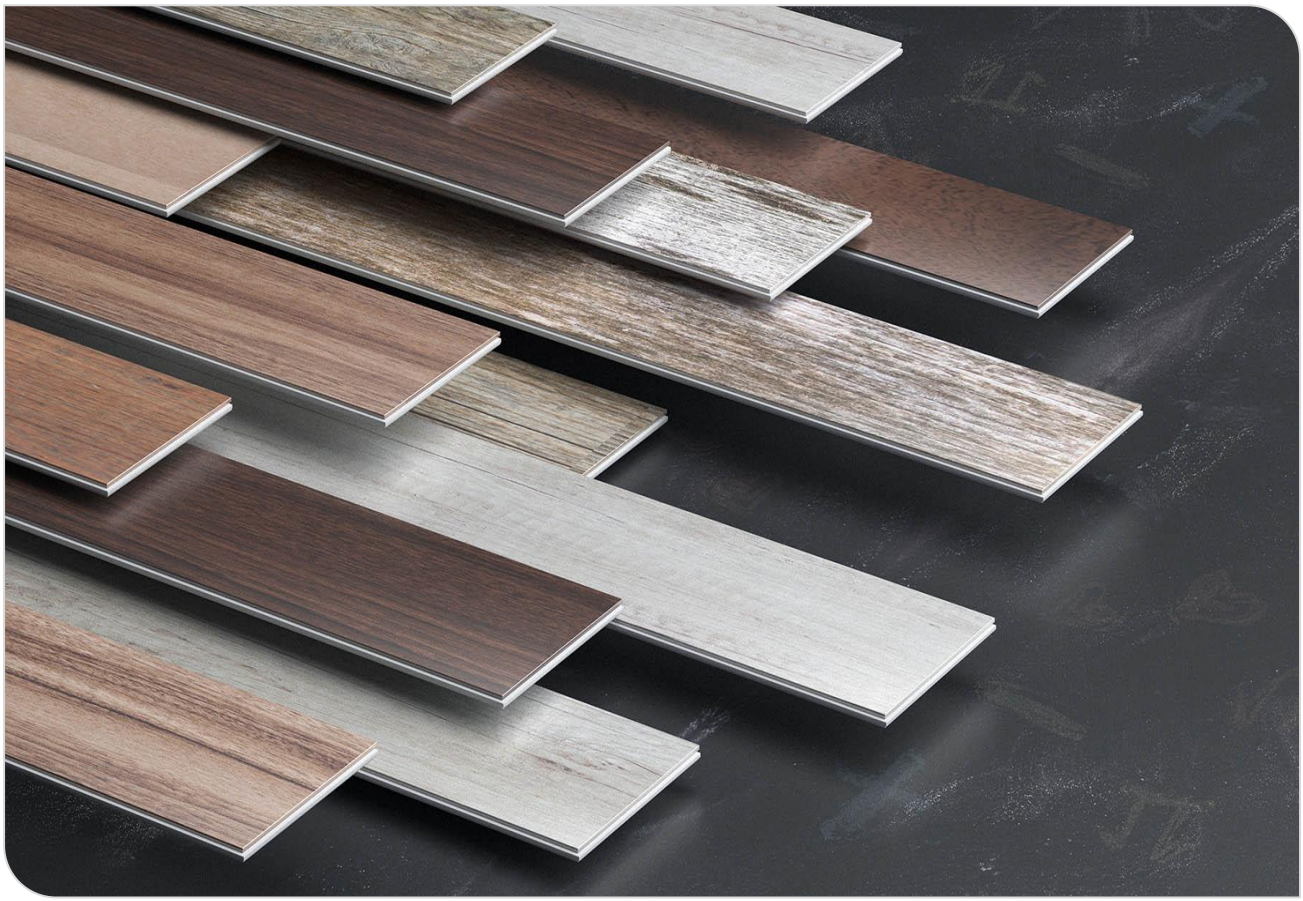
About Nordic Swan Ecolabelled

Floor coverings and flooring underlays



Version 7.0 • 21 June 2023 – 18 September 2023

Consultation

Nordic Ecolabelling

Content

Addresses

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

Denmark
Ecolabelling Denmark
Fonden Dansk Standard
Göteborg Plads 1, DK-2150 Nordhavn
Fischersgade 56, DK-9670 Løgstør
Tel: +45 72 300 450
info@ecolabel.dk
www.svanemaerket.dk

Iceland
Ecolabelling Iceland
Norræn Umhverfismerking
á Íslandi
Suðurlandsbraut 24
IS-108 Reykjavik
Tel: +354 591 20 00
svanurinn@ust.is
www.svanurinn.is

Finland
Ecolabelling Finland
Annankatu 25, 6 flr
FI-00100 Helsinki
Tel: +358 9 61 22 50 00
joutsen@ecolabel.fi
www.ecolabel.fi

Norway
Ecolabelling Norway
Henrik Ibsens gate 20
NO-0255 Oslo
Tel: +47 24 14 46 00
info@svanemerket.no
www.svanemerket.no

Sweden
Ecolabelling Sweden
Box 38114
SE-100 64 Stockholm
Tel: +46 8 55 55 24 00
info@svanen.se
www.svanen.se

What is a Nordic Swan Ecolabelled Floor covering and flooring underlay?

Nordic Swan Ecolabelled Floor coverings and flooring underlays have reduced environmental impact as they must contain a high share of sustainably sourced renewable materials and/or a high share of recycled materials, allowing natural resources savings. Moreover, the production of Nordic Swan Ecolabelled Floor coverings and flooring underlays must be performed in an energy-efficient way decreasing their contribution to climate change. The products have good performance and a long service life which further decreases the need of extracting/harvesting raw materials. To minimize the product's health impact, strict requirements are set on the chemicals used during their production and on the level of emissions released to the indoor environment. Finally, requirements on products traceability, reparability and recyclability make the products more aligned with the concept of circular economy.

A Nordic Swan Ecolabelled floor covering or flooring underlay means:

- The products must contain a high share of renewable and/or recycled materials.
- The renewable raw materials used must be sustainably sourced, through requirements for traceability and a minimum of 70% certified wood raw material must be guaranteed.
- Chemicals used in production such adhesives and surface treatments must have a good environmental and health profile. For instance, endocrine disruptors, phthalates, halogenated flame retardants and PFAS must not be added to the products.
- The manufacturer must work continuously on an energy optimisation strategy and the product must be manufactured in an energy efficient way.
- Emissions of formaldehyde and VOC from relevant chemicals, from the final product must be low to ensure a safe indoor environment.
- The product's quality and performance must be tested so it can fulfil its function through its long service life. A 10-years warranty must be provided.
- Traceability between the product and the manufacturer must be guaranteed to promote renovation, repair and recycling. Product reparability and/or recyclability must be ensured.
- Fulfil all requirements for materials in the criteria for Swan labelling of buildings and renovations.

1 Summary

The Nordic Swan Ecolabel criteria for floor coverings and flooring underlays have been revised and updated to generation 7. The structure of the criteria has been changed and textile floor coverings have been moved to a new separate criteria document. This type of product is, therefore, not part of the revision. Flooring underlays have been added to the criteria's scope, hence the change of name.

Nordic Swan Ecolabel Floor coverings and flooring underlays have reduced environmental impact as they must contain a high share of sustainably sourced renewable materials or, a high share of recycled materials, or combination of thereof, allowing natural resources savings. Moreover, the production of Nordic Swan Ecolabelled Floor coverings and flooring underlays must be performed in an energy-efficient way decreasing their contribution to climate change. Nordic Swan Ecolabel Floor coverings and flooring underlays have good performance and a long service life which further decreases the need of extracting/harvesting raw materials. To minimize the product's health strict requirements are set on the chemicals used during their production and on the level of emissions released to the indoor environment. Finally, requirements set on chemicals contained in recycled materials as well as requirements on traceability, reparability and recyclability make the products more aligned with the concept of circular economy.

Updated material requirements

The extraction of renewable can have major effects on the environment, especially on biodiversity and on landscapes. The requirement on the use of certified virgin renewable materials and documented recycled materials has been tightened in the draft of the new criteria. New requirement has been introduced for responsible sourcing of renewable materials used in the production of polymers contained in plastic, rubber and foam materials. At the same time, the requirements for minimum share of renewable materials or, share of recycled materials, or combination of thereof has been tightened.

Updated chemical requirements

The requirements on the production chemicals have also been tightened as the vast majority of substances classified as CMR are excluded. Furthermore, a number of substances or group of substances have been added to the list of forbidden substances and must neither be used in chemical products nor as additives in materials (notably, endocrine disruptors and PFAS). Finally, to ensure that the products contribute to a safe indoor environment, the requirement on emissions of VOC, SVOC, formaldehyde as well as CMRs (category 1A and 1B) has been tightened and updated to match the draft published by the European Commission on EU Taxonomy.

Updated energy requirements

Overall reduced energy consumption, the use of renewable sources and energy-efficient production are important parameters to reduce the emission of greenhouse gases, highly contributing to climate change. Therefore, a requirement on energy management has been implemented and the energy consumption requirement has been tightened. Moreover, the energy consumed for several additional processes occurring during manufacture must be now

included in the calculation of the latter. Finally, the production of raw materials uses also significant quantities of natural resources. That is why, the energy consumption requirement covers also the energy consumed during manufacture of the main binders in plastic and hybrid floorings.

Updated circular requirements

Several requirements have also been either updated or added to increase the circularity of Nordic Ecolabelled floor covering and flooring underlays. The quality and durability requirements, ensuring that the products have a long service life, and the product information requirement, making sure that all relevant information on how to extend the service life or how to handle the products once they have reached their end-of-use, have been updated. Requirements on products traceability, reparability and recyclability have been added to help manufacturers setting in place the first processes before having a fully operational take back system. Furthermore, strict chemicals requirements set on recycled materials contained in the products and requirement on information on packaging, stating that it must contain a share of recycled materials, also contribute to eliminate the concept of waste, one of the pillars of circular economy.

Changes compared to previous generation

As in the previous version of the criteria, Nordic Swan Ecolabelled products must meet the requirements of the Construction Products Regulation (EU/305/2011) in relation to the documentation of the properties and functions with which the product is marketed. New in the criteria is a set of requirements entitled "Innovation requirements" and having for purpose to reward manufacturers that have come further in their sustainability work, and especially further that Nordic Ecolabelling's requirement in some areas or phases of the products' life cycle.

For a full description of the changes in the revised generation 7, see the table in chapter 6.

Nordic Swan Ecolabelled floor coverings and flooring underlays

Nordic Swan Ecolabelled Floor coverings and flooring underlays have reduced environmental impact as they must contain a high share of sustainably sourced renewable materials and/or a high share of recycled materials, allowing natural resources savings. Moreover, the production of Nordic Swan Ecolabelled Floor coverings and flooring underlays must be performed in an energy-efficient way decreasing their contribution to climate change. The products have good performance and a long service life which further decreases the need of extracting/harvesting raw materials. To minimize the product's health impact, strict requirements are set on the chemicals used during their production and on the level of emissions released to the indoor environment. Finally, requirements on products traceability, reparability and recyclability make the products more aligned with the concept of circular economy.

A Nordic Swan Ecolabelled floor covering or flooring underlay means:

- The products must contain a high share of renewable and/or recycled materials.

- The renewable raw materials used must be sustainably sourced, through requirements for traceability and a minimum of 70% certified wood raw material must be guaranteed.

- Chemicals used in production such adhesives and surface treatments must have a good environmental and health profile. For instance, endocrine disruptors, phthalates, halogenated flame retardants and PFAS must not be added to the products.

- The manufacturer must work continuously on an energy optimisation strategy and the product must be manufactured in an energy efficient way.

- Emissions of formaldehyde and VOC from relevant chemicals, from the final product must be low to ensure a safe indoor environment.

- The product's quality and performance must be tested so it can fulfil its function through its long service life. A 10-years warranty must be provided.

- Traceability between the product and the manufacturer must be guaranteed to promote renovation, repair and recycling. Product reparability and/or recyclability must be ensured.

- Fulfil all requirements for materials in the criteria for Swan labelling of buildings and renovations.

2 Environmental impact of Floor coverings and flooring underlays

The criteria include very heterogenous products in terms of materials as they cover, among others, wooden flooring, bamboo flooring, linoleum flooring, laminate flooring and plastic flooring. The same remark can be made regarding underlays, which is the newly included product type covered by the 7th generation of the criteria.

Despite the differences between the used materials, the main environmental impact of floor coverings and underlays are the same for all types and comes from the extraction/cultivation and the production of the materials themselves;[1] that is, mainly, wood-based materials, linoleum and plastics/polymers.[2] However, floor coverings and underlays of good quality/materials have longer lifespan, decreasing the contribution that the raw material stage has in the product's overall environmental impact. Consequently, the impacts from the use stage becomes more significant, making the basis for good indoor climate (low emissions) and, for instance, the use of recommended cleaning and maintenance methods crucial aspects.[3]

[1] https://susproc.jrc.ec.europa.eu/product-bureau//sites/default/files/contentype/product_group_documents/1581685016/Preliminary%20report%20sept%202014_revLCE_AB.pdf
[2] Feasibility study of wall and floor coverings with a view to establishing EU eco-labelling criteria, 2000
[3] Jönsson, Å. Including the use phase in LCA of Flooring Coverings, 1999

Resource use, chemicals hazardous to the health and the environment, energy consumption, carbon footprint and biodiversity loss have all been identified as direct environmental impacts associated with this product group. Production of floor coverings is an energy-intensive process and is linked to the emissions of substances that are harmful to health and the environment, as adhesives may be required in the construction of the products and the application of a surface treatment is performed. The use of recycled materials has a direct positive effect as it reduces the quantity of virgin materials and flooring/underlays produced. To a higher extent, the same claim can be made if used floor coverings/underlays are recovered, reused and recycled instead of being incinerated, which remains their prevalent way of disposal in the Nordic countries. Environmental costly resources can be spared, and material loops kept tight. Ensuring that both recycling fractions and virgin materials used in the manufacturing of the floor covering/underlays do not contain any harmful chemicals is key to promote recycling and further reducing the product's environmental impact in all stages.

See more details regarding the environmental impact of floor coverings/underlays in the MECO and RPS analyses. The purpose of the analyses has not been to rank the different flooring types or underlays materials in relation to each other, but instead to define the important environmental parameters for the different types of products. More details about the contribution of Nordic Swan Ecolabelled floor coverings and flooring underlays to circular economy can be found in the section bearing the same name. Likewise, more information on how these criteria can help opposing climate change and biodiversity loss is given in the next sections. Finally, the section UN Sustainable Development Goals shows how Nordic Swan Ecolabelled floor coverings can related to the various goals.

2.1 Qualitative MECO analysis

The relevant environmental impacts found in the life cycle of each of the flooring types (e.g., wooden, bamboo, linoleum and plastic) and flooring underlays types are set out in the qualitative MECO table below. A MECO describes the key areas that have impact on the environment and health throughout the life cycle of the product – including consumption of materials/resources (M), energy (E), chemicals (C) and other impact areas (O).

A relevant functional unit would be 1 m^2 flooring, with the possibility to include underlays, for an average product lifetime of 20 years, including installation and maintenance. But because of the lack of recent and harmonised data from LCA studies for all materials, it has not been possible to perform a full quantitative MECO analysis. Furthermore, very different materials and combinations thereof can be used in a floor covering or underlays. That is why, it has been assessed that a qualitative MECO is better suited for that particular product group.

The performed MECO analysis is made for floor coverings and flooring underlays included in the product group definition.

Qualitative MECO matrix for the life cycle of floor coverings and underlays.

	Raw material stage	Production	Use stage	End-of-use stage
Raw materials/ inputs	Wooden floors (solid wood, parquet, laminate, cork and bamboo floorings) and corkment underlays: Land use through deforestation, use of primary raw materials (wood, wooden panels, cork bark and bamboo). Use of endangered tree species. Seldom use of secondary raw materials in the manufacture of wood flooring or HDF included in laminate floorings. Adhesives, fillers, resins and surface treatments (biocides, paint and varnishes). Energy resources for cultivation, harvesting and use of biocides/pesticides. Water for cultivation. Energy resources for production and emissions during production. Linoleum: Land use through deforestation, use of primary raw materials (jute, linseed oil, rosin, limestone, wood flour, cork flour, pigment, surface treatment and sometimes flame retardants. Use of secondary raw materials such as recycled linoleum. Surface treatments. Energy resources for cultivation, harvesting and use of fertilizer/pesticides. Water for cultivation. Energy resources for production and emissions during production. Plastic flooring and underlays: Fossil-based polyolefins and/or other polymers. Use of secondary materials such as recycled PVB or other polymers from various material loops. Bio-based plastics. Mineral fillers, pigments, additives and surface treatments. Land use for crude oil and/or land use through deforestation for cultivation. Energy resources for cultivation, harvesting and fertilizer/pesticides. Water for cultivation. Pre-consumer recycling material can re-enter the manufacturing process. Energy resources for production. Emissions during production.	Recycled/reused raw materials can be used in the manufacture of plastic and wooden flooring. Energy resources for production. Emissions to air and water during production.	Adhesives to install the flooring. Underlayment to improve the performance of the flooring. Refurbish with new surface treatment) (maintenance). Floor coverings have a long lifespan. The thickness of the wooden floor's top layer is decisive for how many times the floor can be sanded during the use phase and thus its lifespan. Floorings with durable/modern surface treatment require less maintenance and have longer lifespan. Chemicals needed for refurbishment/coating of the surface layer after sanding (plastic, linoleum and wood flooring). Chemicals needed for cleaning and maintenance. Spare parts and individual tiles/planks to replace damaged ones for reparable loose-lay/adhesive-free flooring.	Worn out floorings and underlays are mostly incinerated (energy recovery) in the Nordic countries. However, possibilities to reuse wood from solid wood flooring exist. Possibility for material recycling for laminate flooring, plastic and linoleum floorings (production waste, installation waste and worn-out flooring). Recycled material can be reused in the manufacturing process and converted to new flooring.
Energy	Wooden floors (including laminate) and corkment underlays: Energy resources used for felling, debarking, eventual boiling and sawing. Energy resources used to produce adhesives, fillers, resins and surface treatments.	Wooden floors: Energy resources used for sawing and drying. Energy resources for kraft paper, décor paper and HDF manufacturing,	Energy for cleaning/maintenance of the flooring.	Possibility for secondary raw materials generated during wooden floor manufacturing to be energy recycled at the plant.

	Linoleum: Energy resources to produce wood and cork flour, to produce jute and linseed oil. Energy resources to produce pigments (mostly TiO2) and surface treatments. Plastic flooring and underlays: Energy resources to produce polyolefins and/or other polymers (fossil based and bio-based) Energy resources to produce mineral fillers, pigments, additives and surface treatments.	including impregnation. Energy resources for production of the flooring, including gluing and/or pressing/laminating, and surface treating. Linoleum: Energy resources to oxidise the mixture of linseed oil, tall oil and rosin. Energy resources for the manufacturing (calendaring), drying, trimming and surface treatment of the flooring. Plastic: Energy resources for extruding, calendaring, pressing and surface treatment of the flooring (full manufacturing).		Energy resources for material recycling (separating, cleaning drying, reprocessing). Energy recovery if incineration of the worn out flooring is performed.
Chemicals and emissions	Wooden floors (including laminate) and corkment underlays: Biocides/pesticides from wood treatments. Adhesives, fillers, resins and surface treatments. Linoleum: Pesticides/fertilizers for the cultivation of linseed and jute. Surface treatments. Plastic flooring and underlays: Pesticides/fertilizers for cultivation of raw materials for bio-based plastics. Emissions to air and water of various chemicals during raw material extraction and production depending on the plastics/polymers. Additives and surface treatments.	Wooden floors: Formaldehyde, melamine, phenol and isocyanates from adhesives and resins, especially in laminate floorings. Chemicals used for surface treatments. VOC/SVOC from the material, adhesive, resins and surface treatments. Emissions to air and water during production. Waste generation. Linoleum: Chemicals used for surface treatments. VOC/SVOC from the material and surface treatments. Emissions to air and water during production. Waste generation. Accelerators used during manufacturing. Plastic: Chemicals used for surface treatments.	Emissions of formaldehyde and VOC/SVOC to indoor environment. Possible migration of antibacterial substances and/or nanomaterials from surface treatments Possible release of microplastic during maintenance of linoleum flooring. Possible migration of plastic additives from the flooring to indoor environment.	Risk of passing undesirable chemicals (adhesives, resins, biocides, additives, etc.) onwards in the lifecycle by recycling/reusing wood, wood panels, plastics or flooring materials. Incineration and landfilling of floorings should be prevented as much as possible to minimize their effect on the environment.

		VOC/SVOC from the material and surface treatments. Emissions to air and water during production. Waste generation.		
Other	Social and ethical challenges associated with working conditions in India/Bangladesh regarding cultivation of Jute. Impact on biodiversity through land use and deforestation. Use of endangered tree species.	Production of flooring can occur in other parts of the world than Europe.	The use of underlays can improve the performance and the lifespan of the flooring. Installation of the flooring can be physically demanding and may involve a health risk for the installer. Adhesives with better health and environmental profile can be chosen.	Quantity and type of adhesive can hinder recirculation of worn-out flooring. Floorings have long lifespan and old ones may contain harmful chemicals. Possibility to implement fully functional take-back systems in the future. Labelling and traceability of floor coverings are important aspects.

Summary of the most important environmental impacts found in the MECO analysis

The hotspots, or stages and processes in the product's life cycle that have a high environmental impact, identified during the MECO analysis can be found below.

