hazardous substances in the indoor paints and varnishes, as in the Nordic Ecolabel criteria for chemical building products. The formula for calculating environmentally harmful substances is based on the classification rules for environmentally harmful substances[18], but with a tougher limit value. The limit value of maximum 9,0% of environmentally hazardous substances in the products is set on the basis of the criteria for Chemical building products, which have the same formula but with a limit value of maximum 11%. However, in this criteria the limit value is lower with a maximum of 9,0%. The limit is

[18] CLP Regulation (Table 4.1.2): http://echa.europa.eu/documents/10162/13562/clp_en.pdf

lower than in the criteria for Chemical building products because preservatives are exempted from the calculation and the requirement.

Preservatives are exempted from the requirement because they are limited in requirement O5. At this point several preservatives classification according to CLP is not established and maybe change to a stricter environmentally harmful classification. By making an exception for preservatives the requirement is more flexible for future CLP classifications, but the criteria still maintains strict requirements to the contents of environmentally harmful substances by requirement O2 and O5.

For clarification on how this formula works, see the following example:

A paint contains several raw material that contains substances classified as environmentally harmful as follows. Please note that all substances in a raw material that are classified as environmentally harmful must be included in the calculation, and not only in the case where the whole raw material are classified as environmentally harmful.

Example:

Raw material 1:
Substance 1a: 0.01% H410
Substance 1b: 0.05% H412

Raw material 2:
Substance 2a: 0.20% H411
Substance 2b: 0.05% H412

Raw material 3:
Substance 3a: 0.30% H411

This means that in the paint there is:

H410: 0.01%, where LC50 = 1 and non readily biodegradable
H411: 0.50%
H412: 0.10%

For H410 you can then see in table 3 in the requirement that the classification limit at LC50 between 0.1 and 1 and non readily biodegradable is M (multiplying factor) =10.

The result of the calculation using the formula is thus:

((1*100*0.01) + (10*0.50) + 0.10) = 6.1%

The paint fulfils the requirement.

For tinting systems a worst case calculation is done with the colour with most tinting paste and the base paint with most environmentally hazardous substances.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
In the previous version there was a limit of the total amount of environmentally hazardous substances in the products. In the new version there is a weighted formula for environmentally hazardous substances to limit the total amounts in the finish product.

Difference compared to the EU Ecolabel requirement 5a and the related exemptions
EU Ecolabel do not have a requirement regarding a specific level of allowed environmental hazardous substances in the final product, but instead set exceptions and levels for each specified substance groups, e.g. surfactants.

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O4
The requirement is identical, except the allowed level is lower and preservatives are excepted in Nordic Ecolabel indoor paint and varnishes.

O5 Preservatives

Requirement:

- Only preservatives compliant with Directive 98/8/EC of the European Parliament and of the Council and Regulation (EU) No 528/2012 can be used.
- No preservatives added to the product or its raw materials 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 ≥ 500, the substance is considered to be bioaccumulative. If there is no BCF for a substance, that substance is considered to be bioaccumulative if logKow ≥ 4 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.

- The amounts of preservatives in the products must not exceed the limit values in Table 4a and 4b below. However, requirement O2 must still be fulfilled and it takes superiority over requirement O5.

The amounts of preservatives includes preservatives from raw materials. The limits in table 4a and 4b are the maximum theoretical amount at the time of production. The amount shall be calculated on the basis of the added preservatives and the maximum amount in the raw materials.

For tinting systems a worst case calculation is done with the colour with most tinting paste and the base paint with highest content of preservative and isothiazolinone compounds.

Table 4a Concentration limits for preservatives in the final product.

Preservative	Concentration limit
Preservatives totally* (paints, varnishes, base paints with tinting paste etc.)	700 ppm (0.0700% w/w)

**This requirement only applies to preservatives classified with one or more classifications listed in requirement 03 and the total amounts of isothiazolinones from table 4b.*

Table 4b Specific restrictions on isothiazolinones in the final product.

Preservative	Concentration limit
Total amounts of isothiazolinones	500 ppm (0.0500% w/w)
2-methyl-2H-isothiazol-3-one (CAS# 2682-20-4) (MIT**)	15 ppm (0.0015% w/w)

5-Chloro-2-Methyl-2H-Isothiazol-3-one/2-Methyl-2HIsothiazol-3-one (3:1) (CAS#: 55965-84-9) (CMIT/MIT)	15 ppm (0.0015% w/w)

***Note that the shortening MI may also be used.*

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

☒ Documentation showing that none of the preservatives are bioaccumulative.

☒ 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 dry-film preservatives, i.e. to avoid attacks of mould on the film.

Preservatives are needed in paint and varnishes because e.g. filling raw materials may have contaminations that can result in rotting of the products. Paints and varnishes have a long shelf life at the store and at the consumer. It is therefore important that the products do not rot, as this is unprofitable both from an economically and environmentally point of view.

Levels of preservatives such as 2-methyl-2H-isothiazol-3-one (CAS# 2682-20-4) (MIT, may also be called MI) 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 ingoing 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.

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.

For tinting systems a worst case calculation is done with the colour with most tinting paste and the base paint with highest content of preservatives and isothiazolinone compounds.

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. Formaldehyde and/or formaldehyde-releasing substances may be used to preserve indoor paints and varnishes. From this perspective, 2-methyl-2H-isothiazol-3-one (CAS#

2682-20-4) (MIT, may also be called MI) 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 MIT can be airborne allergenic[19,20] even in small amounts. It is therefore important to limit the amount of MIT as much as possible.

On October 4, 2018, MIT received a harmonized classification[21] published in ATP 13, where the classification comes into force May 2020. This applies to a specific concentration limit of 0,0015% as Skin sens. 1. This means that products containing >0,0015% of MIT will be labelled as H317. Since the criteria do not allow H317 on in-can preservation, Nordic Ecolabelling has chosen to change the requirement limit for the isothiazolinone MIT from 100 ppm to 15 ppm to equate the substance with the requirement of CMIT/MIT.

The isothiazolinone blend of 5-Chloro-2-Methyl-2H-Isothiazol-3-one/2-Methyl-2HIsothiazol-3-one (3:1) (CAS#: 55965-84-9) (referred to as CMIT/MIT (3:1)) is limited because this blend is highly allergenic (H314 and H317) and environmentally harmful (H400 and H410). The limit is 15 ppm (0.0015% by weight, 15 mg/kg) in Nordic Ecolabelled indoor paints and varnishes. The limit of 15 ppm was the limit that gave the risk phrase "Contains XX, may cause an allergic reaction" according to the Dangerous Substances Directive. With CLP this limit is lowered to 1,5 ppm for CMIT/MIT. Nordic Ecolabelling has however chosen to maintain the limit of 15 ppm for this mixture since that is the amount where you also can get a preservative effect. With additions as low as 1,5 ppm of CMIT/MIT will not give a good preserving effect.

Isothiazolinones are often used in blends, where several different variants go into the same products. The requirement therefore steers the total amount of isothiazolinones, with special levels for MI and CMIT/MIT (3:1) as they are allergenic in very small amounts.

Amount limits
The total content of isothiazolinone compounds (including MIT and CMIT/MIT (3:1)) in the product may be up to 500 ppm, which is the same level as in the EU Ecolabel and which comments during the public consultation period have shown, is the needed level to preserve both the product and the dry film. Dithio-2,2'-bis-benzmethylamide (CAS#: 2527-58-4) (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 (CAS#: 2527-66-4) (Methyl-BIT or simply MBIT).

The total amount of preservatives may be up to 700 ppm. It is specified that the requirement only applies for preservatives classified according to requirement 03 and preservatives from table 4b in requirement 05.

[19] National Allergy Research Centre (Videncenter for Allergi):
http://www.videncenterforallergi.dk/?site=1&side=7&id=125&pub=606
[20] DR (Danish Broadcasting Corporation): http://www.dr.dk/Nyheder/Indland/2014/05/20/104956.htm
[21] 13th ATP: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1480&from=EN

The limit for the total amount of preservatives and the limit for MIT is new in this version.

> The limits in table 4a and 4b are the maximum theoretical amount at the time of production. The amount shall be calculated on the basis on the added preservatives and the maximum amount in the raw materials.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3

Requirement that preservatives may not be bioaccumulative is new.

Requirement to the total limit for all preservatives classified as in requirement 03 and from table 4b is new.

The total limit of total isothiazolinones and CMIT/MIT (3:1) is the same.

Requirement to the total limit of 2-Methyl-2H-isothiazol-3-one (MIT) is new.

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

The requirement is more straightforward and with less requirements to specific preservatives compared to the EU Ecolabel requirement, see below.

The definition of bioaccumulative substances is a little different.

The limit for total isothiazolinones is the same with 500 ppm. 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.

The level for CMIT/MIT (3:1) is the same in the EU Ecolabel.

For MIT the Nordic Ecolabelling limit is tighter than the EU Ecolabel, with 100 ppm compared to 200 ppm in the EU Ecolabel. The lower limits have been set after discussions with paint producers.

There is no specific leves for 1,2-benzisothiazol-3(2H)-one (CAS#: 2634-33-5) (BIT) or 2-Octyl-2H-Isothiazol-3-one (CAS#: 26530-20-1) (OIT) as there are in the EU Ecolabel, but they have to be included in the calculation of the total amount of isothiazolinones.

There is no specific leves for Zinc pyrithione or N-(3-aminopropyl)-N-dodecylpropane-1,3-diamine (CAS#: 13463-41-7) as there are in the EU Ecolabel, but instead a total limitation of perservatives.

There is no specific requirements to preservatives in colourants/tinting pastes dispensed from tinting machines, as there is in the EU Ecolabel. Instead the requirements shall be fulfilled by a worst case calculation for tinting system with the colour with the most tinting paste and the base paint with highest content of preservatives and isothiazolinone compounds.

The total limitation of preservatives is a little different with only one level, and no special level for products intended for use in areas with high humidity.

A product with the EU Ecolabel has to show fulfilment of the stricter limits of MIT. For tinting systems a worst case calculation have to be done with the colour with most tinting paste and the base paint with highest content of preservatives and isothiazolinone compounds. In addition it has to be shown that the preservative is not bioaccumulative according to the definition in the Nordic Ecolabel and that the level of preservatives in no more than 600 ppm (0.060% by weight).

Difference compared to the Nordic Ecolabel Chemical building products requirement O5
The definition of bioaccumulative substances is the same.

The level of CMIT/MIT (3:1) is the same. The other requirements levels have to be calculated.

O6 Formaldehyde

Requirement:

- Products must not contain actively added formaldehyde (CAS#: 50-00-0).

  Note that the definition of ingoing substances has been waived regarding potential formaldehyde releasing substances.

- The level of free formaldehyde (from formaldehyde not intentionally added) in the final product must not exceed 10 ppm (0.001% by weight, 10 mg/kg)*.

The level of free formaldehyde must be measured for the final product. A calculation based on the contents of free formaldehyde in each raw material cannot be done. The test laboratory must fulfil the requirements in appendix 5.

For tinting systems the colour with the tinting paste and the base paint predicted to contain the highest theoretical amount of formaldehyde (worst case) shall also be determined and measured.

* *Measured with EPA 8315A , VdL-RL03, the Merckoquant method (appendix 2 to RAL-UZ 102), or other equivalent test method.*

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

☒ Test report according to EPA 8315A , VdL-RL03, Merckoquant method (see appendix 2 to RAL-UZ 102) or other equivalent test method for the products showing that requirement is met.

☒ Documentation for that the test laboratory fulfil the requirements in appendix 5.

☒ **Background to the requirement**
Formaldehyde (CAS#: 50-00-0) 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.

Formaldehyde is permitted as residuals from e.g. newly produced polymers since, in Nordic Ecolabelling's experience that newly produced polymers may contain residual monomers in the form of formaldehyde. Products must not, however, have actively added formaldehyde.

The detection limit for the Merckoquant method is 10 ppm, while the VdL-RL 03 method ("Concentration of free formaldehyde determined using the acetyl-acetone

method") do not have a specific detection limit. However if the laboratories have the correct equipment then a detection limit of 10 ppm is technically easy to obtain, even a detection limit of 0,25 ppm is possible according to laboratories that the Nordic Ecolabelling has been in contact with.

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 10 ppm if preservatives or polymer binders that are formaldehyde donors are used. Evidence was submitted of the range of preservatives that this encompasses[22] 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 (CAS#: 52-51-7) and Dodecyldipropylene triamine (CAS#: 2372-82-9) (BDA).

Polymer dispersions (binders) can have residual concentration of formaldehyde and this can be difficult to avoid. However, there is no special requirements to formaldehyde in polymeres as in the EU Ecolabel criteria or the Nordic Ecolabel criteria for Chemical building products. Residual concentration of formaldehyde from polymer dispersions (binders) is covered by the general environmental requirements regarding residuals. Therefore residual levels of formaldehyde from polymer dispersions (binders) is allowed, as long as the content of free formaldehyde do not exceeds 10 ppm in the final product.

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.

The requirement was updated on May 15, 2018 with a clarification regarding the definition of ingoing substances concerning formaldehyde releasing substances in this requirement.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
Compared to the previous version the limit of 10 ppm formaldehyde in the final products is the same.

In the new version it is clearly formulated that the final product must be tested and test method EPA 8315A is added in examples of accepted methods.

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 exceptions for formaldehyde donors and residual formaldehyde from polymer dispersion (binders). 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.

[22] 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

It is specified that the limit values applies for the base together with the colour tint with highest theoretical amount of formaldehyde.

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

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O6

The requirement is almost identical to the Nordic Ecolabel chemical building products requirement. But there is no special requirements regarding formaldehyde releasing substances and residual concentration of formaldehyde from polymer dispersions (binders). In addition it is clearly stated that the level of free formaldehyde must be measured for the final product and not calculated based on raw material. Also text regarding tinting systems is added. Test method EPA 8315A is also added.

O7 Residual monomers in polymers

Requirement:

For each polymer present in the product >1 % the quantity of residual monomers* and its classification have to be stated and may be no more than 100 ppm of each classification in table 5.

For tinting systems a worst case calculation is done with the colour with most tinting paste and the base paint with most residual monomers.

**The quantity of residual monomers is to be stated for newly produced polymers and on the basis of the content in the raw material.*

Table 5 Classification of residual monomers

Classification according to CLP Regulation 1272/2008	
Hazard class and category	**H-phrase**
Carcinogenic Carc 1A/1B/2	H350, H351
Mutagenic Mut 1A/B/2	H340, H341
Toxic for reproduction Repr 1A/1B/2, Lact	H360, H361, H362
Specific target organ toxicity with single exposure STOT SE 1-2	H370, H371
Specific target organ toxicity with repeated exposure STOT RE 1-2	H372, H373
Respiratory sensitisation 1/1A/1B	H334

The classifications are in accordance with the prevailing CLP Regulation EC (No) 1272/2008.

Exemption:

Vinyl acetate (CAS#: 108-05-4) can be in the polymer as residual monomer up to 1000 ppm.

☒ 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
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 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 carcinogenic, mutagenic, toxic for reproduction, acute Tox 1-3, specific target organ toxicity or sensitisation. The unwanted classifications are based on the classifications limits of ingoing substances in requirement O3.

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. The limit is set at 100 ppm per classification in table 5 based on licence data. The limit of 100 ppm residual monomers is to be calculated on the basis of the content in the raw material.

> Exemption vinyl acetate:
>
> Vinyl acetate (CAS#: 108-05-4) is used in polymer dispersions in for example paint. According to the ECHA webpage it is classifed among others as Carc. 2 H351. This classification is relatively new and was made in the transition to CLP. Before vinyl acetate was only classified as flammable. Because the classification as Carc. 2 H351 is so new, there has not been much focus on reducing this monomer in the polymers and it is therefore difficult to obtain polymers containing less than 100 ppm of vinyl acetate. Because these kinds of polymer dispersions are important in the production there has been made an exemption for up to 1000 ppm of vinyl acetate in the polymer. The exemption for up to 1000 ppm is similar to the criteria for Chemical building products.

Nordic Ecolabelling decided in November 2016 in connection with the adjustment of O3 change even O7 so that acute tox was removed from the list of residual monomers in polymers that can not be present in 100 ppm. In March 2017 it was decided to clarify that the requirement to monomers applies only to polymers that are present in the product in over 1 %. These are usually, but not always, binders.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is new.

Difference compared to the EU Ecolabel requirement appendix 7c
The EU Ecolabel requirement excludes all unreacted monomers (including acrylic acids) if the content exceeds 500 ppm in the final product. The Nordic Ecolabel requirement focuses on the monomers that are classified according to table 5. The limits differ as well, since the Nordic Ecolabel requirement's limit is set on each monomer in the polymer. This means that the requirement in Nordic Ecolabel is more focused, as only specific classifications is restricted.

A product with the EU Ecolabel will need to show fulfilment of this requirement when applying for the Nordic Ecolabel because of the 100 ppm limits of classification in table 5 for each polymer.

Difference compared to the Nordic Ecolabel Chemical building products requirement O7
The requirement is identical, except:

- The requirement is formulated a little different

O8 Heavy metals

Requirement:

The following heavy metals or heavy metal compounds must not be present in the product or in its rawmaterials:

- Cadmium
- Lead
- Chromium VI
- Mercury
- Arsenic
- Barium (with the exception of barium sulphate, and other equally insoluble barium compounds)
- Selenium
- Antimony*

Traces of the above mentioned metals from residuals can be included up to 100 ppm (100 mg/kg, 0.0100% by weight) per single metal in the raw material.

** An exception is made for antimony in pigments contained in a TiO_2 rutile lattice on the following terms: test results must prove that the molecular structure is inert and that the environmental and health effects of the pigment are on the same level as, or better than, the results for C.I Pigment Brown 24 CAS no. 68186-90-3 and C.I Pigment Yellow 53 CAS no. 8007-18-9 in the report: UNEF Publications, OECD SIDS Initial Assessment Profile (www.inchem.org).*

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

✉ For pigment that contains antimony integrated into a TiO_2 rutile lattice, documentation must be submitted to show that the molecular structure is inert and that the environmental and health effects of the pigment are on the same level as, or better than, the results for C.I Pigment Brown 24 CAS no. 68186-90-3 and C.I Pigment Yellow 53 CAS no. 8007-18-9 in the report: UNEF Publications, OECD SIDS Initial Assessment Profile (www.inchem.org).

Background to the requirement
Nordic Ecolabelling restricts heavy metals ("heavy metals" refers in this case to heavy and particularly environmentally harmful metals as specified in the text) because they are toxic to people and other organisms, both on land and in the aquatic environment. On forested land, metals can end up in microorganisms in such a way that the degradation of dead organic material and thus the release of nutrients are slowed[23].