The raw material stage:

Raw materials can be either of renewable sources or are of fossil origin. Wood is the most used material and is included in the manufacture of solid wood, parquet and wood-based panels (part of a laminate flooring). However, other plant-based materials are also widely employed as they are the main ingredients in linoleum, cork and bamboo flooring and corkment underlays. Bio-based/bio-attributed plastics, and even bioplastics (where the building blocks themselves come directly from fermentation or other natural process) can also be used. Production of the necessary renewable materials have a significant impact on the environment. Indeed, loss of biodiversity through using endangered tree species as well as through deforestation and land use are direct consequences.

Plastics of fossil origin are though much often used as they are more available and consequently cheaper. Secondary raw materials such as recycled plastics and materials can also be found in floor coverings and flooring underlays. Recycled plastics and especially polyolefins can be used as raw materials while post-production and pre-consumer recycling flooring material can re-enter the manufacturing process with the help of waste minimising actions or take-back systems. However, secondary wood-based raw materials, such as wood chips in HDF or reused wood, are rather used for their energy content (incineration for energy recovery or biogas production) than contained in laminate or solid wood flooring respectively.

Chemicals used during the manufacturing of flooring are usually of fossil origins. Though, natural adhesives made from organic sources are becoming more available. Many different chemicals and chemical products must be manufactured and be used in the production of floor covering and underlays. Adhesives, fillers, resins, accelerators and other additives, as well as surface treatments give the material or the final product its desired properties.

Consumption of various energy raw materials has also been linked to both the raw material and the production stages. There are no specific energy raw materials here that should be highlighted, as it will depend on the available energy sources where the processes take place. The quantity of water used to produce the different raw materials, especially those coming from renewable sources, is also an important aspect to consider.

The production stage:

The main environmental impacts caused in this life cycle stage are due to the energy consumption in the manufacturing stage of floor coverings and flooring underlays.

Regarding wooden floorings, there are a certain number of common steps in every production process such as drying and sawing that are considered high energy intensive processes. The freshly produced and calendared Linoleum must also be stored and dried until it has fully cured. The manufacture of plastic flooring requires that ingredients are firstly extruded to produce a malleable material. The material is then calendared and pressed to obtain its desired shape and characteristics. Energy consumption for the application of surface treatment, the production of chemicals, raw materials and bought-out parts (e.g., HDF and backing layer) used in the manufacturing of flooring can also be of significance.

The production stage is also where most of the harmful emissions take place and generate a non-negligible amount of waste. Especially in the case of the production of MDF/HDF (included in laminate and other hybrid floorings) that causes emissions of total particulate matter/dust from dryers, consisting of wood dust and condensable organic compounds and emissions of non-condensable natural VOC, including formaldehyde. Another source of VOC/SVOC and harmful chemicals to health and the environment is the application of a surface treatment or finish at the end of the flooring manufacturing process.

The use stage:

As the raw material and production stages have high environmental impacts, it is important that the materials used are of good quality and that the floor covering, or flooring underlays has a long lifespan. The floor covering must perform accordingly to the requirements stated by the area of use so its service life can at least be 20 years. The use of underlays can extend the floor covering's service life as well as improve the user experience (e.g., sound dampening, walking comfort).

Loose-laid flooring or floorings installed without the use of adhesives, have the advantage to be more easily reparable. Floor coverings based on click-systems allow the user to the change the damage plank or tile more easily.

Installing a floor can be physically demanding for the workers and it is important to choose adhesives that can both perform in the best way possible and have good health and environmental profile. Furthermore, the longer the service life is, the higher the contribution from the use phase from a product's life cycle becomes in relation to its overall health and environmental impacts. That is why adhesive, formaldehyde-based resins/glues, surface treatments as well as the materials the flooring is made of must be chosen so they do not negatively affect indoor environment by releasing too much VOC/SVOC.

A long service life means more chemicals used for cleaning and maintenance over the years. At the same time, it is worth noticing that certain chemicals and machines used for cleaning can contribute to the release of microplastics. Finally, antibacterial substances or nanomaterials from surface treatments as well as various plastic additives can potentially migrate from the product to the indoor environment.

The end-of-use stage:

Loose-laid or adhesive-free installed floorings can be designed for repair and damage tiles or planks can be easily replaced, making the products overall more circular. In the case of glued-down flooring, the type and quantity of adhesive may hinder treatment of old flooring and consequently material recycling and recirculation.

Wood, linoleum and plastic flooring can be sanded, and a new coating can be applied afterwards. Refurbishment/renovation/repair/reuse are processes with low environmental impact and should be promoted and preferred over material recycling and of course production of new virgin material and product.

All the materials used for manufacturing floor coverings and flooring underlays are characterized by having high energy content and/or being considered as CO_2 storage. Landfilling or incineration without energy recovery must be prevented, also because of the emissions/migration of chemicals occurring during these processes.

Recycling uses less energy than that required to manufacture virgin materials. The use of reused/recycled raw materials reduce drastically the overall resource consumption associated to floor coverings/underlays manufacturing. Reused wood, recycled plastics, recycled wood-based materials can re-enter the manufacturing process and be used instead of virgin materials. That is why, it is of uttermost importance that the recycled fractions are of good quality and do not contain undesirable or legacy chemicals as remains from previous material uses.

Waste generated during manufacturing can either be used because of its high energy content (wood-based waste can be used as fuel in combustion plants) or be reused as input in the process (post-production waste in plastic and linoleum flooring production). Pre-consumer or post-installation waste (10% of the flooring becomes scraps during installation[4]) can also be reused instead of virgin materials and become new flooring. Post-consumer flooring/underlays material is still scarcely used as input in the manufacturing of new products as many parameters must be considered. As of today, and for compatibility reasons,

[4] https://www.golvbranschen.se/miljo-hallbarhet/golvatervinning-for-installationsspill/

flooring manufacturers are able to reuse in the production of new floor coverings only post-consumer recycled flooring material that they selves manufactured in the first place; hence the current need for manufacturer-specific take-back system over systems managed by industry associations.

To ensure flooring and underlays manufacturers the access to post-consumer recycled material of good quality and purity, actions can be taken to put a take-back system in place. The way to a fully operational take-back system includes several steps, each of them being associated with issues. These issues are responsible for the relatively low manufacturers' steerability in managing to recover their own products once they have reached their end-of-use. However, some of these issues can be addressed by the manufacturers so that the chance the product finds its way back increases, no matter the number of actors involved along its service life. For instance, working with materials that are recyclable and developing in-house processes enabling recycling of these could be seen as a first important pillar. As a matter of fact, flooring comprising many different materials, as for instance laminate flooring, are much more difficult to recycle compared to floorings of more homogeneous composition (e.g., plastic and linoleum floorings).

2.2 RPS analysis

Nordic Ecolabelling sets requirements on the stages and processes in the product's life cycle that have a high environmental impact – also called hotspots. A tool called RPS is used to identify where ecolabelling can have the greatest impact. R stands for relevance and identifies the environmental issues; P stands for potential and lists the area where the product's environmental impact can be reduced, and S is for steerability, meaning the possibility to set requirements that can be documented and followed up.

The objective of Nordic Ecolabelling is to steer the industry towards the environmentally best flooring or underlays within each of the different product or material types. That is why, it has been assessed that requirements can be set at the different stages of a floor coverings or flooring underlays' life cycle and environmental gain can be achieved by fulfilling all criteria, no matter the materials used. The table below provides an overview of the key areas where requirements are pertinent, beneficial and applicable due to a high or medium RPS.

Table 1: Summary of results of the RPS analysis.

Lifecycle stages	Area and assessment of R, P, S (high, medium or low)	Comments
Raw materials		
Wooden floors (wood, bamboo, cork and laminate floorings, as well as engineered wood floorings, design wood floorings and hybrid floorings containing high proportion of wood-based materials) and underlays made	**Resources – wood raw materials** R: High P: High S: High	Wood raw materials used in floorings have a high RPS. From a life cycle perspective, forestry is a key part of wood products' environmental impact, and it is also important that wood as a renewable raw material is grown / harvested and used in a sustainable way. Much of the world´s forest loss is driven by conversion of natural forest to other land uses such as cattle farming, palm oil and soy plantations. Deforestation and degradation from illegal and unsustainable

mostly of wood-based materials.		logging, fires and fuelwood harvesting can harm wildlife, jeopardize people´s livelihoods and intensify climate change. Credible forest management certification contributes to a more sustainable wood / timber product industry by helping create market conditions that support forest conservation. Requirements for high share of certified wood raw materials and certified traceability ensures more sustainable forestry.
Linoleum floors, Hybrid flooring and underlays containing other raw materials than the most common ones.	**Resources – other raw materials** R: High P: Medium S: Medium/Low	The individual plant used to produce the natural fibre, or any other renewable raw material must be obtained in the least environmentally impactful way. However, the products in this product group are expected to include relatively low amount of textile fibres. Only flax and other bast fibres are expected to be extensively represented in flooring because of their use in linoleum floorings. That is why, specific requirements on biocides use and on COD/TOC values have been specifically set. The supply chain being very long from the cultivation to the production of the final flooring and the relatively low impact of the fibre types used in this product group are responsible for the medium potential and low steerability. Furthermore, a multitude of raw materials can be used in hybrid floorings or underlays. Hence, it is required that other raw materials may be used only if they are residual products from processes or 100% pre/post-recycled material. Full traceability must be guaranteed.
Plastic floorings, floorings containing WPC, floorings containing rubber and/or foam materials and plastic-based underlays	**Resources – Virgin fossil plastic raw materials and plastics produced from renewable raw materials** R: High P: High S: High	The production of plastics and polymers is highly energy and resource demanding. However, it is troublesome to obtain relevant energy consumption and other resource consumption related to the production of specific plastic/polymer types. Instead, a requirement is set demanding that plastic flooring/underlays must contain a high share of recycled and/or renewable materials. Additional requirements are set on the additives added to the plastic/polymer material as it is known that some of them are classified as hazardous which may affect indoor environment under the use phase and hampers the recirculation/recycling of the material once the product has reached its end of life. Regarding, bio-based plastics/polymers used in underlays/floorings, requirements may be set depending on the raw material used. Plastics/polymers produced from of waste or residual products defined in accordance with (EU) Renewable Energy Directive 2018/2001 are preferred over virgin bio-based plastics and obviously virgin fossil-based plastics and polymers.

		Specific requirements on WPC have been set to minimise the material environmental impact and to ensure that WPC-containing floorings meet the most stringent limit values.
All flooring types	**Resources - recycled raw materials** R: High P: Medium/High S: Medium/High	Use of recovered and recycled materials such as renewable fibres/materials, plastics or even flooring materials will reduce the negative environmental impact of all types of underlays/floorings. Requirements that linoleum, plastic and other type of floorings except wood-based floorings must contain recycled materials will reduce the need for virgin raw materials and thus save natural resources. The potential for using recycled materials is relatively low in wood-based products, often because of how a flooring product is constructed/produced but also because wood may be requested by the energy sector. A challenge of using recycled materials can be the content of harmful substances. Recycled wood raw materials therefor need to be tested to reduce the spread of substances of concern and promote the potential of material reuse in the future. The traceability for recycled wood materials is high due to widespread certification schemes. Recycled Polymers/plastics must also be tested for hazardous chemicals deemed as most relevant for this product group.
Floorings and underlays production		
All product types	**Energy - Production** R: High P: High S: High	High RPS has been identified for energy consumption and its contribution to climate change during the production of floorings and underlays. Working on having a more energy-efficient production, reducing overall energy consumption and increasing the use of renewable energy and fuel play an important role in minimising the product's overall environmental impact. Energy consumption during production of the materials necessary in the product's construction has also been identified as having high RPS. This concerns wood-layers, plastic binders, HDF, linoleum cement and any other main material used in the product. Both energy consumption during the production of the final product and during the production of materials are included in a requirement with limit values that shall not be exceeded. However, steerability to reduce energy consumption for producing chemicals used during the manufacture of floorings and underlays (e.g., adhesives and surface treatments) was identified as low. This, because of the lack of data and the high number of different chemicals that may be used. That is why, it has been left out from the energy consumption requirement.

All product types	**Waste - Production** R: Medium P: Medium S: Medium	Minimization waste production ensures an efficient use of resources (energy and material), enables resource savings and contributes to increase the circularity of the product. Wood dust is produced during the manufacture of wood-based flooring that can be used as renewable fuel. The production of linoleum and plastic flooring generates waste that can re-enter the process and become new floorings. A requirement is set so that all production waste must be either energy recovered or reused and reprocessed according to the good practices. Such requirement can be met easier if a waste minimization management programme is implemented.
All product types	**Chemicals - Production** R: High P: High S: High	Reducing the quantity of health and environmental harmful chemicals and substances used during the production of floorings and underlays has high RPS. However, steerability lowers once one gets further away from the manufacture of the main raw materials and of the final product. SVHC, substances assessed as PBT/vPvB and/or listed as endocrine disruptors can be found in various chemical products. Chemical products such as adhesives, resins and surface treatments can be a source of phthalates, PFAS, chlorinated paraffins biocides, nanomaterials and VOCs such as formaldehyde, among others. Requirements can be set so that a wide range of hazardous substances is excluded, does not migrate or is emitted during the use phase, and does not pollute or contaminate during the end-of-life phase. For instance, application technologies leading to the least VOC emissions are encouraged. Potential and steerability also exist for requirements set at the production stage to limit emissions to air and water. Especially in the case of laminate floors manufacturing. These requirements ensure that both end-users and workers are exposed to as little harmful chemicals as possible.
All product types	**Packaging** R: Medium/Low P: High S: Medium	There is a relevance for plastic material used as packaging as they are produced from fossil feedstock. There is also relevance for paper and cardboard packaging as their production from wood fibres leads to deforestation and biodiversity loss. Requirement is set to promote the use of recycled plastic and/or the use of certified wood fibres in the production of packaging to further reduce the products' environmental impact.
Use stage		
All product types	**Chemicals – Emissions** R: High P: High S: High	An overall high RPS has been found to set requirements on the emissions generated by the finished flooring and underlays.

		High indoor environment quality is very important from the consumer's point of view and that means that they must be protected from emissions of VOCs and CMRs substances, such as formaldehyde. Steerability lowers regarding chemicals used for installation, maintenance and cleaning. Adhesives, oil, levelling compounds and waxes (sometimes containing microplastics) must often be used. Manufacturers can only give recommendations on what chemicals should be used.
All product types	**Quality and durability** R: High P: High S: Medium	A high relevance and potential have been found to set requirements on the quality and durability of the floor covering. The longer the service life for a floor covering is, the less its environmental impact becomes. The consumption of chemicals, raw materials and energy is drastically reduced. High steerability is illustrated by the numerous continuously updated quality and durability standards/technical bulletins specific to the materials or type of flooring/underlays. These must be met to ensure that the product has a long lifespan. Once, the product has been installed, steerability gets lower. However, Information intended to extent the product service may be provided by the manufacturer and made easily available for flooring installers, consumer and cleaning services.
End-of-use stage		
All flooring types	**Circularity/recyclability – take-back systems** R: High P: High S: Low	High relevance and potential have been identified regarding setting requirements at the end-of-use stage to increase recycling of floorings and decrease their incineration. Steerability is however hampered by many parameters such as the choice of the material used in the floorings and their recyclability, the long service life of floorings and the lack of traceability between the installed products and the flooring manufacturers, as well as the numerous actors involved in the life cycle of floorings and the lack of communication between them. As a result, no flooring manufacturers have a fully operational take-back system for worn out floorings as of today. However, Flooring manufacturers have steerability in some cases: - Labelling and traceability can be ensured for some flooring types and in some product areas. - The choice of materials or installation (e.g., with or without adhesive) can facilitate recover and recycling of the floorings. - The services offered can be communicated to the customers. A requirement is set so that traceability is ensured either via labelling for products

		that not glued down or via a register that the manufacturer must fill with information for flooring used in certain B2B projects. A requirement is set to ensure that all flooring manufacturers develop technologies enabling recycling of all their products, except for wood floorings. They must also guarantee to recover production waste and take back, for instance, faulted products. A requirement is set on product and consumer information stating that all services offered by the manufacturer with purpose to proper handle the product when it has reached its end-of-life must be communicated. Because steerability towards a fully operational take back system for used floor coverings is low to medium, it is also required that the products contain a high share of renewable and/or recycled materials to reduce its overall environmental impact.
All flooring types	**Reuse, Renovate and Repair** R: High P: High S: Medium/Low	High relevance and potential have been identified regarding setting requirements at the end-of-use stage to increase reuse, repair and renovate of floor coverings. These processes have the most beneficial benefits as they lead to the least depletion of natural resources, contribute less to climate change and generate less waste. To promote reuse and repair requirements are set on the possibility to renovate/refurbish the flooring if it must be glued down or on the possibility of disassembly and replace if the flooring can be installed without the use of permanent adhesives. Furthermore, a requirement on warranty and spare parts ensures that the product must be reparable though out is service life. Once again, the product information requirement guarantees that all possibilities are communicated to the end-user. Finally, to increase the chance for renovate/repair, it is required that a maintenance plan is provided with the purchase of a floor covering. Hence, actions to renovate/repair the flooring can be planned with the different actors involved. Unfortunately, steerability remains low to medium as it is still up to the end-user to do the right thing and take actions to reuse/renovate/repair the product instead of buying anew.

2.3 Circular economy and Climate

The Nordic Swan Ecolabel is a good tool for companies working on adjusting their business models (and/or products) and willing to make the shift towards a more circular economy. Indeed, the entire product life cycle, including the phases known as raw materials extraction, production, use and end of-use (e.g., the 3 different scenarios, landfilling, incineration and recycling are considered) is

scrutinised. This holistic approach enables the drawing of a bigger picture where all material loops involved in the manufacture of a product are considered. This step is crucial to pinpoint the areas or processes needing adjustments or corrections to be more in line with the concept of circular economy. These so-called hot spots related to circular economy may then serve as basis for the development of circular requirements found in a specific product group's criteria. More information about how the Nordic Swan Ecolabel generally contributes to a circular economy can be found on our website.

Actions taken to commit to the shift towards a more circular economy (through rendering the products more circular) are often closely related to actions taken to reduce the products' contribution to climate change. Therefore, requirements on Nordic Ecolabelling floor coverings and flooring underlays associated with these two aspects are described together below:

- The criteria promote sustainable forestry, protecting key habitats for biodiversity. Forest areas are known to play a role in regulating the climate.

- The criteria promote the use of sustainably harvested renewable materials as well as the use of pre-/post-consumer recycled materials of good quality and purity. This leads to a lesser need of using natural resources (e.g., energy, chemicals, materials and water) and especially a lesser need of extracting more oil to produce virgin fossil materials, highly contributor to climate change.

- The criteria promote the use of chemicals of less environmental and health impact and the production of materials, floor coverings and flooring underlays which do not contain the most hazardous substances. This allows recycling of the materials without the risk of recirculating, for instance, hazardous additives in plastics fractions. Furthermore, a specific requirement is set on recycled plastics so that they are not contaminated with, for example, halogenated flame retardants and heavy metals.

- The criteria promote the use of renewable fuel and energy sources. The energy management and consumption requirements are set so that the manufacturers work continuously on reducing their CO_2-emissions and consequently their general climate impact, as well as on manufacturing specific products in a more resource-efficient fashion. Furthermore, requirements on waste management and on recyclability have for purpose to promote recover/recycling of the waste generated during manufacture. As previously stated, the use of recycled materials further reduces the overall energy consumption and thus, the product's climate impact.

- The criteria promote products with long service life through requirements on quality and durability as well as on product/consumer information. Raw material extraction and product manufacture being the most environmental impactful steps, it is of uttermost importance that Nordic Ecolabelled products have a long service life.

- The criteria promote reuse/repair/renovate of floor coverings over the purchase of new products when this can be avoided. Requirements on

reparability, warranty and spare parts as well as on traceability and maintenance are part of an attempt to tackle overconsumption and reduce the product environmental impact.

- The criteria promote the development of a take back system. A take back system enables recycling of flooring materials and decrease drastically the need for production of new chemicals and materials and the overall need for resources employed during manufacture. Requirements on traceability and recyclability are set to increase the chance of recycling worn out floorings.

2.4 Biodiversity

Biodiversity is the variability of all living organisms on Earth and how they interact. Biodiversity or biological diversity is the variety and variability of life on Earth. Biodiversity is a measure of variation at the genetic (genetic variability), species (species diversity), and ecosystem (ecosystem diversity) level.[5] Biodiversity plays an important role and is beneficial for society,[6] as demonstrated by the development of ecosystem services. These come in three flavours:

- Provisioning services which involve the production of renewable resources (e.g.: food, wood, fresh water),

- Regulating services which are those that lessen environmental change (e.g.: climate regulation, pest/disease control) and,

- Cultural services represent human value and enjoyment (e.g.: landscape aesthetics, cultural heritage, outdoor recreation and spiritual significance).[7]

In 2019 the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) published its first global report, calling for transformative change. The world must bring biodiversity back into the production landscapes in addition to creating more protected areas. In 2022 the UN Convention on Biological Diversity[8] adopted the Kunming-Montreal Global Biodiversity Framework agreeing to conserve and manage at least 30 percent of the world's lands, inland waters, coastal areas and oceans.

Nordic Ecolabelling contributes to protect biodiversity by requiring that renewable raw materials are sustainably sourced and by promoting the use of waste/residues or recycled materials instead of virgin raw materials, thus, enabling natural resources savings. The goal is to counteract loss of species and deterioration of ecosystems, and that sourcing of biological raw materials is in balance with regeneration.

---

[5] "What is biodiversity?" (PDF). United Nations Environment Programme, World Conservation Monitoring Centre.
[6] Cardinale, Bradley; et al. (2012). "Biodiversity loss and its impact on humanity" (PDF). Nature. **486** (7401): 59–67. Bibcode:2012Natur.486...59C. doi:10.1038/nature11148. PMID 22678280. S2CID 4333166
[7] Daniel, T. C.; et al. (21 May 2012). "Contributions of cultural services to the ecosystem services agenda". Proceedings of the National Academy of Sciences. **109** (23): 8812–8819. Bibcode:2012PNAS..109.8812D. doi:10.1073/pnas.1114773109. PMC 3384142. PMID 22615401.
[8] https://www.unep.org/un-biodiversity-conference-cop-15

2.5 UN Sustainable Development Goals

Of all UN sustainable development goals, the one that the Nordic Swan Ecolabel contributes the most to is Goal 12, "Ensure sustainable consumption and production patterns". Through setting requirements at the different phases of the lifecycle and especially on resource use, as well as on the chemicals and the materials included, the Nordic Swan Ecolabel commits to reduce the environmental impact associated with the production and consumption of goods. The same requirements enable control of the supply chain, ensures sustainable production and leads to the delivery of sustainable products to the end-user. The end-user can then safely use the products throughout their service life.

Nordic Swan Ecolabelled products are manufactured all over the world. Wherever the Nordic Swan Ecolabelled product is made, its manufacture must fulfil strict environmental requirements that go beyond the legislation in place. This promotes more environmentally-friendly production methods – in developing countries too. The criteria for floor coverings and flooring underlays contribute to Goal 12 as follows:

- Requirements on the share of renewable and/or recycled raw materials. Especially requirements for certified sustainable wood raw material and their traceability. These requirements are for purpose to lower the product's overall environmental impact and consequently contribute to more sustainable production.

- Requirements on energy management and energy consumption during the products' manufacture. These requirements are directly linked to sustainable production.

- Requirements on harmful chemicals to health and to the environment reduce the emissions of undesirable substances during production, use and end-of-use phases, at the same time facilitating potential material recovery in the future.

- Requirements on quality, durability and product information to ensure long service life. These requirements enable efficient use of natural resources.

- Requirements on traceability, reparability and recyclability may further reduce the environmental impact associated to production and can drastically contribute to a more sustainable consumption.

Although Nordic Ecolabelling mainly contributes to Goal 12, Target 3.9 may also be addressed. Target 3.9 focuses on mortality due to environmental pollution. Comprehensive and strict requirements on chemicals all contribute to this target.

3 Other labels

CE marking

As of 1 July 2013, all construction products covered by a harmonised standard or European Technical Assessment (ETA) must have a performance declaration and

be CE marked in order to be sold in the EU. This is regulated by the EU Construction Products Regulation (305/2011/EU), abbreviated CPR. The purpose of the Construction Products Regulation is to ensure that reliable documentation on the performance of construction products is presented in a harmonised manner throughout the EU, so facilitating free trade. Common, harmonised European standards or European assessment documents (EAD) are used to test and report the product's performance. These serve as a basis for the CE marking of the construction product. Performance requirements are set by each member state, but there are also rules on restrictions in harmonised legislation such as REACH.

The harmonised product standard, EN 14041 "Resilient, textile and laminate floor coverings – Essential characteristics" covers flooring made from plastic, linoleum, cork, rubber and textile flooring There is an equivalent European harmonised product standard for wood flooring; EN 14342 "Wood flooring. Characteristics, evaluation of conformity and marking". This means that since 1 July 2013 these types of flooring must have a CE marking. These standards do not include flooring underlays.

It is worth noticing that the CPR is under revision and that Nordic Ecolabelling is closely following the work ongoing at the European Commission's level.

EU Taxonomy

There are many uncertainties on how EU Taxonomy compliance can be documented as well as interpreted. Therefore, Nordic Ecolabelling cannot guarantee alignment between EU Taxonomy's requirements and its requirements on Floor coverings and flooring underlays yet. Nordic Ecolabelling does not take any legal responsibility for the (degree of) alignment, nor can a Nordic Swan Ecolabel building material be claimed as taxonomy aligned based on the ecolabelling criteria. The responsibility for documentation of EU taxonomy compliance solely belongs to the company who is claiming it. Nordic Ecolabelling closely follow interpretations of the EU Taxonomy criteria in both the Nordic countries and from EU. In the end the interpretation is a task for national authorities or other officially appointed bodies.

However, when it comes the Delegated Act on the objective climate change mitigation (Commission Delegated Regulation (EU) 2021/2139 of 4 June 2021) the following issues have been handled in the criteria for Floor coverings and flooring underlays. Specifically, reference is made to the activity 7.1 "Construction of new buildings: 7.1.5.2: Pollution and prevention control", i.e.,

Building components and materials used in the construction that may come into contact with occupiers emit less than 0,06 mg of formaldehyde per m³ of test chamber air upon testing in accordance with the conditions specified in Annex XVII to Regulation (EC) No 1907/2006 and less than 0,001 mg of other categories 1A and 1B carcinogenic volatile organic compounds per m³ of test chamber air, upon testing in accordance with CEN/EN 16516 or ISO 16000-3:2011 or other equivalent standardised test conditions and determination methods.

This requirement is relevant for the criteria for Floor coverings and flooring underlays. The proposed requirement for formaldehyde emissions is harmonised with the EU Taxonomy requirement. Nordic Swan Ecolabelling is aware that the specified test conditions referred to in Annex XVII has not yet been published. As

mentioned earlier, Nordic Ecolabelling is closely following the development and interpretations of the EU Taxonomy criteria in both the Nordic countries and from EU.

Type I environmental certifications

The EU Ecolabel has criteria documents for wood-, cork and bamboo-based floor coverings (2017/176) and hard covering products (2021/476).

The German ecolabel Der Blaue Engel has criteria documents for low-emission floor coverings made of wood and wood-based materials (criteria document: DE-UZ 176), for resilient floor coverings (criteria document: DE-UZ 120), as well as for low-emission flooring underlays (criteria document DE-UZ 156).

EPD

Environmental Product Declarations (EPD) according to the standard ISO 14025 (environmental labelling and environmental declarations Type III) have been developed with the aim of showing a product's impact on the environment from a life cycle perspective.[9] Different EPDs need to be based on the same PCR (product category rules), for them to be comparable to each other. A PCR describes how the calculations for an EPD should be done within a specific product area/industry. PCRs and EPDs are produced and published by so-called program operators. Program operators are often active on a national level and many countries have their own program operator.[10]

Product-specific EPDs ("single-company"/"product specific" EPDs) are the most common type of EPD. They are designed for a specific product from a specific manufacturer. Many flooring manufacturers have published product specific EPDs. Industry-wide EPDs ("Sector"/"Industry Average" EPDs) represent an average for a specific industry or product type. These EPDs can be based on a weighted average of data or so-called “generic” data from the industry, that is, the dominant percentage of manufacturers.[11] This is common in the construction industry and in the context of the EN 15804 standard, an industry wide EPD is sometimes also "Generic EPD”. For instance, the trade association ERFMI (the European Resilient Floor Manufacturers Institute) has had an LCA carried out using data from ERFMI members which covered more than 85% of all European production of resilient. Output from this analysis is mainly used as input in an EPD calculator, where members can upload generic EPDs to their websites.

Cradle to Cradle (C2C)

The Cradle-to-Cradle Certified® Products Program began as a proprietary system; however, in 2012 the certification was turned over to an independent non-profit called the Cradle-to-Cradle Products Innovation Institute. The Cradle-to-Cradle Products Innovation Institute’s certification criteria from the latest version of the standard 4.0 are material health, product circularity, clean air and

[9] Naturvårdsverket. (den 26 10 2022). Beräkning enligt GHG Protocol eller ISO-standard. Hämtat från https://www.naturvardsverket.se/vagledning-och-stod/luft-och-klimat/berakna-klimatpaverkan/berakning-enligt-ghg-protocol-eller-iso-standard/
[10] IVL. (den 1 11 2022). Klimatanpassad och cirkulär upphandling. Hämtat från IVL: https://www.ivl.se/projektwebbar/klimatanpassad-och-cirkular-upphandling.html
[11] EPD International. (den 02 12 2022). Different EPD types. Hämtat från EPD - The international EPD System: https://www.environdec.com/all-about-epds/what-is-an-epd

climate protection, water and soil stewardship and social fairness. The certification is available at several levels: bronze, silver, gold, platinum, with more stringent requirements at each. Recertification is required every three years and companies need to show measurable improvement to re-certify. Many construction products and notably floor coverings are certified according to the C2C product standard.

FSC/PEFC – raw material labelling

The forest certification schemes Forest Stewardship Council (FSC) and Promoting Sustainable Forest Management (PEFC) play a certain role in the flooring industry. According to the manufacturers, these raw material labels/certification schemes do not compete directly with the Nordic Ecolabel on the Nordic market.

Environmental certification of buildings

There are many different systems for environmental classification of buildings used in the Nordic countries. The systems set requirements for construction materials, including flooring. For suppliers of construction materials to be included in the **LEED** (Leadership in Energy and Environmental Design) system, they must first be certified under the FloorScore system, which assesses the indoor climate performance of construction products.

The British **BREEAM** (Building Research Establishment Environmental Assessment Method) classification system requires a life cycle analysis as the basis of an Environmental Product Declaration (EPD) which is then included in BREEAM's "Green Book". BREEAM's Green Book acts as an online list of assessed products and services in the construction industry. The Norwegian version of BREEAM (**BREEAM-NOR**) sets criteria for selection of environmental hazardous substances which must not be included in construction products. In addition, emission criteria are set equivalent to the level M1 in the Finnish classification system Emission Classification of Building Materials.

The **DGNB** (German Sustainable Building Council) system in Denmark also sets environmental criteria for flooring, which includes evaluating the following substances contained: halogenated and partially halogenated fuels, heavy metals, biocides, Substances of Very High Concern and organic solvents and softeners. Level requirements are also set for the use of sustainable wood. DGNB does not set concrete emission requirements for construction materials, but does set requirements for good air quality in buildings via suitable amounts of ventilation and low emission materials. There is a focus on VOC and formaldehyde levels.

Assessments systems

There are several national registration systems and environmental assessment systems for construction products and construction materials which have a major impact on the market.

- BASTA Online, based on self-registration and self-declaration followed by sample audits by an independent third party.
- Byggvarubedömningen and Sunda Hus, which are environmental assessment/environmental evaluation systems for construction materials which manufacturers sign up to.

- ECOproduct, which is both an environmental evaluation method and a database of already evaluated products. An environmental product declaration (EPD) is used as the basis for evaluating the product. ECOproduct was developed in partnership between SINTEF Byggforsk, Norsk Byggtjeneste and NAL-Ecobox.
- There is also the electronic information system CoBuilder, which shows whether chemicals/products contain substances on the REACH Candidate List, the Norwegian priority list and BREEAM NOR's list of banned substances. CoBuilder also shows whether the products are Nordic Ecolabelled or not.
- Byggtjeneste-NOBB is another database for construction products which contains some environmental information.

4 Justification of the requirements

This section presents proposals for new and revised requirements and explains the background to the requirements and the chosen requirement levels. The changes carried out compared to generation 6 are listed more in details in chapter 6 Changes compared to previous version. The appendices referred to are those that appear in the criteria document "Nordic Swan Ecolabelling of Floor coverings and flooring underlays".

As previously described, the requirements written in this document are the result of an RPS analysis. The requirements are set on the steps and processes identified in the product's life cycle as having the greatest environmental impacts and where Nordic Ecolabelling has sufficient steerability to demand pertinent and credible documentation. By doing so, Nordic Ecolabelling creates good ground for differentiating between products on the market based on their environmental profile.

4.1 Definition of the product group

Nordic Ecolabelling has chosen to limit the criteria to floor coverings intended for indoors used as well as to flooring underlays. Flooring underlays can be defined as a thin layer of either plates or rolled material installed under the floor covering to which there are neither attached nor glued to. The purpose of the underlays is to enhance the properties of the installation and flooring construction (e.g., levelling out subfloor irregularities, support of the flooring click system, sound dampening and humidity barrier). Floor coverings and underlays must e.g., be able to be laid on a surface of concrete or timber boarding.

Floor coverings that can be Nordic Ecolabelled are:

- wooden floorings according to EN 13756 (solid wood flooring, multi-layer wood flooring or engineered wood floorings and wood veneer floor covering/rigid floor covering),

- cork floor covering (meaning both cork tile flooring according to EN 12104 and engineered cork flooring),

- bamboo flooring,

- as well as laminate flooring as defined in standard EN 13329.

In addition to cork flooring, other resilient flooring can be Nordic Ecolabelled according to these criteria, namely:

- plastic flooring,
- and linoleum flooring.

Hybrid flooring, which combines several aspects of wood, laminate and resilient flooring can also be Nordic Ecolabelled if the materials it consists of can fulfil all relevant requirements. However, for hybrid floorings and other flooring types containing a layer made of wood-plastic composite, specific requirements must be fulfilled (see section Wood-plastic composites 4.5.5).

A Nordic Ecolabelled floor covering that is marketed and sold as flooring for wet rooms must be approved for wet rooms.

Flooring underlays, depending on the materials they consist of, are not always products covered by a harmonised standard. That is why it is not defined exactly which types of flooring underlays can be Nordic Ecolabelled. Flooring underlays must fulfil all relevant requirements to become Nordic Ecolabelled. Flooring underlays are added to the product group definition as a separate product type and may not be certified in combination with a floor covering.

The product group does not include the following products:

- Floor coverings and underlays which contains a type of material that accounts for more than 5% by weight of all materials in the product other than the ones described in section 4.5 Raw materials, are not included in the product group definition.
- Textile flooring. They can be Nordic Ecolabelled according to the criteria for Carpets, floor rugs and floor mats.
- Rubber flooring. However, it is allowed to use rubber as a material for instance in the intermediate or backing layer of the flooring.
- PVC/vinyl flooring as well as PVC as a material in flooring underlays. See requirement O5 for more information.
- Construction panels, including medium-density fibreboard (MDF) and high-density fibreboard (HDF) can be Nordic Ecolabelled according to the criteria for Panels and mouldings for interior use*.
- Hard floor coverings based on materials such as natural stone, agglomerated stone and ceramic. However, these products can be certified according to the criteria from the EU Ecolabel.
- Polymeric poured seamless floors which form a hard surface upon curing.
- Flooring that is part of the load-bearing structure of the building.

- Flooring sold together with integrated underfloor heating systems.

* *See https://www.nordic-ecolabel.org/product-groups*

Nordic Ecolabelling determines whether a product can be Nordic Swan Ecolabelled or not, and under which criteria a product can apply for a licence.

If there are other types of floor coverings or underlays being used in buildings, that are not mentioned in the product group definition, and there is a desire for such products to be Nordic Swan Ecolabelled, an assessment may be made as to whether these can also be included. Nordic Ecolabelling will determine which new products may be included in the product group.

Background to the product group definition

The type of floor coverings included in the product group definition has been clarified by referring to relevant standards. Hybrid floorings may be certified if they can meet all requirements such as requirements for materials. For instance, hybrid flooring whose main material is resilient plastics must fulfil the material requirements on plastics. Wood-plastic composites (WPC) may only be used in floor coverings if they can fulfil the specific requirements set on this type of material.

The scope of the product group has also been broadened to include underlays as some of these products can contain high shares of renewable and/or recycled materials. Furthermore, because of their ability to improve the customer's experience and extend the service life of floor coverings, their used during an installation has increased. It is worth noticing that only underlays that can be laid without adhesive under floating or loose-laid installed floor coverings can be Nordic Ecolabelled. This to enable products separation and maximise material recovery/reuse once the flooring must be removed.

Flooring underlays are added to the product group definition as a separate product type. Indeed, the choice of flooring underlays does not depend only on the type of floor coverings installed above but also on the substrate (e.g.., wood, concrete, old floor coverings) it lays on. That is why it is not feasible to certify a flooring underlay together with a specific floor covering as many different combinations of floor coverings/flooring underlays would need to be generated and some might not be even fitted for use.

Textile flooring is removed from this product group and included in the product group "Carpets, floor rugs and floor mats". Indeed, a lot of specific requirements are specifically set on this type of product, and it was deemed as more relevant to include it with other similar products mainly made of textile fibres.

Rubber floorings are still not included as it is known for a fact that they cannot fulfil the requirement on the mandatory share of renewable material, recycled material or combination of both. The use of PVC in floor covering and flooring underlays is forbidden for the reasons named in the background text of requirement O5.

4.2 Definitions

Words/Terms	Definitions
Bamboo flooring	Bamboo flooring means floor coverings made of bamboo in solid pieces or in agglomerates mixed with a binder. No standard definition is available yet
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora. CITES is an international convention for the control of trade (across borders) in wild fauna and flora at risk of extinction.
CoC	Chain of Custody – certification that ensures traceability in the supply chain.
COD	Chemical oxygen demand. A measure of how much oxygen is used during chemical degradation of organic matter.
Cork floorings	Cork floor covering means granulated cork mixed with a binder, and then cured or several layers of cork (agglomerated/veneer) can be pressed together with glue. There are two main classes of cork coverings: cork tile flooring in accordance with EN 12104 and engineered cork flooring.
Decor paper	Decor papers enable surface upgrades for wood-based substrates for use in the production of furniture, laminate flooring and other interior and exterior design panels.
Floating installation	This works with engineered, for instance, wood, laminate, cork, cork tile and bamboo floorings over a wood or concrete subfloor or existing flooring. Tongue-and-groove planks or tiles lock together mechanically. Some products must also be glued together at the joints. The material generally goes over a thin foam or cork pad (known as flooring underlays), which fills minor flaws in the subfloor and absorbs sound. Installations over concrete require a thin plastic vapour barrier.
FSC	Forest Stewardship Council Certification scheme for forestry and traceability in the supply chain.
Genetically modified organisms (GMO)	An organism, with the exception of human beings, in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination. Within the terms of this definition: (a) genetic modification occurs at least through the use of the techniques listed in Annex I A, part 1 of the DIRECTIVE 2001/18/EC; (b) the techniques listed in Annex I A, part 2 (DIRECTIVE 2001/18/EC), are not considered to result in genetic modification.
Glued down installation	Engineered wood is typically glued. Other types of flooring can also be glued down. Adhesive onto a clean, flat, wood or concrete subfloor or existing flooring should be troweled and lay down the sheets, planks, or tiles. No vapour barrier is required. Some glue-down flooring is simply peel-and-stick, the easiest to install. Floorings should not be installed over a concrete sealer of painted concrete. If present, it should be removed by gridding or sanding. Floorings should not be installed over slick, heavily troweled or burnished concrete. For glued down floorings, when installing products wider than 8 cm, a bead of recommended wood glue to all the end grooves prior to installing into the adhesive should be applied.
Hybrid floorings	Hybrid flooring means the next generation of floor coverings that combine several aspects of wood, laminate and resilient floorings. The hybrid floorings can be made of a wide range of materials depending on the properties and characteristics that want to be

	achieved. Among these materials are ceramic, vinyl layers or resilient plastics.
IFL	Intact Forest Landscape Continuous propagation of natural ecosystems within the zone with current forest spread, showing no sign of significant human activity. The area is large enough to maintain all natural biodiversity, including viable populations of widespread species.
Ingoing substances and impurities	**Ingoing substances:** All substances in the chemical product regardless of amount, including additives (e.g., preservatives and stabilisers) from the raw materials. Substances known to be released from ingoing substances (e.g., formaldehyde, arylamine, in situ-generated preservatives) are also regarded as ingoing substances. **Impurities:** Residues from production, incl. raw material production, which remain in the chemical product at concentrations below 1000 ppm (0.1000% by weight). Examples of impurities are residues of reagents incl. residues of monomers, catalysts, by-products, scavengers (i.e., chemicals that are used to eliminate/minimise undesirable substances), detergents for production equipment and carry-over from other or previous production lines.
IUCN	International Union for Conservation of Nature IUCN's Red List is the world's most comprehensive overview of the global conservation status of the planet's species, including trees.
Laminate	Laminate means a process in which paper is used in the product, e.g., melamine, HPL or compact laminate.
Laminate flooring	Laminate flooring means, in accordance with the definition provided in the EN 13329, a floor covering with a surface layer consisting of one or more thin sheets of a fibrous material (usually paper), impregnated with aminoplastic, thermosetting resins (usually melamine), pressed or bonded on a substrate, normally finished with a backer. Two main classes of laminates are produced depending on the process of manufacture, High pressure laminate (HPL) and direct pressed laminate (DPL).
Linoleum	A natural product made of linseed oil, wood, limestone, cork, and resins.
Nanomaterial	'Nanomaterial' means a natural, incidental or manufactured material consisting of solid particles that are present, either on their own or as identifiable constituent particles in aggregates or agglomerates, and where 50 % or more of these particles in the number-based size distribution fulfil at least one of the following conditions: (a) one or more external dimensions of the particle are in the size range 1 nm to 100 nm; (b) the particle has an elongated shape, such as a rod, fibre or tube, where two external dimensions are smaller than 1 nm and the other dimension is larger than 100 nm; (c) the particle has a plate-like shape, where one external dimension is smaller than 1 nm and the other dimensions are larger than 100 nm.
PEFC	Programme for the Endorsement of Forest Certification Certification scheme for forestry and traceability in the supply chain
Recycled materials	Recycled materials are defined according to ISO 14021 in the following two categories: "Pre-consumer/commercial" is defined as material diverted from the waste stream during a manufacturing

	process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it. Nordic Ecolabelling defines rework, regrind or scrap, that cannot be recycled directly in the same process, but requires a reprocessing (e.g., sorting, reclamation and granulation) before it can be recycled, to be pre-consumer/commercial material. This is whether it is produced in-house or externally. ”Post-consumer/commercial” is defined as material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose. This includes returns of material from the distribution chain. Materials that are approved as input in FSC Recycled and which are covered by the term Reclaimed in FSC are regarded as recycled material.
Renewable raw materials	Resources that have a natural rate of availability and yield a continual flow of services which may be consumed in any time period without endangering future consumption possibilities as long as current use does not exceed net renewal during the period under consideration. Wood is a renewable raw material while calcium carbonate is not.
Resilient flooring	Refers to floor coverings that occupy a middle ground between soft floors (like carpeting) and hard floors (like stone or hardwood). According to industry group Resilient Floor Covering Institute (RFCI), only six types of floor coverings can be called resilient flooring: Vinyl, linoleum, cork, rubber, asphalt and polymeric poured seamless floors.
Surface treatment	All techniques that aim to provide a twofold basic functionality: a) to protect the underlying material (wood, cork, bamboo-based materials) against deterioration by the adjacent environment and b) to decorate or improve the aesthetic aspect of the surface. Protection should be given against physical and chemical attacks, including water, chemical agents, UV-light and dirt. The aesthetic aspects refer to characteristics like colour performance, gloss and desire surface structure. The basic principle relies on the fact that most of the wood species, cork and bamboo are hygroscopic and absorb stain and lacquer in different ways depending on their porosity and the cell structure.
VOC	Volatile organic compounds (VOC) are defined as any organic compound having an initial boiling point less than or equal to 250°C measured at a standard pressure of 101.3 kPa. This definition is the same as in the Paints Directive (2004/42/EC).
Vinyl flooring	Vinyl comprises the majority share of the resilient flooring market. This includes Vinyl Composition Tile (VCT), Solid Vinyl Tile (SVT) and Luxury Vinyl Tile (LVT).
Wood-based panels	Example of wood-based panels and manufactured board: Particleboard MDF (Medium Density Fibreboard) HDF (High Density Fibreboard) MFB (Melamine Faced Board) Plywood OSB (Oriented Stranded Board) LVL (Laminated Veneer Lumber)

Wooden flooring	Wooden flooring is defined in accordance with prEN 13756 (revised in 2014) as the assembly of wood elements, pre-assembled boards or parquet panels which constitutes the wearing surface of the floor. This definition includes solid wood flooring, multi-layer wood flooring and wood veneer floor covering.