On agricultural land, metals can disrupt the organisms in the soil, or have a directly toxic effect on plants. Metals on agricultural land can also be taken up by crops to varying degrees, leading to human exposure[24].

[23] SOU 2000:53
[24] SOU 2000:53

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[25].

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

The metals and their compounds – cadmium, lead, chromiumVI, mercury, arsenic, barium (with the exception of barium sulphate, and other equally insoluble barium compounds), selenium and antimony – must therefore not be included in the product or in its ingoing substances. It is, however, accepted that ingoing substances may contain traces of the substances in the form of residuals. Trace amounts of each heavy metal must not exceed 100 ppm (0.1 mg/kg, 0.01% by weight) in the raw material. This means that the requirement is more strict than the general limit for residuals specified in section "1 General environmental requirement". It is relevant to set a stricter requirement to residuals of heavy metals since they are included in the raw materials in indoor paints as sand, gravel etc. The requirement has been set by the Nordic Ecolabel to steer toward natural raw materials with lower amounts of residuals.

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.

The EU Ecolabel has an exemption for cobalt in driers. Cobalt driers are often classified as H361 and is therefore no allowed through requirement O3. There are alternative driers on the market, for example iron driers. Solid cobalt is classified as H317, H334 and H413, and there is therefore no reason to include cobalt in this requirement.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is almost the same, except that an exception for Antimony is added in the new version. In addition in the old version there were requirements to cobalt, in the new version there is no special requirement to cobalt, but problematic compounds with cobalt is covered by requirement O3.

Difference compared to the EU Ecolabel requirement Appendix 5b
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 ingoing substances differs, which means that a product with the EU Ecolabel will need to send in updated information to show fulfilment of this requirement.

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 residuals in the raw material.

The EU Ecolabel has an exemption for cobalt in driers. Cobalt driers are often classified as H361 and is therefore no allowed through requirement O3. Solid cobalt is classified as H317, H334 and H413. There are alternative driers on th e market, for example iron driers.

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O8
The requirement is identical.

O9 Titanium dioxide

Requirement:

[25] Ahlstedt, 1999

If the product contains more than 3.0% by weight titanium dioxid (CAS#: 13463-67-7):

1. The raw material manufacturer must meet the requirements for powder handling according to O10.

2. In addition, emissions from the production of titanium dioxide shall not exceed the values given below during the sulphate process and the chloride process, respectively.

Sulphate process:

SO_X expressed as SO_2: 7.0 kg/tonne TiO_2

Sulphate waste: 500 kg/tonne TiO_2

Chloride process:

When using natural ore: 103 kg chloride waste/tonne TiO_2

When using synthetic ore: 179 kg chloride waste/tonne TiO_2

When using slag ore: 329 kg chloride waste/tonne TiO_2

If more than one type of ore is used, the values apply proportionately to the ore types used.

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

☒ If the product contains titanium dioxide a calculation is to be submitted showing the amount in % by weight in the final product. If the final product contains more than 3.0% by weight titanium dioxide a description from the titanium dioxide producer and calculation is to be submitted, clearly showing that the requirement is fulfilled.

☒ Description of how powdered raw materials are handled during the production process.

Background to the requirement

Titanium dioxide (CAS#: 13463-67-7) 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 SO_X emissions and sulphate wastes from the chloride process. The Titanium Dioxide Harmonisation Directive[26] does not stipulate limits for SO_X emissions for chloride wastes. Furthermore, stakeholders have argued that the levels of SO_X 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)[27], 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[28] 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.

[26] 92/112/EEG
[27] Best Available Technology for the Manufacture of Large Volume Inorganic Chemicals (BREF), EC, August 2007
[28] IVL-report B 1338-A

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.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is set out differently in the new version. In the previous version the requirement was regarding 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.

A product with the EU Ecolabel does not need to send in further information on this requirement.

Difference compared to the Nordic Ecolabel Chemical building products requirement O9
The requirement is identical.

O10 Powdered raw materials

Requirement:

Raw materials in powder form must be added in a closed system, in a suspension or by means of a method that promotes a "low-dust" working environment e.g. using protective equipment which heavily reduce the dust or completely remove the dust from the raw materials (e.g. exhaust ventilation, personal protective equipment and clear safety instructions).

✉ Description of how powdered raw materials are handled during the production process.

Background to the requirement
A requirement has been set that substances in powder form must be added in a closed system, in a suspension or by means of a method, e.g. protective equipment that ensures a "low-dust" working environment. The protective equipment/method should heavily reduce or completely remove the dust from the raw materials. The aim of the requirement is to ensure that the working environment is as dust-free as possible to secure a good working environment for those involved in manufacturing the indoor paint and varnishes.

Respirable crystalline silica/quartz is present as an impurity in most mineral fillers and is therefore commonly used in indoor paint. It is classified as STOT RE 1 (see O3), but

when it is mixed into the wet paint it binds to larger particles and is therefore no longer "respirable". To protect the people working in the production the requirement for constituent powdered substances is important for raw materials containing respirable silica, which is in powder.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is new.

Difference compared to the EU Ecolabel requirement 5 (a)(ii)
EU Ecolabel has references to specific regulations which the Nordic Ecolabel has not. But the main purpose of the requirement is the same, to protect the workers during the production.

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O10
The requirement is identical.

O11 Nanoparticles

Requirement text:

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 annex V point 7 in REACH.
- Synthetic amorphous silica*** and precipitated calcium carbonate (PCC)
- Polymer dispersions

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

*** Nano-titanium dioxide (nano-TiO2) 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 O3 (classification of ingoing chemical substances) and requirement O12 (Other substances excluded from use).*

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

✉ 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
There remains a great deal of uncertainty about how nanoparticles affect health and the

environment[29]. Based on the precautionary principle, Nordic Ecolabelling wishes to adopt a restrictive stance on the use of nanoparticles in Nordic Ecolabelled products.

Definition
The nano definition in indoor paint and varnishes is according to the European Commission's definition of nanoparticles[30]: "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."

Relevance for the product group
A summary of the Nordic Ecolabelling's evaluation of nanomaterials in indoor paint and varnishes is presented below. For more detailed information about specific nanoparticles the Nordic Ecolabelling can be contacted.

In the product group of indoor paint and varnishes it is hard to formulate requirements to the content of nano particles. Indoor paint and and varnishes products consist of many ingoing substances and it is difficult to keep an overview of all ingoing components and the size distributions of them. Many of the traditional raw materials used in indoor paint and varnishes 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 raw materials 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 indoor paint and varnishes it may be useful to differentiate between traditional and new nanomaterials. The traditional nanomaterials are widely used in indoor paint and varnishes have been in use for decades. In a memo from the EU commission from 2012 carbon black (furnace black, lamp black) and amorphous silica (CAS#: 7631-86-9) (SiO_2) 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[31]. 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[32] (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.

[29] 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 (21/5-13)
[30] COMMISSION RECOMMENDATION of 18 October 2011 on the definition of nanomaterial (2011/696/EU)
[31] 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
[32] H. V. Kristensen et al, Nanoteknologiske overflader og nye kvalifikationskrav, Teknologisk Institut, 2010

Nanoparticle exposure in paint products

Various studies have been conducted on nanoparticles in indoor paint and varnishes and their effects.

Many different risk assessments on nanoparticles in paint and varnishes 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"[33] . 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 Commission through the framework program FP7 "Activities towards the development of appropriate solutions for the use, recycling and/or final treatment of nanotechnology-based products"[34]. 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.

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 (Titanium dioxide CAS#: 13463-67-7) 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)[35]. 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 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[36]. 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[37]. The carbon black used in paint is very finely ground and has a particle size of around 10-30 nm[38]. Iron oxide pigment may entirely comprise particles of nano size, or only a fraction of the particles may be nano.

[33] Website for the project NanoKem: http://www.arbejdsmiljoforskning.dk/da/projekter/nanopartikler-i-farve-og-lakindustrien---nanokem (6/1-14)
[34] 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)
[35] 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
[36] Coatings Handbook; Thomas Brock, Michael Groteklaes, Peter Mischke; 2000
[37] Industrial Organic Pigments; W. Herbst, K. Hunger; Third edition 2004; sid 120-124
[38] Coatings Handbook; Thomas Brock, Michael Groteklaes, Peter Mischke; 2000; sid 128

A discussion with Kronos International[39], 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[40].

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

Amorphous silica (SiO_2)
As mentioned above, synthetic amorphous silica is considered a traditional raw material in paint. Since amorphous silica is a nanomaterial, under the European Commission definition, 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 register[41].

[39] Email correspondence with the SHE Director at Kronos International, INC, 12.11.12
[40] W. Herbst, K. Hunger, Industrial Organic Pigments, Third edition 2004
[41] Link to Miljøstyrelsens consultation: http://hoeringsportalen.dk/Hearing/Details/16910 (visited 20/1-14)

In REACH directive (1907/2006/EF[42]) 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[43] to the second "Regulatory Review on Nanomaterials" from 2012[44] 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 nanoparticles that is in the products.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is new.

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 nanoparticles, but there is no restriction of the nanoparticles.

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O11
The requirement is identical to the Nordic Ecolabel chemical building products requirement.