4.3 Overview of the requirements

The criteria are mainly divided into requirement areas where some of the requirements apply to all flooring types and underlays, while others only apply to certain product types. The table below provides an overview of the requirements that must be met for the different flooring types and underlays.

Requirement area	Requirement/Material	Requirement	Responsibility for documentation
Description of the product			
Description of product, of the production process and overview of chemicals	General requirements	O1– O3	Product manufacturer
Share of renewable/recycled raw materials	General requirements	O4	Product manufacturer
Chlorinated plastics in floor coverings and flooring underlays	General requirements	O5	Product manufacturer
Materials			
Wood raw material	Nordic Swan Ecolabelled laminate and wood-based panel	O6	Wood-based panels manufacturer
	Tree species – restrictions	O7	Product manufacturer/Subcontractor
	Traceability and certification	O8	Product manufacturer
	Chemicals in reused wood and recycled material in wood-based panels	O9	Product manufacturer/Subcontractor
Linoleum	Flax (linen) and other bast fibres	O10	Product manufacturer
Other raw materials	Origin	O11	Product manufacturer/Supplier of material
	Recycled fibres - test for harmful substances	O12	Product manufacturer/Supplier of material
	Chemicals in recycled leather	O13	Product manufacturer/Supplier of material
Plastic, rubber and foam	Raw materials for bio-based polymers	O14	Product manufacturer/Supplier of material
	Emission to water from production of foams	O15	Supplier of material
	Blowing agents in foams	O16	Supplier of material
	Rubber, synthetic latex (SBR) and natural latex	O17	Supplier of material
	Recycled plastic, rubber and foam – Traceability	O18	Product manufacturer/Supplier of material
	Chemicals in recycled plastic, rubber and foam	O19	Product manufacturer/Supplier of recycled material

	Additives – Prohibited substances	O20	Product manufacturer/Supplier of material
Wood-plastic composites (WPC)	Wood fibre and plastic	O21	Product manufacturer/Supplier of material
	WPC - Additives – Prohibited substances	O22	Product manufacturer/Supplier of material
Production			
Chemicals	Antibacterial substances	O23	Product manufacturer and chemical manufacturer/supplier of chemical product
	Classification of chemical products	O24	Product manufacturer/supplier of chemical product
	Classification of ingoing substances	O25	Product manufacturer/supplier of chemical product
	Preservatives	O26	Product manufacturer/supplier of chemical product
	Prohibited substances	O27	Product manufacturer/supplier of chemical product
	Nanomaterials	O28	Product manufacturer/supplier of chemical product
	Volatile organic compounds	O29	Product manufacturer/supplier of chemical product
	Free formaldehyde	O30	Product manufacturer/supplier of chemical product
Requirement specific to surface treatments	Application method and quantity applied – surface treatment	O31	Product manufacturer
	Environmentally harmful products and substances in surface treatment	O32	Product manufacturer
	Quantity of applied volatile organic compounds (VOC) in surface treatments	O33	Product manufacturer
Occupational hazard	Emissions to air from production of laminate	O34	Product manufacturer
	Polyurethane	O35	Product manufacturer/Supplier of material
Energy and Waste	Energy mapping	O36	Product manufacturer
	Energy consumption	O37	Product manufacturer/Supplier of material
	Handling of waste and production waste	O38	Product manufacturer
Packaging			
Packaging	Packaging	O39	Product manufacturer
Use-phase requirements			
Emission	Emissions from floor coverings and flooring underlays	O40	Product manufacturer
Quality and durability requirements	Product performance – third-party verification	O41	Product manufacturer
	Quality and durability of floor coverings	O42	Product manufacturer
	Quality and durability of flooring underlays	O43	Product manufacturer
	Wet room approval	O44	Product manufacturer
Circular requirements			
Circular requirements	Warranty and spare parts	O45	Product manufacturer
	Labelling and traceability	O46	Product manufacturer
	Reparability	O47	Product manufacturer

	Recyclability	O48	Product manufacturer
	Product information	O49	Product manufacturer
Innovation			
Innovation	Innovation	O50	Product manufacturer/supplier of chemical product
License maintenance			
License maintenance	Customer complaints	O51	Product manufacturer
	Traceability	O52	Product manufacturer

4.4 Description of the product

O1 Description of the product and material composition

The floor covering or flooring underlays must be made of materials for which requirements are imposed in the criteria.

Materials for which requirements are not imposed must not account for more than 5%. Examples of materials that are not included in the criteria are concrete and ceramic materials.

The applicant must provide the following information about the product:

- Brand/trade name
- A description of the product/products (possibly including drawing/pictures) and the materials involved.
- Flooring type (e.g., wood, laminate, linoleum, plastic, hybrid) or underlays
- The market the product is intended for (private use, commercial use etc.)
- State the percentage composition of the material in the floor and the suppliers of the various materials (see requirement O4 for more information).

✉ A description in line with the requirement above. The template in Appendix 2 can be used by the flooring manufacturer to describe the composition of the materials. Product data sheets can be part of the documentation.

Background

All the required information and especially, the material composition, is crucial for determining whether the floor covering, or underlays is eligible for the Nordic Swan Ecolabel, the requirements that must be met, and who (e.g., subcontractors/suppliers) must document the requirements. It is central for obtaining a good overview and a smooth licence processing procedure.

O2 Description of the production chain and the manufacturing process

The manufacturing process and supply chain for the floor covering or underlays must be described. A flow chart can be used.

Make sure to include all production steps (examples can be seen in the table from the introduction to the energy requirements) and all materials/elements. Specify, if relevant, which finished layer/part(s) is purchased from suppliers and incorporated into the final product (e.g, backing foam, HDF, wood layer).

In case, a contract manufacturer is used to produce the final product, the following information must be submitted:

- The name of the contract manufacturer
- The location of the production site (full address and country)
- The contact information of a responsible.

✉ Submit a detailed description of the production chain and the manufacturing processes (a flow chart can be used). State which finished layer/part(s) is purchased, if relevant.

✉ Provide detailed information according to the points above in case a contract manufacturer is used to produce the final product.

Background

To obtain a clear overview of the product, it is important to have a description of the manufacturing process, of the supply chain and of the different chemicals used during the process. This facilitates the assessment of which requirements in the criteria must be fulfilled and documented. Flow charts are usually good tools to illustrate the different manufacturing steps and the origins of the material used.

O3 Overview of chemical products

All chemical products (e.g., adhesives/resins, additives and pigments, surface treatments and fillers) used in the manufacture of the floor coverings or underlays must be stated and documented with a safety data sheet.

The following information must be submitted for each chemical product:

- trade name
- the function of the chemical
- the process step in which the chemical product is used (the flow chart required in requirement O2 can be used).
- the supplier/producer using the chemical product

✉ List of chemical products used in the manufacturing process.

✉ Safety data sheet in English (or Scandinavian) language for every chemical product, in line with Annex II of REACH 1907/2006.

Background

To gain an overview of which chemicals are used in the various processes in the production, the criteria require the submission of a list of all the chemicals used.

O4 Share of renewable and/or recycled raw materials

Both flooring and underlays must meet one of the following three alternatives. The product must consist of:

a) Minimum 90 % by weight of renewable raw materials

OR

b) Minimum 60 % by weight recycled materials*

OR

c) Floorings and underlays that consist of both renewable and recycled material must comply with the following formula:

$X + Y_1 + Y_2 \geq 80\%$ by weight

X = Percentage by weight of renewable raw materials**

Y_1 = Percentage by weight of pre-consumer recycled materials**

Y_2 = Percentage by weight of post-consumer recycled materials**

Note that floor coverings and flooring underlays containing WPC (wood-plastic composites) must also fulfil specific requirements from section 4.5.5.

Example: A floor's total weight is 2500 g/m². It consists of 900 g/m² post-consumer recycled fillers, 600 g/m² bio-based plastics (renewable), 250 g/m2 post-consumer recycled plastics, 350 g/m² pre-consumer recycled plastics and 400 g/m² other materials (non-renewable nor recycled).
The proportion of renewable raw materials is: 600/2500 = 24%. The proportion of post-consumer recycled materials is: 1150/2500 = 46%. The proportion of pre-consumer recycled materials is: 350/2500 = 14%. The combination of renewable and recycled materials is (600 + 1150 + 350)/2500 = 84%.

** Recycled material is defined in line with ISO 14021. See section 4.2 Definitions for more information.*

*** Recycled renewable materials do not count as both renewable and recycled raw material.*

✉ Summary of the raw materials included in the floor stating the proportion of the raw materials as a percentage by weight. State which raw materials are renewable, and which are pre- or post-consumer recycled. Appendix 2 can be used.

✉ For alternative c), calculations showing that the requirement is fulfilled.

Background

The RPS analysis shows that the cultivation or production of raw materials used in the manufacturing and construction of floor coverings or underlays has high relevance. Both processes are very energy and resource demanding and that is why they have a big influence on the overall environmental impact of the products.

Production of virgin raw materials and especially those of fossil origins can contribute greatly to climate change. Most of the chemicals, polymers and plastics used in the manufacturing of floor coverings and underlays are still produced from oil and its extraction leads ultimately to an increase of greenhouse gases concentration in the atmosphere. Renewable raw materials are less impactful if considering their contribution to climate change. However, their contribution to diversity loss though land use has been proven and that is why it is important that, for instance, wood, cork and bamboo are cultivated in the less impactful manner (see material requirements for more information).

Nordic Ecolabelled floor coverings and underlays must have a reduced overall environmental impact from a life cycle perspective. Hence, Nordic Ecolabelled strives to promote the use of renewable and/or recycled raw materials in floor these products. Many manufacturers are already using recycled material to make new products. For instance, the installation of plastic and linoleum flooring generates approximately 10% scraps (pre-consumer recycled material). For many years, these scraps have been reintroduced into the manufacturing process of several producers to make new floor coverings. The access to post-consumer material of good quality/purity and the material's overall availability, especially for linoleum, has proven to be difficult. Lately, initiatives like Forbo's "Back to the floor recycling program" and Tarkett's ReStart® aim to increase the share of post-consumer recycled material in their floor coverings by recycling their own used floors. Even if these initiatives would guarantee an access to a lot of resource of known good quality/purity, they are still being slow down by complicated traceability and logistic challenges. Another way to reduce the products' contribution to climate change is to replace the fossil raw materials by

vegetable crops. Hence, plastics whose building blocks are produced from renewable raw materials, or bio-based plastics, have been increasingly used in floor coverings.

Due to the material heterogeneity of the product group, the requirement can be fulfilled in three different ways. The first alternative a) requires that the floor consists of at least of 90% renewable materials and is intended to be fulfilled only by solid wood floors, parquet, veneer, bamboo, cork floor coverings and floor coverings of similar construction. The second alternative b) requires the floor to consist of at least 60% recycled raw materials. The last alternative c) allows also floors that consist of both recycled and renewable raw materials to fulfil this requirement. Renewable raw materials and recycled raw materials are weighted equally (see specific requirements on renewable materials in chapter 4.5 Materials for more details). The level of requirement and the limit value of 80% have been set so that only plastic, linoleum, hybrid and laminate floor coverings containing a certain share of recycled material in combination with renewable raw materials can meet the criteria. It is worth noticing that the fillers are now to be included in the calculations as they can also be sourced as pre- or post-consumer recycled material. Pigments are not counted as a filler but as additive. Consequently, they must always be included in the calculations.

The requirement on the proportion of recycled and/or renewable raw materials must be calculated and met for the floor as a whole, including the laying/joining system. Examples of this include locking springs in milled grooves or permanently mounted aluminium rails. These components/materials amount to a very limited proportion of the materials for the entire floor, which is why the criteria document does not cover any specific material requirements for these. If an adhesive-free floor is instead sold with a separate laying system, this must also be counted in the percentage of the floor by weight.

O5 Chlorinated plastics in floor coverings and flooring underlays

Chlorinated plastics such as PVC (polyvinyl chloride) and PVDC (polyvinylidene chloride) must not be included in Nordic Ecolabel floor coverings nor flooring underlays.

✉ Declaration from the flooring manufacturer that the flooring is free from chlorinated plastics. Appendix 2 can be used.

Background

The requirement covers both vinyl flooring and flooring/underlays which includes PVC and/or PVDC as a material/component. The latter may involve cork flooring coated with a thin outer layer of PVC.

PVC has long been in focus in the environmental debate. Some of the environmental problems of PVC are due to the molecule itself – or more precisely the chlorine in the PVC molecule. In other cases, the problems concern additives in the PVC which are harmful to the environment and to health. The latter environmental problem may be easier to tackle using greener alternatives.

Our role as an ecolabelling organisation is to set ambitious requirements that are meaningful in each product group. For this reason, Nordic Ecolabelling does not permit PVC as a material/component in Nordic Ecolabelled floor coverings and flooring underlays. The most important arguments underlying this decision are:

1. The environmental problems caused by PVC manufacture.

2. It is difficult to achieve complete traceability regarding where the PVC has been manufactured.

3. Recycling of post-consumer flooring is very limited in the Nordic countries. It is partly the problem of additives that means that recycling does not work. Flooring has a long service life and old flooring that is taken up may contain cadmium and lead which were used as stabilisers, pigments, etc. Adhesive residues and the fact that the base "comes too" when flooring is taken up are additional problems.

4. Used PVC flooring incinerated in waste incineration plants is associated with difficulties. Large amounts of neutralising lime must be added to protect the equipment and to keep emissions within the limit values. It increases the costs of incineration and for handling the waste product, which is classified as hazardous waste.

5. Not all the Nordic countries allow incineration of used PVC. Denmark has waste legislation which states that all PVC must first be sorted for material recovery. Because this does not exist in practice for vinyl flooring, used vinyl flooring ends up in landfill. The Nordic Ecolabel finds it hard to accept Nordic Ecolabelled products going to landfill.

6. Nordic Ecolabelling's decision to ban PVC in flooring is not based on problems with additives. Phthalates and other harmful additives can be replaced and phthalate-free vinyl flooring is already on the market. Nordic Ecolabelling's attitude is rather that PVC is not a sustainable material in flooring, whether or not harmful additives are substituted.

Consequences

- No vinyl flooring can be Nordic Ecolabelled.

- Nor can other flooring and flooring underlays that contains PVC, PVC-coated cork flooring be Nordic Ecolabelled.

It is important to point out that the decision not to accept PVC as material in floor coverings and flooring underlays applies under prevailing conditions.

4.5 Raw materials

The requirements in this chapter concern requirements for raw materials such as wood (including bamboo and cork), linoleum, other raw materials, plastic, rubber, foam, and wood plastic composites used in floor coverings and underlays.

The requirements only apply to raw materials that accounts for more than 5 wt% of the floor covering or underlays. Water is exempted from the requirements.

Floor coverings and underlays consisting of several differing types of raw materials needs to comply with the specific raw material requirements e.g., a hybrid flooring must comply with requirements for wood raw materials and

plastics raw materials. The same reasoning applies to underlays containing a combination of wood raw materials and other renewable raw materials.

Chemicals used in the production of finished layer/components included in floor coverings such as manufactured board or backing foams must fulfil requirements from section 4.6.1 Chemicals.

4.5.1 Wood raw materials

The requirements in this chapter concern raw materials such as wood, cork or bamboo that are included in underlays, wood flooring and manufactured boards used e.g., in wood (engineered or design floorings), laminate or hybrid floorings.

Wood raw material in paper must also fulfil requirements O7 and O8 if the floor coverings or flooring underlays contains more than 10 wt% paper.

O6 Nordic Swan Ecolabelled laminate and wood-based panel

If the laminate or wood-based panel in the floor covering is Nordic Swan Ecolabelled or included in a license in accordance with the Nordic Swan Ecolabel criteria for Panels and mouldings for interior use, generation 7 or later, the requirements in the chapter 4.5 Raw materials as well as requirements O34, is fulfilled.

✉ Name, manufacturer and licence number of the laminate/wood-based panel.

O7 Tree species – restrictions

Nordic Ecolabelling's list of tree species* consists of virgin woods listed on:

a) CITES (Appendices I, II and III)

b) IUCN Red List, categorised as CR, EN and VU

c) Rainforest Foundation Norway's tree list:

d) Siberian larch (from forests outside the EU)

Use of tree species listed on a) CITES (Appendices I, II and III) **is not permitted**.

Tree species listed on either b), c) or d) may be used if they meet all the following requirements:

- the tree species does not originate from an area/region where it is on the IUCN Red List, categorised as CR, EN or VU
- the tree species does not originate from an Intact Forest Landscape (IFL), as defined in 2002 http://www.intactforests.org/world.map.html.
- the tree species shall originate from FSC or PEFC certified forests/plantations and shall be covered by a valid FSC/PEFC Chain of Custody (CoC) certificate documented/controlled as FSC or PEFC 100% through the FSC transfer method or PEFC physical separation method.
- In addition, tree species grown in plantations shall originate from FSC or PEFC certified plantations established before 1994.

** The list of tree species can be found on the website:* https://www.nordic-ecolabel.org/declare-items/pulp-and-paper/forestry-requirements/forestry-requirements-2020/

✉ Enter the names of the tree species included in the product, Appendix 3a can be used.

✉ Declaration from the applicant/manufacturer/supplier that tree species listed on a)–d) are not used in the product, Appendix 3c can be used.

If species from the lists b), c) or d) are used:

☒ Valid FSC/PEFC Chain of Custody certificate from supplier/applicant/manufacturer covering the specific tree species and documenting that the wood is controlled as FSC or PEFC 100% through the FSC transfer method or PEFC physical separation method.

☒ The applicant/manufacturer/supplier shall document full traceability back to the certified forest unit and document the following:

- the wood does not originate from an area/region where it is on the IUCN Red List, categorised as CR, EN or VU.
- the tree species does not originate from an Intact Forest Landscape (IFL), as defined in 2002: http://www.intactforests.org/world.webmap.html
- For plantations, the applicant/manufacturer/supplier must document that the tree species does not originate from FSC or PEFC certified plantations established after 1994.

Background

The requirement concerning tree species that are banned or restricted is new and part of Nordic Ecolabelling's general forestry requirements. The requirement only applies to virgin wood and not wood defined as recycled material in accordance with ISO 14021.

A number of tree species are not allowed to be used or are allowed only under certain conditions. The tree species are shown on a list, and the species on the list are based on tree species that are relevant to the Nordic Ecolabelling criteria, i.e. wood that may be relevant to use in Nordic Swan Ecolabelled products. Listed tree species are indicated by the scientific name and most common trade names. The scientific name/trade name is not always sufficient, as there may be more than one scientific name/trade name for the listed tree species, not all of which feature on the list.

Criteria for tree species on the list:

a) Species listed in CITES Appendices I, II and III.

b) IUCN Red List, categorised as Critically Endangered (CR), Endangered (EN) and Vulnerable (VU).

c) Rainforest Foundation's list of tropical tree species

d) Siberian larch (derived from forests outside the EU)

Use of species on the CITES list in Nordic Swan Ecolabelled flooring and underlayment products is prohibited. CITES is an international convention for the control of trade (across borders) in wild fauna and flora. Depending on how endangered they are, the tree species in CITES are listed in Appendix I, II or III. Species listed in Appendix are critically endangered and trading in these species is completely forbidden. Special permits for import and export are required for species in Appendices II and III. Trees with valid CITES permits are considered to be legally harvested under the EUTR (EU Timber Regulation). The Nordic

Swan Ecolabel's ban on the use of tree species listed in CITES (Appendix I, II or III) goes beyond EU legislation. CITES regulates trade in endangered species, and there are also challenges concerning corruption in trade with wild animals and plants. Nordic Ecolabelling therefore does not wish to approve species on any of the appendices.

IUCN's Red List is the world's most comprehensive overview of the global conservation status of the planet's species, including trees. IUCN has established clear criteria to assess the risk of extinction according to the origin of tree species. These criteria cover all countries and all species in the world. Nordic Ecolabelling is aware that the IUCN Red List system focuses only on the extinction risk of species, and is therefore not designed for an overall assessment of whether a tree can be of sustainable origin. However, the list is updated continuously and is thus an important tool to estimate the conservation status of a specific tree species globally. The Nordic Swan Ecolabel seeks to prohibit tree species listed as endangered (categories CR, EN and VU).

The Rainforest Foundation is an NGO in Norway that works to protect the world's remaining rainforests. At the moment, the Rainforest Foundation does not see any credible certification schemes operating in the tropics, and therefore recommends not buying tropical woods. The Rainforest Foundation has developed a list of tropical tree species based on tree species that are found on the Norwegian market. This list serves as a guide in complying with Norwegian guidelines for not using tropical wood in public-sector construction projects. Nordic Ecolabelling considers this to be a pragmatic approach for handling tropical wood in the Nordic market.

Siberian larch (with origins in forests outside the EU) is also on the tree list. Siberian larch is a sought-after type of wood in the construction industry due to its high quality. Species of this tree are widespread in the Eurasian North Boreal climate zone, with the species Larix sibirica, Larix gmelinii, Larix cajanderi and Larix sukaczewii particularly widespread in the large areas of Intact Forest Landscapes (IFL) in Russia. Siberian larch should be seen as an indicator species for boreal IFL areas that need to be kept intact.

Exemptions:

Nordic Ecolabelling is aware that wood on lists b), c) or d) may come from legal and sustainable forestry. Therefore, it is possible to use tree species listed under b), c) or d) if the applicant/manufacturer/supplier can demonstrate compliance with a number of strict certification and traceability requirements.

Many of the trees on the list grow in countries that still have large Intact Forest Landscapes (IFL). It is important to protect these for the sake of biodiversity and the climate. Several of these countries are at high risk of corruption, and national legislation relating to the environment, human rights and land ownership is often weak and/or not enforced by the authorities. There are different views on whether certification is good enough to meet the challenges of forest management in countries with a high risk of corruption and illegal logging. For example, relevant challenges related to this were published by Danwatch in a number of

articles in 2018[12],[13], and by redd-monitor.org in 2019[14]. Greenpeace International has terminated its membership of FSC for the reason that the certification body no longer fulfils its goals of protecting forests and human rights[15]. Other environmental organisations like WWF support certification as an important tool for sustainable forestry in these countries. Due to the uncertainty that FSC and PEFC certification systems are good enough to protect important areas of biodiversity and ethical aspects such as human rights and land ownership in areas with a high risk of corruption, Nordic Ecolabelling takes a precautionary approach and seeks further documentation about the tree species and its origins.

To document full traceability of the tree species, the applicant/manufacturer/supplier must present a valid FSC/PEFC Chain of Custody certificate covering the specific tree species and demonstrate that the wood is controlled as FSC or PEFC 100%, through the FSC transfer method or PEFC physical separation method. This means that the FSC percentage or credit control system and the PEFC percentage system are not approved. Full traceability of the wood back to the forest/certified forest unit makes it possible to document that the tree species does not come from an area/region where it is on the IUCN Red List, categorised as CR, EN or VU. Full traceability also makes it possible to document that the tree species does not come from an Intact Forest Landscape (IFL), as defined by Intactforest.org in 2002[16]. Intactforest has monitored IFL areas since 2000 and has developed an updated online map tool that shows the scope of IFLs back to 2002. The monitoring results show that the world's IFLs are disappearing at an alarming rate, which is why Nordic Ecolabelling refers to 2002.

Plantations: Nordic Ecolabelling believes that responsibly managed forest plantations can play a role in preserving natural IFLs by reducing the pressure to cut down the world's remaining natural forests. In order to ensure that the plantation has not replaced original ecosystems (forests/grasslands) over the last 25 years, tree species must come from FSC or PEFC certified plantations that were established before 1994. 1994 follows FSC's international forest management standard (version 5.2), while PEFC works with 2010.

O8 Traceability and certification

The requirement applies to wood raw material, cork and bamboo used in the product.

Species name

The applicant/manufacturer must state the name (species name) of the wood raw material/bamboo/cork used in the product.

Chain of Custody certification

All wood raw material and bamboo used in Nordic Swan Ecolabelled products must be covered by a valid Chain of Custody certificate in accordance with FSC/PEFC schemes.

[12] https://danwatch.dk/undersoegelse/dokumentfalsk-og-millionboeder-danske-byggemarkeder-saelger-trae-forbundet-til-ulovlig-hugst-i-amazonas/
[13] https://danwatch.dk/undersoegelse/baeredygtighedsmaerke-er-ingen-garanti-for-baeredygtigt-trae/
[14] https://redd-monitor.org/2019/08/29/evicted-for-carbon-credits-new-oakland-institute-report-confirms-forced-evictions-for-green-resources-plantations-in-uganda/
[15] https://www.greenpeace.org/international/press-release/15589/greenpeace-international-to-not-renew-fsc-membership/
[16] http://www.intactforests.org/world.webmap.html

The applicant or product manufacturer must have Chain of Custody certification under the FSC/PEFC schemes.

An applicant/manufacturer who only uses recycled material* in the Nordic Swan Ecolabelled product, which is not FSC/PEFC certified, are exempted from the requirement concerning Chain of Custody certification.

Certified wood raw material, bamboo and cork

A minimum of 70% by weight/volume of the wood raw material, bamboo and cork used in the Nordic Swan Ecolabelled product must come from forests that are managed in accordance with sustainable forestry management principles established by FSC and PEFC and/or be recycled raw material*.

For particleboard, a minimum of 50% of the wood raw material in Nordic Swan Ecolabelled particleboard must consist of post consumed recycled raw material*.

The remaining proportion of wood raw material must be covered by FSC/PEFC's control schemes (FSC controlled wood/PEFC controlled sources) or be recycled material.

The applicant/manufacturer must create a designated product group for Nordic Swan Ecolabelled products in there accounting system to control and meet the required certified content in Nordic Swan Ecolabelled products.

**See Terms and definitions.*

For more information, see appendix 4.

✉ The names (species names) of the wood raw material, bamboo and cork that are used, appendix 3a can be used.

✉ The applicant/manufacturer must provide valid FSC/PEFC CoC certification that includes all wood raw material, bamboo and cork used in the Nordic Swan Ecolabelled product.

✉ The applicant/manufacturer shall provide audited accounting documents showing that at least 70% of the material in the Nordic Swan Ecolabelled product or production line is from forests or areas that are managed in accordance with sustainable forestry management principles that meet the requirements of the FSC or PEFC scheme. If the product or production line includes uncertified material, evidence must be provided that the content of uncertified material does not exceed 30% and is covered by a verification system that ensures that it is legally harvested and meets any other requirements laid down by FSC or PEFC with regard to uncertified material.

✉ An applicant/manufacturer who only uses recycled material in the Nordic Swan Ecolabelled product, which is not FSC/PEFC certified, must provide documentary evidence that the material is recycled, e.g., an invoice.

✉ The proportion of wood raw material derived from certified forests must be stated and the basis for calculations must be shown. Appendix 3b can be used.

Background

Nordic Ecolabelling's requirements concerning raw material based on wood, bamboo or cork focus on sustainable forestry and traceability of raw materials.

The many benefits that sustainably managed forests deliver to society include wood for materials and energy, protection against global warming, homes and livelihoods for local communities and indigenous peoples, support of biodiversity and protection of water and soil from pollution and erosion. By setting a requirement that wood raw material must originate from certified, sustainably-

managed forests, Nordic Ecolabelling is supporting the move towards more sustainable forestry practices.

Nordic Ecolabelling requires a declaration of the species of wood contained in the Nordic Swan Ecolabelled product. This makes it possible to check the validity of Chain of Custody certificates in the supply chain. The requirement for CoC certification improves the traceability of materials in the supply chain within the guidelines and control systems of the FSC and PEFC. The company's CoC certification proves how certified wood is kept separate from other wood during production, administration and storage and is inspected annually by independent certification bodies.

The manufacturer of the product must be CoC certified, and there is a requirement that certified raw material must be assigned/allocated to the Nordic Swan Ecolabelled product in the accounts for certified/non-certified material. This ensures that FSC/PEFC credits are used for the Nordic Swan Ecolabelled production and that the credits are "used up" and not sold twice. This will stimulate increased demand for certified wood raw material because more certified wood raw material must be purchased if the manufacturer wants to label other products, and not just the Nordic Swan Ecolabelled products, with the FSC/PEFC logo. This also means that it is possible to label the finished product with the FSC/PEFC logo and that a Nordic Swan Ecolabelled product can carry both the Nordic Swan Ecolabel logo and the FSC/PEFC logo. It should be noted that Nordic Ecolabelling approves both the percentage system and the credit system for accounting and sale of certified material.

The raw material used in the production of particleboard is largely recycled/waste wood. Requiring a minimum of 50% of the wood raw material in Nordic Swan Ecolabelled particleboard to be made from post consumed recycled raw material keeps wood waste in the cycle of the circular economic process.

O9 Chemicals in reused wood and recycled material in wood-based panels

Recycled material in floor coverings, underlays and wood-based panels (e.g., particle boards and fibreboards) must meet the requirements of the European Panel Federation's (EPF) Standard for delivery conditions of recycled wood[17].

This means that the materials must not come from

- Treated wood*
- Wood that exceeds the threshold limit values in the table below:

Substance/compound	Limit value (mg/kg recycled wood)
Arsenic (As)	25
Cadmium (Cd)	50
Chromium (Cr)	25
Copper (Cu)	40
Lead (Pb)	90
Mercury (Hg)	25
Fluorine (F)	100
Chlorine (Cl)	1000
Pentachlorophenol (PCP)	5
Creosote (Benzo(a)pyrene)	0.5

[17] https://europanels.org/issues/standards/ , visited December 2022

The requirement does not apply to sawdust, wood chips and similar materials that come straight from the wood-processing industry where the wood is virgin/untreated.

** The standard defines treated wood as wood that contains halogenated organic compounds or heavy metals as a result of treatment with wood preservatives.*

✉ Certification or equivalent documentation of compliance with the EFP's Standard for delivery conditions of recycled wood

Background

The requirement is set to have better control over the type of recycled material used and to ensure that materials containing undesirable substances are not used. The requirement is the same as that set out in Nordic Ecolabelling's Criteria for furniture and fitments (generation 5) and the EU Ecolabel Criteria for furniture. Compliance with this standard is relatively good in the EU but it is important to ensure that production outside the EU also complies with the requirements of the standard. Requirements are imposed on the content of a number of heavy metals and creosote. If it can be documented that the requirements of the German Waste Wood Ordinance regulation, 2002 or later are met, this will also be approved as documentation.

4.5.2 Linoleum

The requirements in this section cover raw materials used in the manufacture of linoleum flooring. Both Jute used in the backing of the flooring and linseed oil used in the manufacture of the linoleum cement must fulfil the requirements.

Furthermore, the chemicals used in the manufacture of the linoleum cement must fulfil the requirements from the section 4.6.1 Chemicals.

O10 Flax (linen) and other bast fibres

Flax (linen) and other bast fibres (e.g., hemp, jute, and ramie) may only be cultivated using pesticides permitted according to Regulation (EC) No 1107/2009.

Production of flax (linen) and other bast fibres (e.g., hemp, jute, and ramie) using water retting is only allowed if the wastewater from the retting ponds is treated to reduce the chemical oxygen demand (COD) or the total organic carbon (TOC) by at least:

- 75% for hemp fibres
- 95% for flax (linen) and other bast fibres

Test method: Test in accordance with ISO 6060.

Measurement of BOD (Bio-chemical oxygen demand), PCOD (particulate chemical oxygen demand) or TOC (total oxygen demand) may also be used if a correlation to COD is evident.

The requirements for analysis laboratory and test methods are stated in Appendix 1.

✉ Statement from the fibre supplier that only approved pesticides are used. Alternatively, a valid certificate from European Flax Standard or equivalent can be used.

✉ Test report from the producer of the flax (linen)/bast fibre, showing that the requirement is fulfilled.

Background

The use of natural fibres has the advantage that it does not draw directly on fossil resources. It remains relevant, however, to consider whether these natural fibres are sustainably cultivated with minimum damage to the environment. It is, for example, important to ensure that there has been no use of harmful pesticides that could lead to a loss of biodiversity. The requirement can be documented by sending a European Flax Standard certificate or equivalent. According to this standard, the flax is grown following European legislation EU 1107/2009. It is not uncommon for flax from Europe to be sold to countries in Asia for use in textiles and several Asian productions have a certificate for the European Flax Standard.

Water retting is prohibited unless the wastewater is cleaned to reduce the content of organic material and so comply with the requirement levels. Either biological or chemical retting is necessary to separate the fibres from the inner stem and the outer shell. This is done by exposing the stem or other bast fibre to moisture and heat. Water retting is the most effective method, but there are other methods such as placing the fibres in a tank and adding enzymes. Emissions of retting wastewater with a high content of organic material to the aquatic environment can result in a lack of oxygen during degradation, which can damage the aquatic animal and plant life. Requirements for water retting are not covered by the European Flax Standard.

4.5.3 Other raw materials

The requirements in this section concern other raw materials than the ones usually used in resilient floor coverings or flooring underlays. Requirement O11 must be fulfilled regardless the quantity of other raw materials contained in the product. However, requirements O12 and O13 must be fulfilled only if the quantity of, in this case, textile and/or leather exceeds 10% in the product.

O11 Origin

The raw material must be either:

a) waste* or residual products* from other production systems, e.g., straw from grain production or,

b) 100% pre- or post-consumer recycled (e.g., recycled textile, recycled fibres or recycled leather). See section 4.2 Definitions for more information.

The species name (Latin and English/Nordic language) and geographic origin (country) must be stated in case the raw material is or renewable origin.

***Waste and residues as defined in EU Directive 2018/2001/EC. Examples of residual products include straw, chaff and the non-edible part of maize.*

Recycled synthetic fibres

The recycled plastic used as raw materials in recycled synthetic fibres must not come from plants that are EFSA** or FDA*** approved as food contact material or marketed as compatible with these.

** *In line with Commission Regulation (EC) No 282/2008 of 27 March 2008 on recycled plastic materials and articles intended to come into contact with foods.*

*** *In line with the Code of Federal Regulations Title 21: Food and Drugs, PART 177 – Indirect food additives: polymers.*

Recycled leather

Only skins and hides from the following animals can be used in the recycled leather: fish*, sheep, goats, cattle, horses, pigs, elk, deer and reindeer.

**skin from fish on the IUCN Redlist is not allowed.*

✉ Alternative a): Name and geographic origin of the raw material if relevant. Documentation from the raw material producer which shows that the requirement's definition of waste or residual products is met. Documentation regarding traceability stating where the waste or residual product comes from.

✉ Alternative b): Declaration that the renewable raw material is also 100% post-consumer recycled. Documentation in the form of an invoice or delivery note from the manufacturer of the recycled material.

✉ Recycled synthetic fibres: Declaration from the producer of the recycled raw material that the raw material is not EFSA or FDA approved.

✉ Recycled leather: The applicant must provide a declaration from the recycled leather manufacturer or recycled leather supplier that the hides/skins used have come from animals farmed for production of milk, wool and/or meat/fish.

Background

Nordic Ecolabelling is positive about the use of renewable materials but wishes to receive information about their origins as well as, if relevant, the species or type used and their geographical origin. It is important that the renewable raw materials have a sustainable origin and are not suitable for other important uses, such as human food or animal feed. There is therefore a requirement that the raw materials must be waste/residues products or recycled materials from other production.

Nordic Ecolabelling wants to support the circular economy through the use of recycled materials instead of virgin materials. However, fibre to fibre recycling is still limited for textiles and recycled polymers from other synthetic materials are frequently used today as different plastic materials. The requirement thus accepts both fibre to fibre recycling and polymer fibre recycling. Recycled cotton fibre recovered from used clothing and textiles from consumers or industrial waste (post- or pre-consumer textile waste) is also becoming more available.

The requirement stipulates that feedstock used in the recycled raw material must be fully traceable. Without proper traceability, it is difficult to ascertain that the material is recycled. The manufacturer of the recycled raw material can document the traceability by declaring that 100% recycled feedstock has been used.

There is a ban on the use of re-granulate that is approved for contact with foods by the EFSA under Regulation No. 282/2008 or FDA in compliance with Code of Federal Regulations Title 21: Food and Drugs, PART 177—INDIRECT FOOD ADDITIVES: POLYMERS. It is considered inappropriate that raw materials which are approved for production of food packaging should be used in the production of textiles. The highest levels of traceability and purity are required for plastic raw materials used in packaging in contact with food. The use of these plastics for anything other than food contact is therefore downcycling.

The aim of the requirement is to ensure that only hides that are a by-product of the meat/dairy/wool industries are used. This mitigates the environmental impact of livestock, and it makes sense from an ethical point of view that the leather and hides produced are derived from a by-product of the meat/dairy/wool industries. Fish skin provided it is not on the IUCN Redlist, is now also included in this version of the criteria. Fish skin must comply with the same requirements as other types of skin and leather.

O12 Recycled fibres - test for harmful substances

Recycled fibres must not contain the following substances above the limits stated in the table below:

Substance/substance group	Max. limit	Test method
Extractable metals		Atomic absorption spectrometry (AAS) or ICP. The metals are extracted by use of artificial acidic sweat solution according to ISO 105-04 (testing solution II).
Chromium total	2.0 mg/kg	
Lead	1.0 mg/kg	
Mercury	0.02 mg/kg	
Cadmium	0.1 mg/kg	
Organic tin compounds		
TBT and TPhT	0.5 mg/kg	
Phthalates		Extraction of the testing material with an organic solvent. The extract is analysed by gas chromatography (MS detection).
BBP, DBP, DEP, DMP, DEHP, DMEP, DIHP, DHNUP, DCHP, DHxP, DIBP, DIHxP, DIOP, DINP, DIDP, DPrP, DHP, DNOP, DNP and DPP	Total 0.05 weight%	
PAHs (Polycyclic aromatic hydrocarbons)		Extraction of the testing material with an organic solvent. The extract is analysed after clean-up by gas chromatography with mass selective detection (MSD).
Naphthalene, Acenaphtene, Acenaphtylene, Phenanthrene, Anthracene, Fluorene, Fluoranthene and Pyrene	Each 1 mg/kg	
Flame retardants		Extraction of the testing material with an organic solvent. The extract is analysed then by LC/MS/MS respectively GC/MS/MS.
Brominated and chlorinated flame retardants	Total 50 mg/kg	
Chlorophenols		The samples are extracted with a basic aqueous solution following DIN 50009. The extracted free phenols and possibly hydrolysed phenolesters

		are acetylated, transferred to an organic phase and analysed with GC-MS.
Pentachlorophenol	0.5 mg/kg	
Tetrachlorophenol	0.5 mg/kg	
Trichlorophenol	2.0 mg/kg	
Dichlorophenpol	3.0 mg/kg	
Monochlorophenol	3.0 mg/kg	
Per- and polyfluorinated compounds		The method for the determination of PFCs/PFAS is based on an extraction with methanol followed by determination of the PFCs/PFAS by means of LCMS and GC-MS.
PFOS, PFOSA, PFOSF, N-Me-FOSA, N-Me-FOSE, N-Et-FOSE	Total <1.0 µg/m2	
Dyes		EN 14362-1 EN 14362-3 The identification and quantification of dyes extracted with an organic solvent is made by means of chromatographic methods.
Cleavable, classified as carcinogenic	20 mg/kg	
Cleavable aniline	50 mg/kg	
Classified as carcinogenic	50 mg/kg	
Dyes classified as allergenic	50 mg/kg	
Other dyes	50 mg/kg	

This requirement applies to all recycled fibres – both synthetic and natural and must be documented annually with either a) or b):

a) an Oeko-Tex standard 100 class I-III certificate.

b) test report showing that the requirement is fulfilled.

The following are exempted from this requirement:

- Material from PET bottles originally approved for food contact.
- Fibres from chemically recycled polymers, if it can otherwise be documented that the process ensures, that the requirement limits are met.

The requirements for analysis laboratory and test methods are stated in Appendix 1.

✉ Test reports or Oeko-Tex 100 class I-III certificate showing fulfilment of the requirement. A written procedure showing how an annual test is performed in line with the requirement, along with annual in-house checks of compliance with the requirement. Alternatively, a procedure for annual requisition of Oekotex 100 class III certificate. Test results/certificate are to be archived and kept available for inspection by Nordic Ecolabelling.

✉ When using chemically recycled polymers, documentation showing that the recycling process ensures that the requirement is fulfilled.

✉ When using the exemption for material from PET bottles, this must be documented by the fibre supplier.

Background

It is important to consider the potential exposure of the user and the environment to undesirable chemicals from recycled material. The requirement covers the chemical substances and substance groups that are at greatest risk of being present in recycled fibre for textile production. Recycled fibre may contain residues of additives from previously used dyes, pesticides from cultivation, biocides used during transport, and so on[18]. This applies to both fibre recovered from used textiles and fibre recovered from products other than textiles.