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[42] Link to REACH-directive: http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_396/l_39620061230en00010849.pdf
[43] 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
[44] 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

O12 Other substances excluded from use

Requirement:

The product must not contain ingoing substances that are:

- Substances on the Candidate List*.
- Substances evaluated by EU as PBT (Persistent, bioaccumulative and toxic) or vPvB (very persistent and very bioaccumulative), in accordance with the criteria in annex XIII in REACH.
- Substances considered to be potential endocrine disruptors in category 1 or 2 on the EU's priority list of substances that are to be investigated further for endocrine disruptive effects. See link: http://ec.europa.eu/environment/chemicals/endocrine/strategy/substances_en.htm
- Organotin compounds
- Phthalates
- APEO – alkylphenol ethoxylates and alkylphenol derivatives (substances that release alkylphenols on degradation).
- Halogenated organic substances, including perfluorinated substances and polyfluorinated alkylated substances (PFAS)**. Exemptions for:
    - Preservatives that fulfil O5
    - Paint pigments that meet the EU's requirements concerning colourants in food packaging under Resolution AP (89) point 2.5.
    - Driers in oxidative drying paints, see also O3 regarding classifications.
- Isocyanates– Exemption for water-borne polyisocyanates with a chain length of more than 10, where the concentration of isocyanates with a chain length of less than 10 as an impurity is documented.
- Fragrances

** The Candidate List (list of Substances of Very High Concern established according to article 59 of REACH) can be found on the ECHA website at: http://echa.europa.eu/candidate-list-table*

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

☒ If halogenated organic pigments are used, a declaration is required from the pigment supplier confirming that the pigment meets the EU's requirement concerning colourants in food packaging under Resolution AP (89) point 2.5.

☒ If water-borne polyisocyanates with a chain length of more than 10, where the concentration of isocyanates with a chain length of less than 10 as an impurity are used, send documentation showing this.

Background to the requirement

There are a number of requirements here about substances that the product must not contain. The reason/background for this is stated below in each case:

Substances of Very High Concern and the Candidate List

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

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

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

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

"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 indoor paint and varnishes. PBT and vPvB are defined in Annex XIII of REACH (Regulation (EC) No 1907/2006). Materials that meet or substances that form substances that meet the PBT or vPvB criteria can be found at: http://esis.jrc.ec.europa.eu/.

A list can also be found on: http://esis.jrc.ec.europa.eu/index.php?PGM=pbt.

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 disruptors45. 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[46], see http://ec.europa.eu/environment/endocrine/documents/final_report_2007.pdf.

[45] Miljøstatus i Norge, 2008:
[46] http://ec.europa.eu/environment/endocrine/documents/final_report_2007.pdf
http://ec.europa.eu/environment/endocrine/documents/bkh_report.pdf#page=1
http://ec.europa.eu/environment/endocrine/documents/wrc_report.pdf
http://ec.europa.eu/environment/docum/pdf/bkh_main.pdf

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

Organotin compounds: organotin compounds in indoor paints and varnishes may only be used to a small degree, but to have consistence with the criteria of chemical building products and especially appendix 2 for raw materials between the two criterias, organotin compounds included in this requirement.

Organotin compounds are used as a catalyst in sealants that harden through cross-linking. The level of tin catalyst depends on the cross-linking system, and the quantity of silicone or polymer.

Organotin compounds were on the Danish Environmental Protection Agency's list of undesirable substances[47], but were subsequently removed since they are used in quantities of less than 100 tonnes per year. They have a number of inherent properties that are not desirable in Nordic Ecolabelled indoor paint and varnishesproducts, such as endocrine disrupting and environmentally hazardous, see more below.

Tributyltin (TBT, CAS#: 688-73-3) is usually self-classified as H301, H312, H315, H319, H372, H400 and H410[48]. Dibutyltin (DBT, CAS#: 1002-53-5) is usually self-classified as H302[49]. Triphenyltin (TPT, CAS#: 668-34-8) is usually self-classified as H301, H311, H331, H400 and H410[50]. Tributyltin (TBT) is the organotin compound that has been most thoroughly studied. TBT has been proven to have endocrine disruptive effects on marine organisms. Raised TBT concentrations have been recorded in various species of marine mammal, and research results show that the substance penetrates the blood-brain barrier and the hepatic barrier, and suppresses the immune system of mammals[51].

Plasticisers – Phthalates: 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 (CAS#: 117-81-7, DEHP), dibutyl phthalate (CAS#: 84-74-2, DBP), butyl benzyl phthalate (CAS#: 85-68-7, BBP) and dimethoxyethyl phthalate (CAS#: 117-82-8, 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 phtalate compounds are also listed on the candidatelist, these are: DEHP (bis-(2-ethylhexyl)phtalate), DBP

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[47] http://www2.mst.dk/udgiv/publikationer/2010/978-87-92617-15-6/pdf/978-87-92617-16-3.pdf
[48] ECHA: www.echa.eu (http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=3635&HarmOnly=no?fc=true&lang=en, 24.06.2013)
[49] ECHA: http://clp-inventory.echa.europa.eu/DetailsOfNotifAndLabelling.aspx?SubstanceID=154766&NotificationID=10600814
[50] ECHA: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=228892&HarmOnly=no?fc=true&lang=en (24.06.2013)
[51] http://www.havet.nu/dokument/Havet2007-tbt.pdf (visited 14.01.2013)

(dibutylphtalate), BBP (benzylbutylphtalate), DIBP (CAS#: 84-69-5, diisobutylphtalate), DPP (CAS#: 131-18-0, dipentylphtalate), PiPP (pentaisophenylphtalate), DiPP (diisopentylphtalate), N-pentyl-isopentyl phatlate (CAS#: 776297-69-9) and DMEP (bis(2-methoxyethyl)phtalate). All are on the list due to their classification a toxic for reproduction.

The limitation of the use of DEHP, DBP, BBP, DINP (CAS#: 28553-12-0, diisononylphthalate), DIDP (CAS#: 26761-40-0, diisodecylphthalate) and DNOP (CAS# 117-84-0, di-n-octylphthalate) are also regulated by REACH Appendix XVII.

DIHP (CAS#: 68515-50-4) 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[52] where it is noted to have properties such as toxic to reproduction category 1B, 2 and 3 and therefore evaluated as a non-desirable phthalate in Nordic Ecolabelling.

In the EU Ecolabel criteria for indoor and outdoor paints (decision November 2013) a number of phthalates are excluded.

By precautionary reasons Nordic Ecolabelling choses to go on to exclude phthalates from the criteria as a group, since this group consists of a number of phthalates with different properties.

To ensure steerability for the requirement on phthalates, we are excluding phthalates from use in Nordic Ecolabelled indoor paints and varnishes in this requirement.

APEO[53,54,55]: Alkylphenol ethoxylates and alkylphenol derivatives, i.e. substances that release alkylphenols on degradation, must not be used in ecolabelled indoor paint and varnishes. APEO may occur in: binders, dispersants, thickeners, siccatives, anti-foaming agents, pigments, waxes, etc. APEO have a number of problematic environmental and health properties. They are not readily degradable according to standardised tests for ready degradability, they tend to bioaccumulate, they have been found in high concentrations in waste sludge, degradation products of APEO, alkylphenols and APEO with one or two ethoxy groups are very toxic to aquatic organisms and certain alkylphenols are suspected of being endocrine disruptors. Alkylphenols and bisphenol A are among the more potent chemicals with oestrogen effects that may occur in wastewater.

APEO-containing raw materials may be replaced with APEO-free raw materials that are based on three groups of surfactants: alkyl sulphates, alkyl ether sulphates and alcohol ethoxylates. These three groups of surfactants are readily degradable under aerobic and anaerobic conditions, and they are toxic or highly toxic to aquatic organisms.

Alkyl sulphates and alkyl ether sulphates are not considered to be bioaccumulative, but certain alcohol ethoxylates (in long chains with few ethoxylate units) have the potential to bioaccumulate. Even if the substituted surfactants are toxic or highly toxic to

[52] ECHAs rapport om DHNUP:
http://echa.europa.eu/documents/10162/13638/supdoc_dhnup_c7_11_20110526_en.pdf
[53] Substitution af alkylphenolethoxylater (APE) i maling, træbeskyttelse, lime og fugemasser, Working report from the Danish Environmental Protection Agency, No. 46/2003
[54] Nonylphenol og nonylphenolethoxylater i spildevand og slam, Miljøprojekt nr. 704/2002
[55] Feminisation of fish, Environmental Project no. 729, Danish Environmental Protection Agency, 2002

aquatic organisms, there is an environmental benefit to the substitution, since they are readily degradable. A further advantage of replacing APEO is that the degradation product nonylphenol is avoided. This product may be an endocrine disruptor.

Halogenated organic substances: Organic substances that contain halogenated substances such as chlorine, bromine, fluorine or iodine must not appear in Nordic ecolabelled indoor paint and varnishes. 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. There is therefore a requirement that halogenated organic compounds must not appear in indoor paint and varnishes. This means that substances such as brominated flame retardants, chlorinated paraffins, perfluoralkyl compounds and certain plasticisers are not permitted in Nordic Ecolabelled indoor paint and varnishes.

Perfluorinated substances and polyperfluorinated alkylated substances: 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[56,57.] 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.

There are also halogenated pigments used in the paint industry. There is an exception of the preservatives that fulfil O5 and for pigments fulfilling the EU requirements for pigments in food packaging according to Resolution AP (89) point 2.5. The reason for including a requirement that pigments need to fulfil Resolution AP (89) is that the Nordic Ecolabelling does not wish to allow PCBs at all but since it is not possible to set a zero limit for pigments, the Nordic Ecolabelling has chosen to use the same limit as in food packaging (Resolution AP (89) point 2.5). This level has been chosen since it is a well-known method in the industry and the low level used in food packaging is considered strict enough for indoor paint and varnishes. The exemption for these halogenated pigments is needed to make it possible to produce products with good colourfastness without choosing pigments with even worse environmental profile.