In mechanical recycling processes, all the chemical substances remain in the fibre and may be transferred to the new textile fibre. In the chemical recycling process, some chemical substances remain in the material, and both unproblematic and problematic substances can cause technical interference with the process[19]. It is possible to conduct a spot test for the most relevant substances over a set interval, but since the recycled feedstock may come from multiple sources and can therefore vary a great deal, it is not possible to implement the testing required to identify all the potential "old additives".

Recycled fibre from PET bottles may also contain small amounts of undesirable substances such as antimony and heavy metals, which are derived from labels, adhesives, printing inks and waste from the transport and sorting of the plastic. However, measurements have established that the levels fall well below the limits set for heavy metals in packaging materials in California's Toxics in Packaging Prevention Act of 2006[20].

O13 Chemicals in recycled leather

The requirement applies to chemicals in the recycled* leather.

Chromium

The extractable Chromium content of the recycled leather must be less than 200 mg / kg (mass of Chromium (total) / dry weight of leather) according to EN ISO 17072-1.

Recycled leather must not contain Chromium VI in compliance with EN ISO 17075 (detection limit 3 ppm) or equivalent test method.

Cadmium and Lead

Cadmium and Lead shall not be found in recycled leather.

The content of Cadmium and Lead shall be tested according to the methods AAS, ICP-OES or ICP-MS (detection limit 10 ppm).

**See section 4.2 Definitions for more information.*

[18] IKEA and H&M analyze the content of recycled fabrics, article 29-10-2019 on Treehugger.com https://www.treehugger.com/sustainable-fashion/ikea-and-hm-analyze-content-recycled-fabrics.html?utm_source=TreeHugger+Newsletters&utm_campaign=9cd1c025b2-EMAIL_CAMPAIGN_11_16_2018_COPY_01&utm_medium=email&utm_term=0_32de41485d-9cd1c025b2-243762625

[19] Nordic Council of Ministers (2016). Gaining benefits from discarded textiles: LCA of different treatment pathways

[20] M. Whitt, Survey of heavy metal contamination in recycled polyethylene terephthalate used for food packaging, Journal of Plastic Film & Sheeting 2012

The requirements for analysis laboratory and test methods are stated in Appendix 1.

✉ A test report showing that the requirement on total Chromium and Chromium (VI) is fulfilled.

✉ A test report showing that the requirement on Cadmium and Lead is fulfilled.

Background

Release of Cr (VI) compounds is a problem as hexavalent chromium compounds are contact allergens. Cr (VI) is one of the most well-known allergens. Hexavalent chromium (Cr (VI)) is not used in the tanning industry and has no effect in the tanning process. However, chromium (III) salts can - under certain conditions - be converted to Cr (VI) compounds.[21] Regardless of which tanning process is used, it is relevant to ensure that the content of chromium and especially chromium (VI) in the leather is documented and low.

The requirement is also set to ensure that there is no cadmium and lead in the leather. Lead occurs most often due to contaminants in the chromate during chromium tanning.

4.5.4 Plastic, rubber and foam

The requirement in this section applies to all plastic (e.g., polyethylene, polypropylene and polyurethane and their derivatives), rubber and foam contained in floor coverings and underlays. Products including polyurethane must also fulfil the specific requirement O35 Polyurethane in section 4.6.3.

O14 Raw materials for bio-based polymers

Raw materials used in the production of bio-based polymers must meet the following requirements.

Palm oil and soy

Palm oil, soybean oil and soybean flour must not be used as raw.

Specific conditions for sugar cane

Raw materials from sugar cane must either comply with a) or b):

a) Waste or residual products* defined in accordance with (EU) Renewable Energy Directive 2018/2001. There must be traceability back to the production / process where the residual production occurred.

b) Sugar cane must not be genetically modified (see section 4.2 Definitions). Sugar cane must also be certified to Bonsucro standard (EU REDII approved), version 5.1 or later version.

The producer of the bio-based polymer must have a chain of custody (CoC) certification according to the standard by which the raw material is certified. Traceability must at least be ensured by mass balance. Book and claim systems are not accepted.

The producer of the bio-based polymer must document its purchase of certified raw materials for polymer production, for example in the form of specifications on an invoice or delivery note.

[21] Investigation and health related assessment (allergy only) of chromium in leather shoes

Other raw materials

The name (in Latin and in English) and supplier of the raw materials used must be stated.

The raw materials must meet either c) or d):

c) Waste or residual products* defined in accordance with (EU) Renewable Energy Directive 2018/2001. There must be traceability back to the production/process where the residual production occurred.

d) Primary raw materials (e.g., corn) must not be genetically modified***. Here geographical origin (country/state) must be stated.

Traceability must at least be ensured by mass balance. Book and claim systems are not accepted.

The producer of the bio-based polymer must document its purchase of certified raw materials for polymer production, for example in the form of specifications on an invoice or delivery note.

** Residual products as defined in EU Directive 2018/2001/EC. Residual products come from agriculture, aquaculture, fishing and forestry, or they can be processed residues. A processed residual product means a substance that is not the end product(s) that the production process directly seeks to produce; residues are not the primary target of the production process, and the process has not been deliberately modified to produce them. Examples of residual products are, for example, straw, bait, the non-edible part of maize, livestock manure and bagasse. Examples of processing residues are, for example, raw glycerol or brown lye from paper production. PFAD (Palm Fatty Acid Distillate) from palm oil is not considered a residual/waste product and may therefore not be used.*

✉ Declaration by the producer of the polymer, that palm oil (incl. PFAD (Palm Fatty Acid Distillate)) soybean oil and soy flour are not used as raw materials for the bio-based polymer.

✉ For waste and residual products a) and/or c): Documentation from the polymer producer which shows that the requirement's definition of waste or residual products is met. Documentation showing the level of certification (e.g., mass balance). Documentation regarding traceability stating where the waste or residual product comes from.

✉ Sugar cane b): Indicate which certification system sugar cane is certified for. A copy of a valid CoC certificate or a certificate number. Documentation in the form of an invoice or delivery note from the manufacturer of bio-based polymer which shows that certified raw material has been purchased for the production of the polymer. Declaration stating that the sugar cane has not been genetically modified.

✉ For primary raw materials d): Declaration by the producer of the polymer stating that raw materials have not been genetically modified according to the definition in the requirement. Name (in Latin and English) and geographical origin (country/state) of the primary raw materials used.

Background

In terms of resources and climate impact, it is positive to use renewable raw materials instead of fossil fuels. However, it is important that the cultivation of bio-based raw materials is sustainable. Establishment of palm oil plantations is one of the main reasons for deforestation of rainforests, and thus threatens the livelihoods of indigenous people, plants and animals. Rainforests are very important for biodiversity and in regulating the climate. Soybeans are grown in

areas that are often established at the expense of rainforests and forest waters in South America. Soy production is one of the biggest threats to the rainforest on the American continent, especially in the southern Amazon. Based on this, palm oil, soybean oil and soy flour are banned as raw materials for bio-based polymers.

Sugar cane is a relevant raw material for polymer production. Sugar cane is currently not as strongly associated with problems with deforestation of rainforest as mentioned above for palm and soybean oil, but there may also be challenges associated with this production. As bio-based plastic is still relatively new and the number of producers is relatively small, sugar cane is permitted as a raw material, but it is required that it be certified according to a sustainability standard that meets several requirements for e.g., protection of biological diversity. For all certification systems, there is a requirement for traceability at the mass balance level. Book and claim system will not be approved.

In addition, there is a requirement that sugar cane and any other primary raw materials must not be genetically modified. Genetic modification is a debated topic, and several countries have banned the cultivation of GMOs. Topics discussed are food safety, land use, lack of knowledge about effects under local agricultural / forest conditions and the risk of negative environmental and health impacts. Nordic Ecolabelling emphasizes the precautionary principle and regulations that have a holistic approach to GMOs. This means that sustainability, ethics, and societal benefits must be emphasized together with health and the environment. Concerns exist about the consequences when genetically modified plants, animals and microorganisms spread in nature. Nordic Ecolabelling believes that GMOs should be assessed on a case-by-case basis. Research results have not clearly shown that current GMO crops contribute to the development towards sustainable agriculture with less use of pesticides, and there is a lack of research on the long-term effects of genetically modified plants, both environmental consequences and socio-economic consequences. There are possible adverse effects of GMOs along the entire value chain from research and development of the plants, via cultivation, to storage, use and waste management. In several of these phases, there is a lack of scientific studies, and there is a lack of overall assessments.

For other primary raw materials, there is a requirement that the name of the raw material, supplier and origin of the raw material must be stated. The most ideal is to use waste and residual products from other productions, e.g., by-products such as straw from cereal production and by-products from maize. By using secondary raw materials, parts that are not used as food are utilized. PFAD (Palm Fatty Acid Distillate) from palm oil is not considered a residual raw material and must therefore not be used. PFAD occurs in the production of palm oil for the food industry, and there is rarely traceability in the processes in which PFAD occurs.

O15 Emissions to water from production of foams

Emissions of oxygen demanding substances to water from the production of foam materials (e.g., EPS, XPS, EVA, PUR, PE, latex and rubber) must be reduced by 90% measured as COD or TOC. The reduction may be achieved through on-site or off-site treatment. In the case of off-site treatment, the average treatment level of the effluent treatment plant may be used.

Chemical oxygen demand (COD) must be analysed under ISO 6060. The requirements for analysis laboratory and test methods are stated in Appendix 1.

✉ Description of how the effluent from foam material production is treated and how COD emissions are measured and monitored.

✉ Test report showing that the limit value for chemical oxygen demand (COD) is fulfilled.

Background

Foam materials may be used as backing in floor coverings. Since there are environmental problems associated with the production of foam made of latex or polyurethane, it is relevant to set requirements concerning these. Nordic Ecolabelling requires emissions of oxygen demanding substances from the production to be low.

O16 Blowing agents in foams

CFC, HCFC, HFC, methylene chloride or other halogenated organic compounds must not be used as blowing agents in the manufacture of foam materials (e.g., EPS, XPS, EVA, PUR, PE, latex and rubber).

✉ Information from the manufacturer of the foam stating which blowing agent has been used.

Background

Halogenated organic compounds may not be used as blowing agents or auxiliaries for these. Historically, CFC (ChloroFluoroCarbons), HCFC (HydroChloroFluoroCarbons) and HFC (HydroFluoroCarbons) have been used in the production of PU foam, and it is generally known that these substances are harmful to the environment, especially as greenhouse gases and as ozone depleting substances. The requirement prohibits the use of halogenated organic compounds that are used as blowing agents or auxiliaries for these. Many manufacturers of PU foam have replaced CFC and HCFC with carbon dioxide but ensuring that they are not used is still considered relevant. Blowing agents are only relevant for PU foam, as the production of latex foam does not require blowing agents. Expanded polystyrene uses water or pentane as a blowing agent.

O17 Rubber, synthetic latex (SBR) and natural latex

1,3-butadiene

The content of 1,3-butadiene in synthetic latex must be less than 1 mg/kg latex and must be determined using test method EN 13130-4.

PAHs

The sum of the PAHs concentration in rubber and latex must be below 10 mg/kg and each individual PAH concentration must be below 1.0 mg/kg.

The requirement concerns the following PAHs:

Substance name	CAS No.	Substance name	CAS No.
Benzo[A]Pyrene	50-32-8	Benzo[A]Pyrene	50-32-8
Benzo[E]Pyrene	192-97-2	Benzo[E]Pyrene	192-97-2
Benzo[A]Anthracene	56-55-3	Acenaphthylene	208-96-8
Dibenzo[A,H]Anthracene	53-70-3	Acenaphthene	83-32-9
Benzo[B]Fluoranthene	53-70-3	Anthracene	120-12-7
Benzo[J]Fluoranthene	205-82-3	Fluorene	86-73-7
Benzo[K]Fluoranthene	207-08-9	Naphthaline	91-20-3

Chrysene	218-01-9	Phenanthrene	85-01-8
Benzo[ghi]perylene	191-24-2	Fluoranthene	206-44-0
Indeno[1,2,3-cd]pyrene	193-39-5	Pyrene	129-00-0

The rubber material must be tested in accordance with ISO 18287 or ZEK 01.2-08 (GC/MS).

Nitrosamines

The following requirements must be met for nitrosamines in rubber and latex material:

- The content of nitrosamines must not exceed 0.05 mg per kg rubber.
- The total content of nitrosamine-soluble substances must not exceed 1 mg per kg rubber.

The requirements for analysis laboratory and test methods are stated in Appendix 1.

✉ Results of an analysis/test for the content of 1,3-butadiene in synthetic latex.

✉ Results of an analysis/test for the content of PAHs in rubber.

✉ Results of an analysis/test for the content of nitrosamines in rubber and latex.

Background

A number of synthetic latex materials are made of substances that are hazardous to the environment and human health, for example substances that are suspected to cause cancer. One substance that acts as a monomer in the production of latex is 1,3-butadiene (CAS No. 106-99-0) which has H340 and H350 classifications. There is therefore a requirement for content of butadiene to be tested to ensure that the monomer content of the final latex is low.

There are more than 100 PAHs compounds. Several of the PAHs are carcinogenic and classed as Carc. 1B. PAHs can be found in plastic and rubber parts in a wide range of consumer products. They are present as impurities in some of the raw materials used to produce such products, namely in plasticising oils and in carbon black. The substances are not intentionally added to the products in question, and they have no specific function as constituent ingredients of the plastic or rubber parts. Extender oils are mineral oils that are produced from crude oil (PAHs that remain in the oil are called petrogens). Carbon black is the product of incomplete combustion or thermal decomposition processes of heavy oils, such as coal tar (PAHs that remain, however, are mainly pyrogenes PAHs). The requirement is harmonized with the levels in Oeko-tex 100 standard class II.

The requirement has been changed and harmonized with the level of requirements in the criteria for furnitures. Nitrosamines and nitrosamine-soluble substances are suspected to be carcinogenic. Nitrosamines are by-products formed in the production of rubber.

O18 Recycled plastic, rubber and foam - Traceability

Recycled plastic must not come from manufacturing plants that are EFSA* or FDA** approved as food contact material or marketed as compatible with these.

The traceability of the recycled raw material must be documented with either a) or b) below:

a) Global Recycled Standard certificate or Recycled Claim Standard certificate showing that the raw material is recycled, or other equivalent certification approved by Nordic Ecolabelling.

b) By giving the name of the recycled raw material producer, by documenting that the feedstock used is recycled material and by stating the share of recycled material included in the raw material, see 4.2 Definitions.

** In line with Commission Regulation (EC) No 282/2008 of 27 March 2008 on recycled plastic materials and articles intended to come into contact with foods.*

*** In line with the Code of Federal Regulations Title 21: Food and Drugs, PART 177 – INDIRECT FOOD ADDITIVES: POLYMERS.*

☒ Declaration from the producer of the recycled raw material that the raw material is not EFSA or FDA approved, see requirement.

☒ a) Certificate from an independent certifier of the supply chain (e.g., Global Recycled Standard or Recycled Claim Standard).

☒ b) Documentation in the form of an invoice or delivery note from the manufacturer of the recycled plastic, rubber or foam which shows that recycled material has been purchased to produce the polymer. Documentation in form of a statement from the recycled material producer, showing that the feedstock used is recycled material and showing the share of recycled raw material contained in the raw material.

Background to the requirement

Nordic Ecolabelling wishes to support a circular economy by encouraging the use of recycled materials over virgin raw material – in this case crude oil. Substantial environmental potential is expected in the future with regard to reduce resource consumption and CO_2 emissions. However, availability and access to recycled polymers/plastics of good quality and purity is still challenging.

Prohibition on the use of re-granulate resulting from reprocessing processes that have obtained an approval pursuant to Commission Regulation (EC) No 282/2008 on recycled plastics materials and articles intended for food contact or approval pursuant to Regulation (EC) No 282/2008 to the Code of Federal Regulations Title 21: Food and Drugs, PART 177 — INDIRECT FOOD ADDITIVES: POLYMERS. These are both approvals for the material to be used for food contact. Plastic materials approved for food packaging require the highest traceability and purity of the plastic raw material and it will therefore be down cycling to use this plastic for anything other than food contact products.

The requirement states that the feedstock used in the recycled raw material must be traceable. Without traceability, it is difficult to ensure that the material really is recycled. Traceability can be documented with a certificate from a third-party certifier of the supply chain, such as the Global Recycled Standard, for example. The Global Recycled Standard (GRS) is an international, voluntary standard that sets requirements for third-party certification of recycled content and chain of custody in the supply chain. This standard restricts the use of undesirable chemicals in the manufacture of new products, but the standard does not cover chemicals that may enter via the recycled materials, and thus gives no guarantee about what may be present in the finished GRS product[22] (see more on

[22] Recycled Claim Standard (RCS) + Global Recycled Standard (GRS) - Textile Exchange

undesirable chemicals in recycled materials in requirement O19). Alternatively, traceability may be documented by the producer of the recycled raw material declaring that 100% recycled feedstock has been used.

O19 Chemicals in recycled plastic, rubber and foam

The requirement applies to chemicals in the recycled* plastic, rubber and foam raw material.

Recycled plastics, rubber and foams must not contain:

- halogenated flame retardants
- cadmium
- lead
- mercury
- chromium VI
- arsenic
- phthalates

Impurities up to 100 ppm are permitted.

**See section 4.2 Definitions for more information.*

The requirements for analysis laboratory and test methods are stated in Appendix 1.

✉ A test report (XRF, X-ray fluorescence or equivalent method) from the supplier of the recycled plastic, rubber and foam showing compliance with the requirement. Alternatively, the requirement can be documented with traceability to the source to substantiate that these substances are not included.

Background

The requirement applies to chemicals contained in the recycled plastic raw material and not chemicals that are added through regranulation. There are separate requirements for this, see O20. The requirement must be documented with a test report using X-ray fluorescence (XRF) or equivalent methods, or traceability to the source that substantiates that the specified substances are not included. The aim of the requirement is to capture the “worst substances”. There are different practices in the industry for testing substances in recycled plastics. Some manufacturers rely on questionnaires/declarations from their subcontractors and follow them up with chemical analyses if it is considered likely that the plastic contains substances of concern. Some manufacturers of recycled plastic have XRF (X-ray fluorescence spectrometer) equipment for testing the plastic to see whether it can meet the given requirement (a level of 100 ppm can be achieved). Although this will entail extra documentation work, it shows that it is possible to set such a requirement. Using recycled plastic is good as it helps reduce resource use and stimulates a circular economy. At the same time, there is no wish to recycle chemicals that are harmful to health and the environment.

O20 Additives - Prohibited substances

Additives to plastic, rubber and foam (both virgin and recycled plastic) must not be classified nor categorised according to the list below. The requirement applies to additives actively added to the polymer raw material in the master batch or compound in production of plastic, rubber and foam. The requirement also covers substances that are added during re-compounding of recycled plastic, foam or rubber raw materials.

The following substances must not be present:

- Substances on the Candidate List
    - The Candidate List can be found on the ECHA website: http://echa.europa.eu/candidate-list-table
    - Exemption applies to melamine (CAS No. 108-78-1)
    - D4 (CAS No. 556-67-2), D5 (CAS No. 541-02-6) or D6 (CAS No. 540-97-6) must only be included in the form of residues from raw material production and are allowed in concentrations up to 1000 ppm each in the silicone raw material.
- CMR substances - Carcinogenic, Germ cell mutagenicity, Reproductive toxicity category 1A or B or category 2 (including all combinations of stated exposure route and stated specific effect)
    - An exemption is made for titanium dioxide (CAS No. 13463-67-7) classified H351
    - An exemption is made for 1,1,1-Trimethylolpropane (TMP, CAS No. 77-99-6) classified H361
- Substances that have been judged in the EU to be PBT (Persistent, Bioaccumulative and Toxic) or vPvB (very Persistent and very Bioaccumulative)
    - PBT and vPvB in accordance with the criteria in Annex XIII of REACH
- Substances classified with hazard classes EUH440 (Persistent, Bioaccumulative and Toxic properties, PBT), EUH441 (Very Persistent, Very Bioaccumulative properties, vPvB), EUH450 (Persistent, Mobile and Toxic properties, PMT and EUH451 (Very Persistent, Very Mobile properties, vPvM) according to lastly proposed revision of CLP regulation.
- Endocrine disruptors: Substances on the EU member state initiative "Endocrine Disruptor Lists", List I, List II and List III, see following links:

  List I: https://edlists.org/the-ed-lists/list-i-substances-identified-as-endocrine-disruptors-by-the-eu

  List II: https://edlists.org/the-ed-lists/list-ii-substances-under-eu-investigation-endocrine-disruption

  List III: https://edlists.org/the-ed-lists/list-iii-substances-identified-as-endocrine-disruptors-by-participating-national-authorities

  Substances that are transferred to one of the corresponding sub-lists "Substances no longer on list" and that no longer feature on Lists I–III are not prohibited. However, this does not apply to the substances listed in Sub-List II that were evaluated on the basis of regulations or directives that do not have provisions for identifying endocrine disruptors (e.g., the Cosmetics Regulation). These substances may have endocrine disrupting properties. Nordic Ecolabelling will assess these substances on a case-by-case basis, based on the background information provided in Sub-List II.
- Substances classified with hazard classes EUH380/EUH381 (Endocrine disruption for human health, ED HH 1 or ED HH 2) and EUH340/EUH341 (Endocrine disruption for the environment, ED ENV 1 or ED ENV 2) according to lastly proposed revision of CLP regulation.
- Halogenated organic compounds, such as short-chain chlorinated paraffins (C10-C13), medium-chain chlorinated paraffins (C14-C17) and halogenated flame retardants, with the following exemptions:

    - Halogenated organic pigments that comply with the Council of Europe recommendation "Resolution AP (89) 1 on the use of colorants in plastic materials coming into contact with food", point 2.5.
- Per- and polyfluoroalkyl substances (PFASs), e.g., PFOA and PFOS
- Butylhydroxytoluene (BHT, CAS No. 128-37-0)
- Bisphenols and bisphenol derivatives
    - Bisphenol A used in the production of epoxy acrylate is not covered by the requirement.
    - Assessment of regulatory needs: Bisphenols. ECHA – 16 December 2021: Section 2.1: Bisphenols for which further EU RRM is proposed – restriction https://echa.europa.eu/documents/10162/c2a8b29d-0e2d-7df8-dac1-2433e2477b02
- Organotin compounds
- APEO (alkylphenol ethoxylates) and APD (alkylphenol derivatives/alkylphenols)
    - Alkylphenol derivatives are defined as substances that release alkylphenols when they break down.
    - An exemption is made for sterically hindered phenolic antioxidants with molecular weight (MW) > 600 g/mole.
- Phthalates
    - Phthalates are defined as esters of 1,2-benzenedicarboxylic acid (orthophthalic acid).
- Pigments, dyes and other additives based on lead, tin, cadmium, chromium VI and mercury, and their compounds.
- Nanomaterials and nanoparticles
    - Nanomaterials/-particles are defined according to the EU Commission Recommendation on the Definition of Nanomaterial (2022/C 229/01). Pigments are exempted from the requirement.