This requirement was updated on June 1 2016 to include an exemption for driers used in oxidative drying paints, see also under requirement O3. These driers can contain halogenated organic substances and therefore need to be exempted.

Isocyanates: Isocyanates cause allergies and asthma and some, including TDI (toluene diisocyanate), are also carcinogenic. There are therefore special regulations governing work with material containing 0.5% isocyanates. Isocyanates are toxic to organisms in the environment.

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

Nordic Ecolabelling has chosen to exclude the use of isocyanates, based on their problematic properties, not least the following: "The harmfulness of isocyanates is reflected in the limit value set for their use. Most people are aware that organic solvents are harmful. However, if we compare the limit value for the solvent toluene with the limit value for isocyanates, the latter is 100.000 times lower. Isocyanates are 100.000 times more dangerous than toluene"[58].

Nordic Ecolabelling has chosen to do an exception for water-borne polyisocyanates with a chain length of more than 10, since they are used in water-based paints, for example in binders. These long-chain polyisocyanates are considered non-reactive since they are fully polymerised, which means fully reacted and stable. They are therefore unlikely to react and release isocyanates when used, for example when paint is applied. (Polymerisation: a reaction where two or more molecules bond and make a polymer. The polymer thereby comprises many identical units, with each unit called a monomer).

Fragrances: Fragrances must not be present in Nordic Ecolabelled indoor paint and varnishes since fragrances do not have a function in the use of any indoor paint and varnishes. Nordic Ecolabelling is not aware of any fragrances being used in indoor paint and varnishesbut, since fragrances are gaining a foothold in many products, Nordic Ecolabelling wishes to prevent future use of fragrances in indoor paint and varnishes.

Note that naphtha and bisphenol A have been deleted from this list, since their classification excludes them from use under requirement O3.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
In the previous version was APEO, perfluorinated substances and polyperfluorinated alkylated substances also not permitted.

In the previous criteria halogenated organic solvents with specific classifications were not permitted. In the new version halogenated organic substances is not permitted, except preservatives that fulfil O5 and paint pigments that meet the EU's requirements concerning colourants in food packaging under Resolution AP (89) point 2.5.

The other requirements in the new version are new.

Difference compared to the EU Ecolabel requirement 5b, appendix 4b, 4c and 6b
The requirement covers many of 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 ingoing substances and residuals.

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% by weight."

[58] http://www.leksikon.org/art.php?n=3600

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O12
The requirement is identical.

O13 Content of Volatile (VOC) and Semi-volatile Organic Compounds (SVOC)

Requirement:

The maximum content of Volatile Organic Compounds (VOCs) and Semi-Volatile Organic Compounds (SVOCs) shall not exceed the limits given in Table 6.

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

For tinting systems the content of VOCs and SVOCs shall be determined for the colour with most tinting paste and the base paint with highest content of VOC and SVOC.

The VOC and SVOC content shall be determined either by testing the final product or by calculation based on the raw materials*.

The test methods given in ISO 11890-2 shall be used. For the SVOC content, guidance given in appendix 4 regarding test method ISO 11890-2 shall be followed.

Instead of testing the SVOC content, the emission of Total Semi-Volatile Organic Compounds (TSVOC) can be tested for the final product with test method CEN/TS 16516, EN 16516, ISO 16000-6/-9/-10/-11 or EN 16402 all after 28 days, see table 6a.AgBB, Indoor Air Comfort, Indoor Air Comfort Gold or Blue Angel certification are also accepted as documentation for the level of TSVOC emission.

The test laboratory must fulfil the requirements in appendix 5.

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 n-Tetradecane ($C_{14}H_{30}$).

Semi volatile organic compounds (SVOCs) means any organic compound having a boiling point greater than 250 °C and less than 370 °C measured at a standard pressure of 101,3 kPa and which, in a capillary column are eluting with a retention range after n-Tetradecane (C14H30) and up to and including n-Docosane ($C_{22}H_{46}$).

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 6. 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 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 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 6a. TSVOC emission limits from the final product (alternative to SVOC content requirement in table 6)**

	TSVOC limit (mg/m3 after 28 days)
All products	0.1

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

✉ Test report or calculation showing that the content level of VOC and SVOC in the final product in table 6 is fulfilled, based on test of the final product or on all ingoing raw materials using test methods given in ISO 11890-2. For the SVOC content, guidance given in appendix 4 regarding test method ISO 11890-2 shall be followed.

✉ If alternative for content of SVOC is used: Test report showing that the level of TSVOC emission from the final product in table 6a is fulfilled, based on test of the final product using methods given in CEN/TS 16516, EN 16516, ISO 16000-6/-9/-10/-11 or EN 16402 all after 28 days. AgBB, Indoor Air Comfort, Indoor Air Comfort Gold or Blue Angel certification are also accepted as documentation for the level of TSVOC emission.

✉ Documentation for that the test laboratory fulfil the requirements in appendix 5.

Background to the requirement

<u>VOC – Volatile Organic Compounds</u>
Volatile organic compounds (VOCs) are defined here as follows:

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 n-Tetradecane ($C_{14}H_{30}$). These are measured according to the methods given in the VOC directive (2004/42/EC), i.e. as follows:

- Levels of volatile organic compounds are measured in g/l, according to the method ISO 11890-2 2002.
- Levels of volatile organic compounds where reactive diluents are present are measured in g/l, according to the method ASTMD 2369.

A lower initial boiling point is not defined in Directive 2004/42/EC, but 60°C maybe appropriate.

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 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[59].

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[60].

The lowest content levels are set for matt interior wall and ceiling paints, with a further reduction from 15 to 10 g/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.

The limits on VOC have been made more stringent in this version of the indoor paints and varnishes criteria for all categories in table 6 besides primers and binding primers (categories g and h), which have been kept at the same limit as before.

SVOC – semi Volatile Organic Compounds
Semi volatile organic compounds (SVOCs) are defined here as follows:

Any organic compound having a boiling point greater than 250 °C and less than 370 °C measured at a standard pressure of 101,3 kPa and which, in a capillary column are eluting with a retention range after n-Tetradecane (C14H30) and up to and including n-Docosane ($C_{22}H_{46}$). 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[61] and the German Blauer Engel (Blue Angel)[62] specifically limit their use in paints, so inclusion in the EU Ecolabel and Nordic Ecolabelling will harmonise criteria.

Construction and building products are a major source of SVOCs and the Construction Products Directive[63] has an optional criterion[64] that SVOCs need to be avoided within the sector[65]. The major issue is that SVOC's can redistribute themselves from one

[59] http://www.epa.gov/iaq/voc.html
[60] http://ec.europa.eu/environment/air/pollutants/stationary/paints/paints_review.htm
[61] Das Österreichische Umweltzeichen: http://www.ecolabelindex.com/ecolabel/osterreichisches-umweltzeichen-austrian-ecolabel (2014-10-03)
[62] Blauer Engel http://www.blauer-engel.de
[63] Construction Products Directive 89/106/EEG
[64] European Collaborative Action. Urban air, indoor environment and human exposure. Report N 27; Harmonisation framework for indoor material labelling schemes in the EU (2010)
[65] CEN/TC 351 Construction products: Assessment of the release of dangerous substances.

surface, such as paints, onto other surfaces, from which they can be inhaled and ingested[66].

Binders were also identified as an environmental hot spot from LCA evidence, in the EU Ecolabel revision. The proposed introduction of 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.

Test methods and instructions for VOC and SVOC content:
The VOC and SVOC content shall be determined by testing the final product using test methods given in ISO 11890-2. Calculation on the basis of the contents of VOC and SVOC in each raw material is also possible. The calculation shall be based on information about the content of VOC and SVOC in each raw material determined by methods given in ISO 11890-2.

For VOC the test method is ISO 11890-2 on the basis of test methods in Directive 2004/42/EC.

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

For SVOC an approach based on ISO 11890-2 was the consensus from industry stakeholders, during the EU Ecolabel revision process (EU criteria 2014/312/EU). 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.

The scope of ISO 11890-2 does not cover SVOC measurement, meaning that laboratories contacted by applicants that decide to use SVOC measurement will interpret SVOC content testing in a different manner. This will lead to systematically different test results, and ambiguous statements of compliance.

Ideally, ISO 11890-2 should be amended for its scope to include SVOC determination. As the standardisation process can take some time, appendix 4 in the Nordic Ecolabel criteria for Indoor paint and varnishes aims at providing guidance to laboratories delivering SVOC test data based on ISO 11890-2, until the standard has been modified to include SVOC measurement. These test data could then be used in the application dossier for the Nordic Ecolabel. The guidance in appendix 4 is identical to the recommendations for SVOC testing in the EU Ecolabel criteria (2014/312/EU).

TSVOC - Total Semi-volatile Organic Compounds:
Total Semi-volatile Organic Compounds (TSVOC) is the sum of Semi-volatile Organic Compounds (SVOC). However please note that the definitions of VOC and SVOC are

[66] EnVIE; Coordination Action on Indoor air Quality and Health Effects

not identical when speaking of emission from and content in the products, respectively. Emission of VOC is all individual substances within the retention range C_6 - C_{16}, and emission of SVOC is all individual substances within the retention range > C_{16}- C_{22}. An alternative to measure the content of SVOC is to measure the emission of TSVOC from the final product. The content of VOC shall however still be determined by test method ISO 11890-2. The level of emission of TSVOC is however not directly correlated with the content levels of SVOC in the product. Because the test metode (modified ISO 11890-2) for the content level of SVOC is new and the requiremet for SVOC content also is new in this criteria, it is decided to have an alternative to this requirement. The alternativ is the emission of TSVOC, because issue of emission is important regarding health and in addition the test methods are well known and widely used, also by other certifications systems. Emission of TSVOC is used by several other certifications systems e.g. AgBB, Blue Angel, Indoor Air Comfort and Indoor Air Comfort Gold. BREEAM and BREEAM-NOR have requirements to emission of TVOC, but not TSVOC. Please note that products cannot be BREEAM or BREEAM-NOR certified, only buildings can.

The emission of TSVOC shall be documented by test report using test method CEN/TS 16516, EN 16516, ISO 16000-6/-9/-10/-11 or EN 16402. Please note that EN 16516 are expected to be adopted mid 2016, until then also prEN 16516 will be accepted. Also AgBB, Indoor Air Comfort, Indoor Air Comfort Gold or Blue Angel certification are accepted as documentation for TSVOC emission. Also other certifications systems may be accepted, if it can be documented that accepted mentioned test metodes and emission level in this criteria are met. The acceptede level of emission of TSVOC in this criteria is the same as in AgBB and Indoor Air Comfort.

AgBB (Committee for Health-Related Evaluation of Building Products) is a German indoor climate labelling scheme for building products, with a focus on volatile organic compounds. This uses LCI (Lowest Concentration of Interest) values as one of its parameters for health-related evaluation of emissions of individual substances from building materials. The LCI values from AgBB are updated approximately every two years and are based on OEL values (Occupational Exposure Limits)[67]. This lays down requirements for substances such as TVOC, SVOC, selected carcinogenic VOCs, aldehydes and substances with LCI values.

The Blue Angel is an ecolabel owned by The Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety[68] in Germany. Amongst products that can be awarded with The Blue Angel is paint for indoor walls and ceilings. There is requirements to VOC- and SVOC-emission, substances classification, metals, plasticizer, preservations, formaldehyde and more[69].

Indoor Air Comfort and Indoor Air Comfort Gold is created by Eurofins. Indoor Air Comfort shows compliance of product emissions with the criteria of all legal specifications issued by authorities in the European Union. Indoor Air Comfort Gold

[67] Harmonisation framework for indoor material labelling schemes in the EU, ECA Report no. 27, 2010.

[68] http://www.bmub.bund.de/en/

[69] The Blue Angel: http://www.blauer-engel.de/en/products/construction/low-emission-wall-paints/wall-paint

shows compliance of product emissions with the criteria of many of the voluntary specifications issued by some ecolabels and similar specifications in the EU.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
In the new version it is specified that test method ISO 11890-2 shall be used.

The level of permitted VOC is lower in the new version for all product, except primers and binding primers which is the same.

The previous version did not have a requirement to SVOC or alternatively emission of TSVOC.

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. Test method ISO 17895 is not possible in this requirement. In this criteria an alternativ to the SVOC content is possible by measuring the emission of TSVOC.

A product with the EU Ecolabel need to send in further information on this requirement, if test method ISO 17895 is used.

A product with the EU Ecolabel may need to send in further information on this requirement.

Difference compared to the Nordic Ecolabel Chemical building products requirement O22
The requirement is different. In chemical building products the level of accepted VOC is different because of other product types. For paint and varnishes there is no requirements to SVOC or alternatively emission of TSVOC.

O14 Volatile Aromatic Hydrocarbons - VAH

Requirement:

Volatile aromatic hydrocarbons (VAH) must not be actively added to the product, but may occur as residuals to a total 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.

☒ Calculation of the level of volatile aromatic hydrocarbons in the product (based on data for all ingoing raw materials).

Background to this requirement
VAHs have specific environmental and human health impacts including DNA damage[70]. Exposure to these products should be minimised and any way to mandate a reduction in

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

their use encouraged. The current criterion prevents their addition, but allows their presence from residuals.

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.

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 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 Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is similar, except that VAH must not be actively added the product

Difference compared to the EU Ecolabel requirement 5x, appendix 7d
The requirement is the same as the EU Ecolabel requirement in not allowing VAH that are deliberately added and allowing residuals up to 100 ppm. 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 ingoing substances and residuals makes it necessary for products with the EU Ecolabel to show fulfilment of this requirement.

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O22
The requirement is identical.

4.1.3 Quality requirements

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 A, shall be undertaken, see requirements O17-O20 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 A. 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 and undercoat (g, h)
O17	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 or having specific properties: 6 m^2/L With opacity 8m^2/L
O18	Resistance to water — ISO 2812-3	—	—	—	Resistant to water	Resistant to water	—
O19	Adhesion — EN 24624		—	—	—	Score 2	1,5 MPa (masonry paint)
O20	Abrasion — EN ISO 7784-2	—	—	—	—	70 mg weight loss	—

O15 White pigment content

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 7a, 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 7b, with 98 % opacity.

For tinting systems this requirement only applies to the base paint with the highest white pigment content or for the paint in a paint series with the highest white pigment content.

* *Wet scrub resistance is here defined in accordance with EN 13300 and EN ISO 11998, see requirement O16.*

Table 7a Relationship between wet scrub resistance and TiO_2 content for indoor wall and ceiling paints with claims of wet scrub resistance

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

Table 7b. Limits for white pigment content for products not covered by table 7a

Type of paint	Indoor limit (g/m^2) with 98% opacity
Wall paints	25
Other paints (including ceiling 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 O15) 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 for white pigment content (O15) 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 36 g/m^2 for all types of products, whereas this requirement allows up to 40 g/m^2 if the product fulfils the requirements for class 1 wet scrub resistance (O16).

The limit of 25 g/m^2 is a new limit in this criteria version for wall 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 limit of 36 g/m^2 for ceiling paints is the same as in the previous criteria, because the consumers in the nordic countries prefer matt celing paints and it is important that the quality is good.

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

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
In the previous version the maximum level of white pigment content was 36 g/m^2, regardless of the type of paint. In the new version the level is still 36 g/m^2, but additional requirements and levels are set depending on claims or not regarding wet scrub resistance.

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 25 g/m^2 for paints falling under the exemption in EU Ecolabel requirement 1b (here O15) 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 paints not claiming wet scrub has the limit of 25 g/m^2. Ceiling paint have a limit of 36 g/m^2, whereas it is 25 g/m^2 in the EU Ecolabel criteria.

A product (excluding anti-rust paints) with the EU Ecolabel does not need to send in further information on this requirement.

Difference compared to the Nordic Ecolabel Chemical building products requirement
There is no similar requirement in chemical building products.

O16 Claims for Wet Scrub Resistance

Requirement:

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

All wall and ceiling paints 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.

The test laboratory must fulfil the requirements in appendix 5.

For tinting systems or a paint series with different colours this requirement only have to be demonstrated for one of the paints.

☒ 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.

☒ Documentation for that the test laboratory fulfil the requirements in appendix 5.

Background to this requirement
Wet scrub is only relevant for products in this criteria which are wall or ceiling paints. 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 Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is similar, except that it now covers all wall and ceiling paints with claims on wet scrub, whereas the previous version only covered wall paints with claims.

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 (excluding anti-rust paint) with the EU Ecolabel does not need to send in further information on this requirement.

Difference compared to the Nordic Ecolabel Chemical building products requirement

There is no similar requirement in the Nordic Ecolabel chemical building products.

O17 Spreading rate

Requirement:

The spreading rate should be at least at the levels presented in table 8 below.

The test laboratory must fulfil the requirements in appendix 5.

Table 8. Spreading rate

	Opacity/hiding power	Spreading rate of at least the following
White paints and light-coloured paints (Tri-stimulus (Y-value) > 70%) (including finishes and intermediates)*	Hiding power 98%	8 m^2 per liter of product
Semi-transparent primers	Without opacity or having specific properties** With opacity	6 m^2 per liter of product 8 m^2 per liter 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)	Not relevant	1 m^2 per kg of product
Opaque elastomeric paints	Opaque	4 m^2 per liter of product

* *Base paints to be used with a tinting system.*

** *Opaque primers with specific blocking/sealing, penetrating/binding properties and primers with special adhesion properties.*

- For paint series that are available in more colours the spreading rate shall apply to the whitest colour.
- 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.

✉ 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
- ISO 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.

☒ Documentation for that the test laboratory fulfil the requirements in appendix 5.

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 O15 - 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 (O19) 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".

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is the same, except that specific requirements for transparent and semi-transparent primers and undercoats, and opaque elastomeric paints are added.

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.

A product with the EU Ecolabel does not need to send in further information on this requirement.

Difference compared to the Nordic Ecolabel Chemical building products requirement
There is no similar requirement in the Nordic Ecolabel chemical building products.

O18 Resistance to water

Requirement:

All floor 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 test laboratory must fulfil the requirements in appendix 5.

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

☒ Documentation for that the test laboratory fulfil the requirements in appendix 5.

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.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
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.

A product with the EU Ecolabel does not need to send in further information on this requirement.

Difference compared to the Nordic Ecolabel Chemical building products requirement
The requirement is different in the Nordic Ecolabel chemical building products because the criteria covers outdoor paint and varnishes.