✉ A declaration from the manufacturer/supplier of the chemical product, in accordance with Appendix 5.

✉ A safety data sheet for the product in compliance with current European legislation (Annex II of REACH, Regulation (EC) No. 1907/2006).

Background

The requirement covers ingoing substances in additives that are added to the polymer raw material in the master batch or compound. Substances that arise from the actual polymer production are thus not covered by this requirement. Recycled plastic raw materials are counted as polymer raw materials, where additives that are added to a new master batch or compound are covered by requirements.

See background to requirement O25 and O27.

Nanoparticles

Nanoparticles are not desirable in ecolabelled products. These include nanometals such as nano silver, nanogold and nano copper. Nanometals such as nano silver and nano copper are a particular problem as they are present in

many products for their antibacterial effect. See more information in the chapter 4.6.1 Chemicals.

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*. It should be noted that Nordic Ecolabelling does not require a test for all raw materials in terms of nanoparticles. The requirement needs a declaration from the raw material supplier for raw materials that are not covered by the exemption. The declaration must state that the raw material does not contain nanomaterial, as defined in the requirement.

4.5.5 Wood-plastic composites (WPC)

In addition to the requirements in this section, the WPC must fulfil specific requirements set on plastic raw materials. The plastic raw material included in the WPC must fulfil requirements O18, O19 and O20 from section 4.5.4.

O21 Wood fibre and plastic

The subsidiary requirements below must be fulfilled by the raw materials of plastic and wood fiber in the wood-plastic composite material:

a) The plastic raw material in WPC must be 100% post-consumer recycled plastic.

b) The recycled plastic must not be PVC, PVDC or PET.

c) The wood/cellulose fibre must be 100% post-consumer recycled materials. In addition, the wood/cellulose fibre must not originate from wood impregnated with biocides or heavy metals.

✉ From the manufacturer of WPC:

- For Plastic raw materials: State the proportion and type of post-consumer recycled plastic according to the requirement.
- For wood/cellulose fibres: State the proportion of post-consumer recycled wood/cellulose fibres according to the requirement. Send a declaration that the wood has not been impregnated with biocides or heavy metals.

✉ From the supplier of recycled plastic raw materials.

- Declaration that the plastic is 100% post-consumer recycled and does not contain PVC, PVDC or PET.

Background

Wood-plastic composite (WPC) is a new material that has been added to these criteria. In WPC a plastic matrix is combined with a plant-based filler and has properties that differ from those of the individual materials. The plant material is usually woodmeal or cellulose pulp but may also be hemp or flax. The plastic is almost always one of the olefins, polyethylene or polypropylene, or a blend of these. The wood fibre component accounts for a very small part of the environmental impact (often waste).

For the environmental impact of the composite material, the plastic component is crucial. In general, the plastic raw material can be recycled or newly produced. If the plastic raw material is recycled, energy use and climate impact are reduced.

But it also has great significance if the recycled raw material is post-consumer or just pre-consumer.

WPC can be considered a dead end because plastic and wood are mixed and cannot be separated in the waste phase. WPC can be recycled into a new WPC, but since WPC can be made of many different types of polymeric materials, it requires that the individual product made in WPC returns to the specific manufacturer of that type of WPC, which is not immediately logistically possible to solve. On the other hand, WPC provides the opportunity to use recycled post-consumer plastic that has been collected from households and that is difficult to find outlets for today.

There are differences in outlet for recycled plastic raw materials depending on whether the source is collected consumer packaging (i.e., post-consumer plastic) or plastic from businesses (trade, industry and agriculture). The latter fraction is called post-commercial or post-industrial. In order for it to be relevant for the Nordic Ecolabel to label a composite material that cannot be separated into its original materials at end-of-life, there is a requirement that 100% post-consumer plastic according to ISO 14021.

Nordic Ecolabelling allows the use of WPC in this generation of criteria, with the following arguments.

- A Nordic Swan Ecolabelled WPC should comprise residual products (wood fibre) and recycled plastic. Nordic Ecolabelling's requirements can help towards increased use of recycled raw material (collected consumer packaging) for which it is more difficult to find a market.

- Furthermore, WPC, when it meets Nordic Ecolabelling's requirements, is also free of substances that are hazardous to health and the environment and has a long service life.

- The criteria for floor coverings include other materials that cannot be currently separated for material recovery and must be sent for incineration instead, such as laminate flooring.

- It is possible to recycle WPC (e.g., after the use phase or from production waste) to new WPC at the manufacturer. However, there is no integrated fraction for WPC in today's Nordic waste systems.

O22 WPC - Additives - Prohibited substances

Additives used during WPC production (e.g., pigments, UV-stabilisers and bonding agents) must not be classified nor categorised according to the list below. The requirement applies to additives actively added to the polymer raw material in the master batch or compound in production of plastic. The requirement also covers substances that are added during re-compounding of recycled plastics.

The following substances must not be present:

- Substances on the Candidate List
    - The Candidate List can be found on the ECHA website: http://echa.europa.eu/candidate-list-table
    - Exemption applies to melamine (CAS No. 108-78-1)

  - D4 (CAS No. 556-67-2), D5 (CAS No. 541-02-6) or D6 (CAS No. 540-97-6) must only be included in the form of residues from raw material production and are allowed in concentrations up to 1000 ppm each in the silicone raw material.
- CMR substances - Carcinogenic, Germ cell mutagenicity, Reproductive toxicity category 1A or B or category 2 (including all combinations of stated exposure route and stated specific effect)
  - An exemption is made for titanium dioxide (CAS No. 13463-67-7) classified H351
  - An exemption is made for 1,1,1-Trimethylolpropane (TMP, CAS No. 77-99-6) classified H361
- Substances that have been judged in the EU to be PBT (Persistent, Bioaccumulative and Toxic) or vPvB (very Persistent and very Bioaccumulative)
  - PBT and vPvB in accordance with the criteria in Annex XIII of REACH
- Substances classified with hazard classes EUH440 (Persistent, Bioaccumulative and Toxic properties, PBT), EUH441 (Very Persistent, Very Bioaccumulative properties, vPvB), EUH450 (Persistent, Mobile and Toxic properties, PMT and EUH451 (Very Persistent, Very Mobile properties, vPvM) according to lastly proposed revision of CLP regulation.
- Endocrine disruptors: Substances on the EU member state initiative "Endocrine Disruptor Lists", List I, List II and List III, see following links:

  List I: https://edlists.org/the-ed-lists/list-i-substances-identified-as-endocrine-disruptors-by-the-eu

  List II: https://edlists.org/the-ed-lists/list-ii-substances-under-eu-investigation-endocrine-disruption

  List III: https://edlists.org/the-ed-lists/list-iii-substances-identified-as-endocrine-disruptors-by-participating-national-authorities

  Substances that are transferred to one of the corresponding sub-lists "Substances no longer on list" and that no longer feature on Lists I–III are not prohibited. However, this does not apply to the substances listed in Sub-List II that were evaluated on the basis of regulations or directives that do not have provisions for identifying endocrine disruptors (e.g., the Cosmetics Regulation). These substances may have endocrine disrupting properties. Nordic Ecolabelling will assess these substances on a case-by-case basis, based on the background information provided in Sub-List II.
- Substances classified with hazard classes EUH380/EUH381 (Endocrine disruption for human health, ED HH 1 or ED HH 2) and EUH340/EUH341 (Endocrine disruption for the environment, ED ENV 1 or ED ENV 2) according to lastly proposed revision of CLP regulation.
- Halogenated organic compounds, such as short-chain chlorinated paraffins (C10-C13), medium-chain chlorinated paraffins (C14-C17) and halogenated flame retardants, with the following exemptions:
  - Halogenated organic pigments that comply with the Council of Europe recommendation "Resolution AP (89) 1 on the use of colorants in plastic materials coming into contact with food", point 2.5.
- Per- and polyfluoroalkyl substances (PFASs), e.g., PFOA and PFOS

- Butylhydroxytoluene (BHT, CAS No. 128-37-0)
- Bisphenols and bisphenol derivatives
    - Bisphenol A used in the production of epoxy acrylate is not covered by the requirement.
    - Assessment of regulatory needs: Bisphenols. ECHA – 16 December 2021: Section 2.1: Bisphenols for which further EU RRM is proposed – restriction https://echa.europa.eu/documents/10162/c2a8b29d-0e2d-7df8-dac1-2433e2477b02
- Organotin compounds
- APEO (alkylphenol ethoxylates) and APD (alkylphenol derivatives/alkylphenols)
    - Alkylphenol derivatives are defined as substances that release alkylphenols when they break down.
    - An exemption is made for sterically hindered phenolic antioxidants with molecular weight (MW) > 600 g/mole.
- Phthalates
    - Phthalates are defined as esters of 1,2-benzenedicarboxylic acid (orthophthalic acid).
- Pigments, dyes and other additives based on lead, tin, cadmium, chromium VI and mercury, and their compounds.
- Nanomaterials and nanoparticles
    - Nanomaterials/-particles are defined according to the EU Commission Recommendation on the Definition of Nanomaterial (2022/C 229/01). Pigments are exempted from the requirement.

✉ A declaration from the manufacturer/supplier of the chemical product, in accordance with Appendix 5.

✉ A safety data sheet for the product in compliance with current European legislation (Annex II of REACH, Regulation (EC) No. 1907/2006).

Background

During manufacture of WPC, it is common to add bonding agents (resins and adhesives), stabilisers and pigments to the structure to bind together the plastic and wood fibre. For more information about the chemical substances see chapters 4.5.4 Plastic, rubber and foam and 4.6.1 Chemicals.

4.6 Production

4.6.1 Chemicals

Introduction to chemical requirements

The requirements in this chapter apply to chemical products used in the production/assembly of the Nordic Swan Ecolabelled floor coverings or flooring underlays, such as adhesives, resins, sealants, or waxes, as well as lacquers, oils, paints, stains or fillers. The requirements also apply to chemicals used at the production site of subcontractors manufacturing finished layers/elements such as manufactured board and backing foam.

Lamination (thin layer of laminate < 2 mm, including melamine) on another panel is not considered to be surface treatment. For a wood-based panel with laminate, both elements must fulfil the requirements for the relevant panel type individually, i.e., the wood-based panel and laminate must both meet the requirements for chemicals.

Chemical products used in the manufacture of paper, and to print patterns on the decor paper, are not covered by the requirements. Auxiliary substances such as lubricants and detergents are also not covered by the requirements.

Requirements specific for surface treatment are presented in chapter 4.6.2.

Definitions

The requirements in the criteria document apply to all ingoing substances in the chemical product. Impurities are not regarded as ingoing substances and are therefore exempt from the requirements. Ingoing substances and impurities are defined as below, unless otherwise stated.

- **Ingoing substances**: All substances in the product, including additives (e.g. preservatives and stabilisers) in the raw materials. Substances known to be released from ingoing substances (e.g., formaldehyde, arylamine, in situ-generated preservatives) are also regarded as ingoing substances.
- **Impurities**: Residues from production, incl. raw material production, which remain in the chemical product at concentrations below 1000 ppm (0.1000% by weight). Examples of impurities are reagent residue incl. residues of monomers, catalysts, by-products, “scavengers” (i.e., chemicals used to eliminate/minimise undesirable substances), cleaning agents for production equipment and “carry-over” from other/previous production lines.

O23 Antibacterial substances

Chemical products and nanomaterials* with antibacterial or disinfectant properties must not be added during production or during surface treatment process. They must not be added to the finished product nor to finished ingoing elements (e.g., HDF or backing foam) either.

The term antibacterial means chemical products that prevent or inhibit growth of microorganisms, such as bacteria or fungi. Silver ions, silver nanoparticles, gold nanoparticles and copper nanoparticles are classed as antibacterial agents.

The requirement does not apply to preservatives used to preserve the chemical product, so-called in-can preservatives.

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

✉ Declaration from the manufacturer of the product that no chemical products and nanomaterials with antibacterial or disinfecting properties have been added during production or to the finished product. Appendix 2 can be used.

✉ Declaration from the manufacturer/supplier that the chemical product does not contain nanomaterials with antibacterial or disinfecting properties, in accordance with Appendix 6.

Background

Products treated with antibacterial agents are commonly marketed as preventing bacteria formation, growth and odours. Antibacterial treatment is often unnecessary and should be used with care as the substances can be harmful to health and the environment, and they risk leading to increased antibiotic resistance. For the background to nanomaterials, see the requirement concerning nanomaterials.

O24 Classification of chemical products

Chemical products, including surface treatments, used in the production of the Nordic Swan Ecolabelled product must not be classified in accordance with the table below:

CLP Regulation 1272/2008		
Hazard statement	**Hazard class and category**	**Hazard code**
Toxic to the environment	Aquatic Acute 1 Aquatic Chronic 1 Aquatic Chronic 2 Ozone	H400 H410 H411 H420
Acute toxicity	Acute Tox 1 or 2 Acute Tox 1 or 2 Acute Tox 1 or 2 Acute Tox 3 Acute Tox 3 Acute Tox 3	H300 H310 H330 H301 H311 H331
Specific target organ toxicity – single exposure/repeated exposure	STOT SE 1 STOT RE 1	H370 H372
Carcinogenic[1]	Carc. 1A or 1B Carc. 2	H350 H351
Germ cell mutagenic[1]	Mut. 1A or 1B Mut. 2	H340 H341
Reproductive toxicity[1]	Repr. 1A or 1B Repr. 2 Lact.	H360 H361 H362

[1] *Including all combinations of stated exposure route and stated specific effect. For example, H350 also covers the classification H350i.*

Note that responsibility for correct classification lies with the manufacturer.

Exemptions apply for:

- Accelerators for linoleum production are exempted from classifications H400 and H410 and may be present in amounts up to 1% by weight of the linoleum.
- Classification H351 for adhesive products containing methylene diphenyl diisocyanate (MDI). Isocyanates used in the production of polyurethane and polyurethane foam are regulated in separate requirement O35.
- Classifications H350, H341, H301, H311 and H331 for adhesive products and resins containing formaldehyde (CAS no. 50-00-0). Formaldehyde emissions are regulated in requirements O30 and O40.
- Classifications H341, H301 and H331 for resins containing a maximum of 10% by weight of phenol (CAS no. 108-95-2).
- Classifications H301, H311, H331 and H370 for resins containing a maximum of 10% by weight of methanol (CAS no. 67-56-1).

- Classifications H351 and H361 for resins containing melamine (CAS no. 108-78-1).
- Classifications H411 and H412 for UV curing products under the following conditions: There must be a controlled closed process where no discharge to recipient takes place. Spillage and general waste (e.g. cleaning residue) must be collected in containers approved for hazardous waste and handled by a waste contractor.

✉ A declaration from the chemical manufacturer or supplier, in accordance with Appendix 6.

✉ A safety data sheet for the product in compliance with current European legislation (Annex II of REACH, Regulation (EC) No. 1907/2006).

✉ Exemption for UV curing products: Description of the process and how waste and residual waste are handled, including information about who receives the wastes.

Background

Nordic Ecolabelling is generally committed to restricting the use of chemicals that are harmful to health and the environment, and the classification requirement prohibits the products of highest concern.

Exemptions:

As in previous generation, an exemption is given for accelerators in linoleum flooring production from the classification H400 and H410 up to 1 percent of the linoleum, as alternative accelerators without such classifications are not available at the time being.

Similarly, an exemption for adhesive products containing methylene diphenyl diisocyanate (MDI) is kept. There are currently no substitute products that are widely available in the market. Hazard code H373 is no longer exempted because it is not anymore forbidden hazard code in the requirement.

The exemption for adhesives and resins containing formaldehyde is only granted if later requirements O30 and O40 concerning the content of free formaldehyde in adhesives and emissions from the finished product are fulfilled.

Resins containing phenol, formaldehyde, methanol and melamine are used in the production of several types of laminates to impregnate the paper. Since it is not possible to produce laminate without these resins, an exemption is made for these substances. A maximum of 10% by weight of phenol and methanol is permitted in the finished resin – the same limit value as was used in the previous generation of the criteria. To ensure that the resins have hardened properly, a subsequent requirement is made concerning emissions from the laminate in its finished form.

The exemption for melamine was introduced during the validity period of the previous criteria, since at that time several suppliers began to self-classify it as H361 (Repr. 2). At the end of 2020, ECHA's Risk Assessment Committee (RAC) also agreed that melamine should be given the harmonized classifications H351 (Carc. 2) and H373 (STOT RE 2). The harmonised classifications will become binding on 23 November 2023. The classification H361 will not be a harmonized

classification, but there may still be producers who use this self-classification alongside the harmonized classifications once they come into effect. Nordic Ecolabelling gives an exemption for both the classifications H351 and H361, as there is no substance that can replace melamine at this moment in time. Hazard code H373 is no longer exempted because it is not anymore forbidden hazard code in the requirement.

This requirement limiting the use of chemical products classified as environmentally hazardous contains an exemption for UV curing products. These kinds of products are often classified as environmentally hazardous due to the content of acrylates. The acrylates change properties in the hardening and bind to the surface coating, so they do not pose an environmental hazard in the finished product. Instead, it is important that no emissions of uncured product that have the environmentally hazardous properties occur. Requirements are therefore set for the application, which must take place in a controlled closed process where no discharges to recipient take place.

An exemption has also been introduced for UV curing products that can be used to impregnate the top paper layer. The UV curing technique is used to achieve a surface with good durability and quality, while at the same time having the advantage that the chemicals have low VOC levels.

O25 Classification of ingoing substances

Ingoing substances in the chemical product used in production must not have the classifications in the table below.

CLP Regulation 1272/2008		
Hazard statement	**Hazard class and category**	**Hazard code**
Carcinogenic[1]	Carc. 1A or 1B Carc. 2	H350 H351
Germ cell mutagenic[1]	Mut. 1A or 1B Mut. 2	H340 H341
Reproductive toxicity[1]	Repr. 1A or 1B Repr. 2 Lact.	H360 H361 H362
Endocrine disruption for human health[2]	ED HH 1 ED HH 2	EUH380 EUH381
Endocrine disruption for the environment[2]	ED ENV 1 ED ENV 2	EUH431 EUH431
Persistent, Bioaccumulative and Toxic properties[2] Very Persistent, Very Bioaccumulative properties[2]	PBT vPvB	EUH440 EUH441
Persistent, Mobile and Toxic properties Very Persistent, Very Mobile properties	PMT vPvM	EUH450 EUH451

[1] Including all combinations of stated exposure route and stated specific effect. For example, H350 also covers the classification H350i.

[2] See also requirement O27 for additional requirements on potential or identified endocrine disruptors and PBT/vPvB substances.

Exemptions apply for:

- Photo initiators classified H351, H341 or H361

- Chemical products containing methylene diphenyl diisocyanate (MDI) classified as H351.
- Adhesive and resin containing formaldehyde (CAS no. 50-00-0) classified as H350 and H341. Formaldehyde emissions are regulated in requirements O30 and O40.
- Resin containing maximum 10% by weight of phenol (CAS no. 108-95-2) classified as H341.
- Resin containing melamine (CAS no. 108-78-1) classified as H351 and H361.
- Titanium dioxide (CAS no. 13463-67-7) classified as H351.
- 1,1,1-Trimethylolpropane (TMP, CAS no. 77-99-6) classified as H361 is exempted until 31.05.2025.

✉ A declaration from the chemical manufacturer or supplier, in accordance with Appendix 6.

✉ A safety data sheet for the product in compliance with current European legislation (Annex II of REACH, Regulation (EC) No. 1907/2006).

Background

A ban on CMR Category 2 substances has been added to the requirement. Nordic Ecolabelling would like to restrict the use of substances that are carcinogenic, mutagenic and toxic for reproduction (CMR) to the greatest extent possible. This requirement now represents a further restriction on the classification requirement since it applies to ingoing substances in the chemical product.

An exemption has been made for photo initiators classified with H341, H351, or H361. Photo initiators are compounds that produce radicals when exposed to UV light. Then, these react with monomers and/or oligomers to initiate polymer chain growth. They are essential ingredients of all "modern" UV-curable adhesives, and the industry has not yet found substances that can replace them.

Exemptions are also needed in this requirement for methylene diphenyl diisocyanate (MDI), formaldehyde, and melamine. See more background about this in requirement O24 Classification of chemical products.