O19 Adhesion

Requirement:

- Pigmented masonry primers 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 primers masonry primers, transparent primers, metal and wood primers shall score 2 or less in the EN 2409 test for adhesion.
- The test laboratory must fulfil the requirements in appendix 5.

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.

☒ Documentation for that the test laboratory fulfil the requirements in appendix 5.

Background to this requirement
Adhesion is an important parameter for paints which shows that the products (primers, 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 requirement is the same as the previous revision of the EU and Nordic Ecolabel, except that transparent primers is not excepted in this criteria. This means that all transparent primers must fulfill the requirement.

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.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
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. In addition transparent primers is not excepted in this criteria.

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 and transparent primers, with the EU Ecolabel, needs to show fulfilment of this requirement as a compliment to the EU Ecolabel.

A product with the EU Ecolabel may need to send in further information on this requirement.

Difference compared to the Nordic Ecolabel Chemical building products requirement
The requirement is different in the Nordic Ecolabel chemical building products because the criteria covers outdoor paint and varnishes.

O20 Abrasion

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 test laboratory must fulfil the requirements in appendix 5.

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

✉ Documentation for that the test laboratory fulfil the requirements in appendix 5.

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.

An alternative test method, ISO 5470-1, 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 Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is the same as in the previous version, except an alternative test method, ISO 5470-1, has been added.

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.

A product with the EU Ecolabel does not need to send in further information on this requirement.

Difference compared to the Nordic Ecolabel Chemical building products requirement
The requirement is different in the Nordic Ecolabel chemical building products because the criteria only covers outdoor paint and varnishes.

4.1.4 Consumer information, packaging and take-back systems

O21 Consumer information

Requirement:

The following information must be placed on the packaging or enclosed with each individual product:

- The purpose, substrate and other conditions of application for which the product is intended. This shall include advice on preparation, e.g. correct preparation of the substrate or temperature.
- Estimate of "normal" coverage (e.g. l/m2 or equivalent).
- Recommended preventive safety measures for users, such as safety equipment and ventilation (particularly when working in enclosed spaces or similar).
- Recommendations on cleaning used tools and how waste products from cleaning can best be disposed (to limit water pollution). These recommendations are to be adapted to the product types and areas of application. Pictograms shall also be used where appropriate.
- Recommendations on how the product is to be stored after opening, including safety instructions where relevant.
- Recommendations on the disposal of residual product and packaging.

✉ Label, product sheet or equivalent and description of how the information accompanies each product.

Background to this requirement

Consumer information requirements have been set in order to ensure that the product is used correctly and to minimise the impact of the product on health and the environment. The recommendation concerning preventive safety measures has been clarified to explicitly include safety equipment and ventilation. It must be made clear what level of ventilation is required when using each type of product.

Recommendations on how to store the products after opening, how to clean tools and how to handle residues in order to minimise the risk of incorrect handling is required to inform the user.

Information for the user on how to use the product, on which substrates and how much product is estimated to give "normal" coverage can help to reduce waste through correct handling of the product.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3

The requirement is almost the same, except information on estimate of "normal" coverage is added.

Difference compared to the EU Ecolabel requirement 6

EU Ecolabel have more or less the same requirements.

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O31
The requirement is identical.

O22 Packaging

Requirement:

- Packaging must be re-sealable, unless documentation can be provided that the entire product will always be used in one go.
- The type of plastic material must be documented by the manufacturer. Product packaging and labels must not contain halogenated plastic.
- Any surface coating of the packaging must not contain halogens.

✉ Photo of the packaging showing that the packaging can be resealed. Or descriptions of whether the entire product is always used in one go.

✉ Description of the packaging type and size.

✉ Declaration from the packaging manufacturer that no halogenated plastics have been used or product data sheets clearly showing that the requirement is met by all parts of the packaging, including lids, caps, etc.

✉ Declaration from the packaging manufacturer that the packaging has not been surface coated, or that the surface coating does not contain halogens.

✉ Declaration from the label producer that no halogenated plastics have been used.

Background to this requirement
The requirement has been set that packaging must be re-sealable in order to ensure that the products can be used on multiple occasions, unless documentation can be submitted that the product will always be used all at once.

Moreover, the type of plastics used must be documented by the manufacturer to ensure that neither the labels nor the product packaging contain halogenated plastics. This is because the incineration of PVC and other halogenated plastics can give rise to problems during disposal.

Packaging may sometimes (in our experience) be treated with a surface coating that contains halogens such as fluorine in order to prevent the product from sticking to the packaging and not releasing. Nordic Ecolabelling therefore also sets the requirement that the surface coating on the packaging must not contain halogens.

Metal packaging is heavy to transport. However, because some products may require metal packaging, the requirement is set that metal packaging must not be used for packs of less than 1 l unless particular health and environment-related arguments indicate otherwise. Products that will be pigmented/made up to a given colour such that their end volume is 1 l are considered to fulfil the requirement for metal packaging.

In November 2016 this requirement was updated to allow the metalpackaging even for packing <1 liter. Although metals have worse environmental profile than plastic, it has advantages in paint cans: It is difficult to find good enough plastic packaging especially for the smaller packaging sizes that do not leak or do not have problems with skinning which to some extent may depend on the fack that plastic itself is not completely sealed,

but there is a certain exchange through the plastic. This becomes more significant for smaller jars when the plastic surface becomes relatively greater compared to the volume.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is new.

Difference compared to the EU Ecolabel requirement
There is no similar requirement in the EU Ecolabel.

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O29
The requirement is identical.

O23 Take-back systems

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

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

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

4.1.5 Quality management and regulatory requirements

O24-O30

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 14001 or EMAS and the following procedures are applied, it is sufficient if the accredited auditor certifies compliance with the requirements.

The requirements below (O24-O30) 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.

O24 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 where this is stated) that the requirement is fulfilled.

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.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is new.

Difference compared to the EU Ecolabel requirement
There is no similar requirement in the EU Ecolabel.

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O34
This requirement is identical to the chemical building products requirement.

O25 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.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is new.

Difference compared to the EU Ecolabel requirement
There is no similar requirement in the EU Ecolabel.

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O35
This requirement is identical to the chemical building products requirement.

O26 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.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is new.

Difference compared to the EU Ecolabel requirement
There is no similar requirement in the EU Ecolabel.

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O36
This requirement is identical to the chemical building products requirement.

O27 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.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is new.

Difference compared to the EU Ecolabel requirement
There is no similar requirement in the EU Ecolabel.

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O37
This requirement is identical to the chemical building products requirement.

O28 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.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is new.

Difference compared to the EU Ecolabel requirement
There is no similar requirement in the EU Ecolabel.

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O38
This requirement is identical to the chemical building products requirement.

O29 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.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is new.

Difference compared to the EU Ecolabel requirement
There is no similar requirement in the EU Ecolabel.

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O39
This requirement is identical to the chemical building products requirement.

O30 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 raw materials that went into it. In the case of problems in production, a traceability system can help ensure that all raw materials in the Nordic Ecolabelled product are the same and in the same quantities as at the time of application.

Difference compared to the Nordic Ecolabel Indoor paint and varnishes version 2 to version 3
The requirement is new.

Difference compared to the EU Ecolabel requirement
There is no similar requirement in the EU Ecolabel.

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

Difference compared to the Nordic Ecolabel Chemical building products requirement O40
This requirement is identical to the chemical building products requirement.

5 Changes compared to previous version

This document has been compared to the previous version of the criteria document for indoor paints and varnishes. The main differences between this version 3 and the previous version 2 are the following:

- New definition of ingoing substances and residuals.
- Semi-Volatile organic substances (SVOC) is a new requirement in this version (O13).
- The requirement on VOC (O13) has been made more stringent than in the previous version.
- A new weighted formula for environmentally hazardous substances allowed in the finish product (O4).
- Several new substances excluded from use (O12).
- Exclusion of substances on the candidate list, vPvB, PBT and endocrine disruptors (O12).
- More stringent requirement on preservatives (O5).
- Phthalates were previous excluded based on classification, now all phthalates are excluded (O12).
- A new requirement limiting the classified rest monomers (O7).
- A new requirement excluding nanoparticles (O11).
- New requirements regarding take-back systems, packaging and quality management systems (O21- O30).

In appendix 1 there is a more complete list of differences between this version 3 and the previous version 2. In addition more detailed information about the differences is found under each requirement in this document.

The main differences between this version of the criteria and the EU Ecolabel criteria (2014) are the following:

- The Nordic Ecolabel's product group only covers indoor paints and varnishes and excludes anti-rust paints.
- The definition of ingoing substances and residuals differs between the documents where the Nordic Ecolabel has the most stringent definition. This has an impact of several of the requirements.
- The requirements are made more readable and simple.
- More straightforward 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.
- Requirements regarding take-back systems, packaging and quality management systems has been added.

In appendix 2 there is a more complete list of differences between this version of the criteria and the EU Ecolabel criteria (2014). In addition more detailed information about the differences is found under each requirement in this document.

6 New criteria

- Make a new MEKA and RPS (Relevance, Potential, Steerability) analysis.
- Evaluate the limits of preservatives.
- Evaluate the limit of ingoing substances classified as environmentally harmful.
- Evaluate the possibilities to set requirements to renewable raw materials.
- Evaluate the exemption for vinyl acetate in the requirement regarding residual monomers in polymers.
- Evaluate the exemption for glyoxal in the requirement regarding classification of ingoing chemical substances.
- Evaluate the requirements and limits of the content levels of SVOC and emission of TSVOC.

7 Terms and definitions

For the purpose of this document, the following definitions shall apply (mainly 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) **Ingoing substances'** are defined as all substances in the product – including additives (e.g. preservatives or stabilisers) in the raw materials, but not residuals from production of raw materials.

(11) **Residuals'** residuals are defined as residuals, pollutants and contaminants derived from production, including production of the raw materials, which are present in the final product in amounts less than 100 ppm (0,0100 w-%, 100 mg/kg), but not substances added to the raw materials or product intentionally and with a purpose – regardless of amount. Residuals in the raw materials above 1,0% are regarded as ingoing substances. Known substances released from the raw materials are also regarded as ingoing substances.

(12) '**Raw material'** a raw material may consist of one or more ingoing substances. A raw material may e.g. be a drying agent or a neutralising agent.

The raw materials are the materials that are bought by the paint producer and mixed to together to generate the final product e.g. the paint.

(13) '**Preservatives** means all preservatives, biocides and biocidal active substances, including in-can preservatives and dry-film preservatives.

(14) **'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;

(15)'**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;

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

(17) '**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;

(18) '**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;

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

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

(21) '**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;

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

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

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

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

Appendix 1 Differences between this Nordic Ecolabel version 3 and the previous version 2 of the criteria.

Table Appendix1. The table shows the differences between this Nordic Ecolabel version 3 compared to the previous version 2 of the criteria.

More detailed information about the differences is found under each requirement in this document.

Requirement	Comparison between version 3 and the previous verison 2
Product group definition	Is the same.
O1 – Information about the product	New requirement.
O2 – Classification of the final product	The definition of ingoing substances and residuals is different. Classifications have changed a little and hazardous to the ozone layer, aspiration hazard, explosive, oxidising and highly flammable have been added. In addition in the previous version classification as sensitising, because of an substance classified as R43 (H317) was exempted.
O3 - Classification of ingoing chemical substances	The definition of ingoing substances and residuals is different. The exemptions have changed.
O4 - Environmentally harmful substances	In the previous version there was a limit of the total amount of environmentally hazardous substances in the products. In the new version there is a weighted formula for environmentally hazardous substances to limit the total amounts in the finish product.
O5 - Preservatives	Requirements to bioaccumulative, the total limit of MIT and the total limit for all preservatives are new.
O6 - Formaldehyde	Formaldehyde have to be tested in the final product in the new version.
O7 - Residual monomers in polymers	New requirement.
O8 - Heavy metals	Antimony is added. Cobalt is removed, but problematic compounds with cobalt is covered by requirement O3.
O9 - Titanium dioxide	In the previous version the requirement was regarding the amounts of emissions in mg per m^2 of dry film, whereas the new requirement relates to kg waste per tonne.
O10 - Powdered raw materials	New requirement.
O11 - Nanoparticles	New requirement.
O12 - Other substances excluded from use	Most of the requirement is new.
O13 - VOC and SVOC	The previous version only had limits on VOC, so SVOC (or alternatively emission of TSVOC) is new to this version. The limits on VOC has been made more stringent than in the previous version.
O14 - VAH	The requirement is similar, except that VAH must not be actively added the product.

O15 – White pigments	The new requirement is similar, except that the last version had an upper limit on 36g/m^2 for all types of products, whereas the new version allows up to 40g/m^2 if the product fulfils the requirements for class 1 wet scrub resistance.
O16 – Wet scrub	The requirement is similar, except that it now covers all wall and ceiling paints with claims on wet scrub, whereas the previous version only covered wall paints with claims.
O17 - Spreading rate	The requirement is similar , except with an additional category for " transparent and semi-transparent primers " and ”opaque elastomeric paints”.
O18 - Resistance to water	The same as in the previous version.
O19 - Adhesion	The requirement is similar , except that both masonry primers and pigmented masonry primers are included. It has also been made more clear that in the test EN 2409 it is required to score 2 or less to pass.
O20 - Abrasion	The requirement is similar, except an alternative test method, ISO 5470-1, has been added.
O21 Consumer information	The requirement is almost the same, except information on estimate of ”normal” coverage is added.
O22 Packaging	New requirement.
O23 Take-back system	New requirement.
O24-O30 Quality management and regulatory requirements	New requirements.

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 (version 3) and the EU Ecolabel (2014) concerning documentation.

More detailed information about the differences is found under each requirement in this document.

Requirement	Comparison with EU Ecolabel	Extra documentation
Product group definition (No EU Ecolabel equivalence)	The EU Ecolabel criteria covers the same indoor product categories, but in addition also exterior categories and anti-rust products.	No
O1 – Information about the product (No EU Ecolabel equivalence)	Do not have this requirement.	Yes
O2 – Classification of the final product (EU Ecolabel 5a)	The definition of ingoing substances and residuals is different. This requirement is a little bit different from the one in the EU Ecolabel, but covers more or less the same classifications. Classifications as Hazardous to the ozone layer, Aspiration hazard, Explosive Category 1.1-1.6, Oxidising and Highly flammable is added in Nordic Ecolabel. Exemption for preservatives concerning the warning phrase "Contains xxx, may cause an allergic reaction" has been added in Nordic Ecolabel.	Yes
O3 - Classification of ingoing chemical substances (EU Ecolabel requirement 5a)	The definition of ingoing substances and residuals is different. The requirement limits the same classifications. Some of the exemptions are different.	Yes
O4 - Environmentally harmful substances (EU Ecolabel requirement 5a)	EU Ecolabel do not have a requirement regarding a specific level of allowed environmental hazardous substances in the final product, but instead set exceptions and levels for each specified substance groups, e.g. surfactants.	Yes
O5 - Preservatives (EU Ecolabel requirement 5c i-iv)	The requirement is more straightforward and with less requirements to specific preservatives compared to the EU Ecolabel requirement. For MIT the Nordic Ecolabelling limit is stricter than the EU Ecolabel, with 100 ppm compared to 200 ppm in the EU Ecolabel. There is no special level for paint for high humidity areas.	Yes

O6 - Formaldehyde (EU Ecolabel app. 7a)	There is no special level for residual levels of formaldehyde from polymer dispersions.	Yes
O7 - Residual monomers in polymers (EU Ecolabel app. 7c)	The requirement is different. Nordic Ecolabel only have the requirement for monomer with specified classifications and other levels.	Yes
O8 - Heavy metals (EU Ecolabel app. 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 residuals in the raw material. The EU Ecolabel has an exemption for cobalt in driers.	Yes
O9 - Titanium dioxide (EU Ecolabel requirement 2)	The requirement is the same.	No
O10 - Powdered raw materials (EU Ecolabel requirement 5a ii)	EU-Ecolabel has references to specific regulations which the Nordic Ecolabel has not.	Yes
O11 -nanoparticles (No EU Ecolabel equivalence)	The EU Ecolabel does not have such a requirement, but has a statement saying that the producer has to identify any nanoparticles.	Yes
O12 - Other substances excluded from use (EU Ecolabel requirement 5b, app. 4b, 4c and 6b)	The requirement covers many of 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 ingoing substances and residuals.	Yes
O13 - VOC and SVOC (EU Ecolabel requirement 4)	The requirements are almost the same, except the use of test method ISO 17895 in Nordic Ecolabel is not allowed. In the Nordic Ecolabel criteria there is also an alternative to the content of SVOC and that is the emission of TSVOC.	Yes, if ISO 17895 is used.
O14 - VAH (EU Ecolabel 5x, appendix 7d)	The requirement is the same, but the differences in definitions of ingoing substances and residuals makes it necessary for products with the EU Ecolabel to show fulfilment of this requirement	Yes
O15 – White pigments (EU requirement 1a)	The same as the EU Ecolabel	No
O16 – wet scrub (EU requirement 1a and 1b)	The EU Ecolabel requires all paints to fulfil wet scrub regardless if there are claims or not.	No
O17 - Spreading rate (EU Ecolabel 3a)	The same as the EU Ecolabel. The requirement has been made a bit more readable with inserting the different limits in a table.	No
O18 - resistance to water (EU Ecolabel 3b)	The same as the EU Ecolabel.	No
O19 - Adhesion (EU Ecolabel 3c)	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.	Yes, for masonry primers. Other products do not need additional information.
O20 - Abrasion (EU Ecolabel 3d)	The same as the EU Ecolabel, but with a Nordic Ecolabel addition of an alternative test method.	No

O21 Consumer information (EU Ecolabel 6)	More or less the same as in EU Ecolabel requirement, but information may have to be added.	Yes, if information is not covered.
O22 Packaging (No EU Ecolabel equivalence)	No equivalence	Yes
O23 Take-back system (No EU Ecolabel equivalence)	No equivalence	Yes
O23-O30 Quality management and regulatory requirements (No EU Ecolabel equivalence)	No equivalence	Yes

Appendix 3 Documentation for applicants, whom have the Nordic Ecolabel for chemical building products

If an applicant have the Nordic Ecolabel for chemical building products:
This criteria is harmonized with the Nordic Ecolabel criteria for chemical building products. Therefore an applicant which have some products and/or raw materials approved in the criteria for chemical building products, they may not need additional documentation if applying for the Nordic Ecolabel for indoor paint and varnishes.

For a **product** with the Nordic Ecolabel for chemical building products additional documentation is not need for these requirements: O6, O8-O12, O14 and O21-O30.

For **raw materials** approved in the Nordic Ecolabel criteria for chemical building products: Appendix 2 can be reused.