In addition, there are exemptions for titanium dioxide (CAS no. 13463-67-7) and 1.1,1-Trimethylolpropane (TMP, CAS no. 77-99-6). Titanium dioxide is a white pigment that is used in many different types of product. 1,1,1-Trimethylolpropane (TMP) is used to coat titanium dioxide to make the titanium dioxide particles disperse more easily. About 90% of all titanium dioxide is dispersed with TMP. There are currently no replacement substances for titanium dioxide and TMP, but work is underway to replace TMP in the industry. The exemption is therefore time limited.

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

The Nordic Swan Ecolabel aims for comprehensive hazard identification and protection of the environment and human health.

O26 Preservatives

The content of preservatives in the chemical product must meet the following limit values:

Preservative	Limit value
Bronopol	≤ 500 ppm (0.05% by weight)
IPBC (iodopropynyl butylcarbamate)	≤ 2000 ppm (0.20% by weight)
Mixture (3:1) of CMIT/MIT (5 chloro-2-methyl-4-isothiazolin-3-one / 2-methyl-4-isothiazolin-3-one)	≤ 15 ppm (0.0015 % by weight)
MIT (2-methyl-2H-isothiazol-3-one)	≤ 15 ppm (0.0015 % by weight)
Total amount of isothiazolinones	≤ 500 ppm (0.05% by weight).

✉ A declaration from the chemical manufacturer or supplier, in accordance with Appendix 6.

✉ A safety data sheet for the product in compliance with current European legislation (Annex II of REACH, Regulation (EC) No. 1907/2006).

Background

The content of the preservatives bronopol, IPBC, CMIT/MIT and MIT is restricted via specific limit values. The content of the total amount of isothiazolinones is also limited. IPBC is a fungicide that has become more commonly used and the limit value is the same as in Nordic Ecolabelling's Criteria for Chemical building products. Water-based paints and adhesives may contain the preservative bronopol and it is difficult to find substitutes. A limited amount of bronopol is therefore permitted although it is classified as a substance of concern and hazardous to the environment. Isothiazolinones are used as a preservative in many water-based products, where they act as fungicides, biocides and algal growth inhibitors. They are toxic to aquatic organisms and can cause varying degrees of allergic reactions. It has proved difficult to avoid the use of these preservatives in water-based products, which is what Nordic Ecolabelling's criteria for chemicals indirectly promote. Preservatives also play an important role in ensuring the shelf-life of the products before they are used. Alternative preservatives to isothiazolinones include formaldehyde and/or formaldehyde-releasing substances, which are carcinogenic. In this respect, isothiazolinone and CMIT/MIT are better, even though they also exhibit hazardous properties. To limit the use of these substances as much as possible, the amount of the substances is restricted.

O27 Prohibited substances

The chemical product used in production must not contain the following substances:

- Substances on the Candidate List
  - The Candidate List can be found on the ECHA website: http://echa.europa.eu/candidate-list-table
  - Exemption applies to melamine (CAS No. 108-78-1)
  - D4 (CAS No. 556-67-2), D5 (CAS No. 541-02-6) or D6 (CAS No. 540-97-6) must only be included in the form of residues from raw

material production and are allowed in concentrations up to 1000 ppm each in the silicone raw material.

- Substances that have been judged in the EU to be PBT (Persistent, Bioaccumulative and Toxic) or vPvB (very Persistent and very Bioaccumulative)
    - PBT and vPvB in accordance with the criteria in Annex XIII of REACH
- Endocrine disruptors: Substances on the EU member state initiative "Endocrine Disruptor Lists", List I, List II and List III, see following links:

  List I: https://edlists.org/the-ed-lists/list-i-substances-identified-as-endocrine-disruptors-by-the-eu

  List II: https://edlists.org/the-ed-lists/list-ii-substances-under-eu-investigation-endocrine-disruption

  List III: https://edlists.org/the-ed-lists/list-iii-substances-identified-as-endocrine-disruptors-by-participating-national-authorities

  Substances that are transferred to one of the corresponding sub-lists "Substances no longer on list" and that no longer feature on Lists I–III are not prohibited. However, this does not apply to the substances listed in Sub-List II that were evaluated on the basis of regulations or directives that do not have provisions for identifying endocrine disruptors (e.g., the Cosmetics Regulation). These substances may have endocrine disrupting properties. Nordic Ecolabelling will assess these substances on a case-by-case basis, based on the background information provided in Sub-List II.
- Halogenated organic compounds, such as short-chain chlorinated paraffins (C10-C13), medium-chain chlorinated paraffins (C14-C17)
    - Halogenated organic pigments that comply with the Council of Europe recommendation "Resolution AP (89) 1 on the use of colorants in plastic materials coming into contact with food", point 2.5.
    - Exemptions apply for bronopol, IPBC, MIT and CMIT/MIT (3:1). These are addressed in a separate requirement, see requirement O26.
    - Exemption applies also for epoxy acrylate used in UV curing products.
- Per- and polyfluoroalkyl substances (PFASs), e.g., PFOA and PFOS
- Butylhydroxytoluene (BHT, CAS No. 128-37-0)
    - An exemption is made for BHT that is included in UV curing chemical products. If BHT receives a harmonised classification that means the substance does not meet the requirements anymore and the exemption will be removed.
- Aziridine and polyazidirines
    - An exemption is made for aziridines/polyaziridines, if the substance is not classified as carcinogenic, mutagenic or reprotoxic from any manufacturer or in ECHA
- Bisphenols and bisphenol derivatives
    - Bisphenol A used in the production of epoxy acrylate is not covered by the requirement.
    - Assessment of regulatory needs: Bisphenols. ECHA – 16 December 2021: Section 2.1: Bisphenols for which further EU

RRM is proposed – restriction https://echa.europa.eu/documents/10162/c2a8b29d-0e2d-7df8-dac1-2433e2477b02

- Organotin compounds
- APEO (alkylphenol ethoxylates) and APD (alkylphenol derivatives/alkylphenols)
    - Alkylphenol derivatives are defined as substances that release alkylphenols when they break down.
    - An exemption is made for sterically hindered phenolic antioxidants with molecular weight (MW) > 600 g/mole.
- Phthalates
    - Phthalates are esters of 1,2-benzenedicarboxylic acid (orthophthalic acid).
- Pigments, dyes and additives based on lead, tin, cadmium, chromium VI and mercury, and their compounds.

✉ A declaration from the chemical manufacturer or supplier, in accordance with Appendix 6.

✉ A safety data sheet for the product in compliance with current European legislation (Annex II of REACH, Regulation (EC) No. 1907/2006).

Background

Candidate List Substances and PBT, vPvB

The ban on substances on the Candidate List, substances that are PBT (Persistent, Bioaccumulative and Toxic) and vPvB (very Persistent and very Bioaccumulative) and the ban on substances that are considered to be potential endocrine disruptors in category 1 or 2 on the EU's priority list of substances for further evaluation of their role in endocrine disruption are new in this revision. The Candidate List contains substances of very high concern, so-called SVHC substances. SVHCs (Substances of Very High Concern) meet one or more of these criteria:

- Very harmful to health: carcinogenic, mutagenic, toxic for reproduction (CMR substances, category 1A and 1B), set out in REACH, Article 57 a, b, c

- Very harmful to the environment: persistent, bio-accumulative and toxic (PBT) or very persistent and very bio-accumulative (vPvB), set out in REACH, Article 57 d, e

- Serious effects to human health or the environment on another basis than the groups above, but that give equivalent cause for concern (e.g. endocrine disruptors and inhaled allergens), set out in REACH, Article 57 f.

SVHC may be included on the Candidate List with a view to later inclusion on the Authorisation List. This means that the substance becomes regulated (ban, phasing out or some other form of restriction). Nordic Ecolabelling prohibits Candidate List substances due to their hazardous properties. Other SVHC substances are addressed via bans on the use of PBT and vPvB substances, the classification requirements and a ban on endocrine disruptors.

Siloxanes D4, D5 and D6 are included on the Candidate List of Substances of Very High Concern in REACH. However, an exemption has been added for these siloxanes to make it clear that documentation is required to confirm that the content is below the stated limit value in any silicone used. It is possible to find chemicals containing silicone in use throughout the production chain, for example as softeners. The requirement has thus been reworded since the previous generation of the criteria because it used to only cover finishing, membranes, and laminates.

PBT (and vPvB substances) are substances defined in Annex XIII of REACH, which are generally undesirable in Nordic Swan Ecolabelled products.

Endocrine disruptors:

Potential endocrine disruptors are substances that can negatively affect the hormonal 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 adverse effects, with a particular focus on hormones that affect sexual development and reproduction. Several studies have shown effects on animals that are probably due to changes in the hormone balance. Effluent discharges are one of the major sources of the presence and distribution of endocrine disruptors in aquatic ecosystems[23]. Nordic Ecolabelling excludes identified and potential endocrine disruptors listed on the "Endocrine Disruptor Lists" at www.edlists.org, which is based on the EU member state initiative. Substances listed in Lists I, II and/or III are excluded.

Licensees are responsible for keeping track of updates to the lists so that their Nordic Swan Ecolabelled products fulfil the requirement throughout the entire validity period of the licence. Nordic Ecolabelling recognises the challenges associated with new substances that are added to Lists II and III. We will evaluate the circumstances and possibly decide on a transition period from case to case.

The requirement applies to substances on the main lists (Lists I, II and III) and not to the corresponding sub-lists called "Substances no longer on list". Substances that are transferred to one of the sub-lists and that no longer feature on Lists I–III are not prohibited. However, special attention is paid to the substances on List II that have been evaluated under the Cosmetics Regulation, for example, where there are no specific provisions to identify endocrine disruptors. It is still unclear how these substances will be handled at www.edlists.org after the evaluation (safety assessment of the substances included in cosmetics, for example) has been completed. Nordic Ecolabelling will assess the circumstances for the substances on Sub-List II on a case-by-case basis, based on the background information provided in the sub-list. By excluding both identified and prioritised potential endocrine disruptors that are under evaluation, Nordic Ecolabelling ensures a restrictive approach towards endocrine disruptors.

[23] Miljøstatus i Norge (2008) (Environmental status in Norway): Endocrine disruptors. http://www.miljostatus.no/Tema/Kjemikalier/Noen-farlige-kjemikalier/Hormonforstyrrende-stoffer/#D (dated 26 February 2009).

Halogenated organic compounds

Halogenated organic compounds that contain halogens such as chlorine, bromine, fluorine or iodine must not be present in the chemical products used. This includes halogenated flame retardants, chloroparaffins, perfluoroalkyl compounds and certain organic bleaching chemicals. Halogenated organic compounds have various properties that are not desirable in Nordic Swan Ecolabelled products. They are harmful to human health and the environment, highly toxic to aquatic organisms, carcinogenic or harmful to health in other ways. The halogenated organic compounds do not break down readily in the environment, which increases the risk of harmful effects from the substances. A side reaction can occur during the manufacture of epoxy acrylate which results in a small amount of chlorine remaining inside the molecule. The chlorine that is bound in the molecule is relatively stable and will not react further while polymerisation continues. The ban on ingoing substances in the form of halogenated organic compounds applies to the chlorine because it becomes part of the molecule. The quantity of oligomers is normally below 1000 ppm. According to the manufacturers of UV curing chemical products, however, it is not possible to state an exact quantity. Nordic Ecolabelling does not want to ban epoxy acrylate that is used in UV curing chemical products, as such products have multiple environmental benefits. The chlorine in the molecules is not added intentionally for a specific purpose and is therefore exempted. Bisphenol A is also used in the manufacture of epoxy acrylate. It has thus been made more explicit that Bisphenol A used in this manufacturing process is exempt from the requirement.

Per- and polyfluoroalkylsubstances (PFAs), e.g., PFOA and PFOS

Fluorosurfactants and other per- and polyfluoroalkyl substances (PFASs) constitute a group of substances that have harmful properties. Certain per- and polyfluorinated compounds can degrade to the very stable PFOS (perfluorooctane sulphonate) and PFOA (perfluorooctanoic acid) and similar substances. These substances are extremely persistent and are easily absorbed by the body[24]. The substances are found all over the globe, from the large oceans to the Arctic. PFOS have also been found in birds and fish and in their eggs. The substances in this group impact on the biological processes of the body and are suspected to be endocrine disruptors, carcinogenic and to have a negative impact on the human immune system[25]. PFOA, APFO (ammonium pentadecene fluoro octanoate) and certain fluoride acids are on the Candidate List due to their repro-toxicity, as well as PBT. There are new research results showing that shorter chains (2-6 carbon atoms) have been discovered in nature[26].

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

[25] 6 E.g., Heilmann, C. et al, Persistente fluorbindelser reducerer immunfunktionen, Ugeskr Læger 177/7, 30.3.2015 OSPAR 2005: Hazardous Substances Series, Perfluorooctane Sulphonate (PFOS), OSPAR Commission, 2005 (2006 Update), MST, 2005b: Miljøprojekt nr. 1013, 2005, More Environmentally Friendly Alternatives to PFOS-compounds and PFOA, Danish Environmental Protection Agency, 2005.

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

BHT

Butylhydroxytoluene (BHT, CAS No. 128-37-0) is new to the list of prohibited substances. BHT does not have an official harmonized classification. BHT is included in the EU member state initiative "Endocrine Disruptor Lists", List II Substances under evaluation for endocrine disruption under EU legislation. Nordic Ecolabelling introduces an exemption for UV curing chemical products. BHT has an important function in such products and can be difficult to replace. Nordic Ecolabelling does not want to prohibit the use of UV curing chemical products as they have other positive properties such as low VOC content. If BHT receives a harmonized official classification that is not allowed in these criteria, then the exemption is no longer valid.

Aziridines and polyazidirines

Aziridine and polyaziridines are classified as H350 (carcinogenic) and H340 (mutagenic) and are thus included in the ban on CMR substances. However, they are on the list of prohibited substances to make it clear that they are prohibited. The substances were also on the list for generation 6 of the criteria.

Bisphenols and bisphenols derivatives

Several bisphenols with the general bisphenol structure and 'bisphenol derivatives' which have constituents with structural properties common to bisphenols are now prohibited. Based on the potential for widespread use and available information on potential endocrine disruptors, reproductive toxicity and PBT/vPvB properties, 34 substances[27] were identified in need for further regulatory risk management in EU[28].

Organotin compounds

Organotin compounds are used in biocides and as fungicides in a wide range of consumer products. In the textile industry, they can be found in products such as socks, shoes, and sportswear to prevent odours caused by the breakdown of perspiration. One of the most common organotin compounds is tributyltin (TBT). Several of the tin-organic compounds are banned for selected areas of use through Reach Annex XVII entry 20 and the following three; TBTO, DBTC and DOTE are on the EU Candidate List[29].

Alkylphenols, alkylphenol ethoxylates and/or alkylphenol derivates

Alkylphenol ethoxylates (APEO) and/or alkylphenol derivatives (APD) are a group of non-readily degradable surfactants that are proven endocrine disruptors. APEOs may be present in binders, dispersing and thickening agents, siccatives, foam inhibitors, pigment pastes, wax, etc. Alternatives to APEOs are available based on alkyl sulphates, alkyl ether sulphates and alcohol ethoxylates. These are readily biodegradable but also have harmful properties, being toxic to aquatic organisms and some may be bioaccumulative. However, there is an

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

[28] [2] Annex XV restriction report https://echa.europa.eu/documents/10162/450ca46b-493f-fd0c-afec-c3aea39de487

[29] https://miljostatus.miljodirektoratet.no/tema/miljogifter/prioriterte-miljogifter/tbt-og-andre-organisketinnforbindelser/) besøgt 8 august 2019.

environmental gain to be made by substitution since they break down rapidly and the degradation product nonylphenol, with its endocrine-disrupting effects, is avoided.

Phthlalates

The ban on phthalates has not been changed. Many phthalates are harmful to the environment and human health and should not be used in ecolabelled products for a variety of reasons. Some phthalates are on the EU's priority list of substances for further evaluation of their role in endocrine disruption, and some have already been identified as endocrine disruptors. Some phthalate compounds are also on the Candidate List. All are there because they are classified as toxic for reproduction. Some are also regulated in Annex XVII of REACH, and many phthalates are on the Danish Environmental Protection Agency's "List of Undesirable Substances" and on the Norwegian Environment Agency's "List of Priority Substances". For precautionary reasons, Nordic Ecolabelling has decided to continue to exclude phthalates as a group.

Additives based on lead, tin, cadmium, chromium (VI) and mercury, and their compounds

Nordic Ecolabelling restricts heavy metals because they are toxic to humans and other organisms, both on land and in the aquatic environment. Mercury, cadmium and lead are toxic to the human nervous system, kidneys and other organs, and the metals can accumulate in living organisms. Chromium (VI) is classified as very toxic, CMR and harmful to the environment.

O28 Nanomaterials

The chemical product must not have nanomaterials* as ingoing substances (See Definitions). Exemptions are made for:

- Pigments. This exemption does not include pigments added for purposes other than colouring.
- Naturally occurring inorganic fillers**
- Synthetic amorphous silica (SAS). This exemption applies to non-modified SAS.
- Polymer dispersions

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

*** This applies to fillers covered by Annex V item 7 of REACH*

✉ A declaration from the chemical manufacturer that the chemical product does not contain any nanomaterial, in accordance with Appendix 6.

Background

Due to the small size and large surface area of nanoparticles, they are usually more reactive and may have different properties than larger particles of the same material. There is concern among public authorities, researchers, environmental organisations, and others about the lack of knowledge regarding the potential

harmful effects on health and the environment[30,31,32,33,34,35]. Coatings and other modifications may also alter the properties. Nordic Ecolabelling takes the concerns about nanomaterials seriously and uses the precautionary principle to rule out nanomaterials/particles in the products. Nanomaterials/-particles are defined according to the EU Commission Recommendation on the Definition of Nanomaterial (2022/C 229/01)[36].

Most nanomaterials on the market today have either been in use for decades, or have recently been manipulated into nanoforms of existing materials[37]. For example, carbon black nanoparticles and amorphous silicon dioxide (SiO_2) have been used in previous centuries. Titanium dioxide (TiO_2), has long been used as a dye in bulk form, but is now manufactured as a nanomaterial for other purposes[38]. Other types of engineered nanomaterials are expected to enter the market in the future[39].

In the construction panel product group, nanomaterials are used, among other things, to impregnate or seal surfaces, in order to create hydrophobic, self-cleaning, and antibacterial surfaces. These effects may, for example, come from the addition of nanometals such as silver, gold and copper or titanium dioxide.

The requirement has the following exemptions:

[30] UNEP (2017) Frontiers 2017 Emerging Issues of Environmental Concern. United Nations Environment Programme, Nairobi. https://wedocs.unep.org/bitstream/handle/20.500.11822/22255/Frontiers_2017_EN.pdf?sequence=1&isAllowed=y

[31] Parliamentary Assembly of the Council of Europe (2017 (2013)) Nanotechnology: balancing benefits and risks to public health and the environment. http://semantic-pace.net/tools/pdf.aspx?doc=aHR0cDovL2Fzc2VtYmx5LmNvZS5pbnQvbncveG1sL1hSZWYvWDJlLURXLWV4dHIuYXNwP2ZpbGVpZD0xOTczMCZsYW5nPUVO&xsl=aHR0cDovL3NlbWFudGljcGFjZS5uZXQvWHNsdC9QZGYvWFJlZi1XRC1BVC1YTUwyUERGLnhzbA==&xsltparams=ZmlsZWlkPTE5NzMw

[32] Larsen PB, Mørck TAa, Andersen DN, Hougard KS (2020) A critical review of studies on the reproductive and developmental toxicity of nanomaterials. European Chemicals Agency.

32 SCCS (Scientific Committee on Consumer Safety) (2019) Guidance on the Safety Assessment of Nanomaterials in Cosmetics. SCCS/1611/19. https://ec.europa.eu/health/sites/health/files/scientific_committees/consumer_safety/docs/sccs_o_233.pdf

[33] Mackevica A, Foss Hansen S (2016) Release of nanomaterials from solid nanocomposites and consumer exposure assessment – a forward-looking review. Nanotoxicology 10(6):641–53. doi: 10.3109/17435390.2015.1132346

[34] BEUC – The European Consumer Organisation et. al (2014) European NGOs' position paper on the Regulation of nanomaterials. www.beuc.eu/publications/beuc-x-2014-024_sma_nano_position_paper_caracal_final_clean.pdf

[35] Azolay D and Tuncak B (2014) Managing the unseen – opportunities and challenges with nanotechnology. Swedish Society for Nature Conservation. www.naturskyddsforeningen.se/sites/default/files/dokument-media/rapporter/Rapport-Nano.pdf

[36] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022H0614(01)&from=EN

[37] EU observatory for nanomaterials and European Chemicals Agency (2019) What are next generation nanomaterials and why are regulators interested in them? Information note. https://euon.echa.europa.eu/documents/23168237/24095696/190919_background_note_next_gen_materials_en.pdf/b9178324-5a69-2e4b-1f2b-aac2c2845f45

[38] 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

[39] EU observatory for nanomaterials and European Chemicals Agency (2019) What are next generation nanomaterials and why are regulators interested in them? Information note. https://euon.echa.europa.eu/documents/23168237/24095696/190919_background_note_next_gen_materials_en.pdf/b9178324-5a69-2e4b-1f2b-aac2c2845f45

Pigments

Pigments are finely ground, insoluble particles that are used to give the products a certain colour. There are no substitutes that can perform the function of pigments such as paint dyes, inks, fabric dyes, masterbatch, etc. and many pigments consist entirely or partially of nanoparticles. Therefore, nanosize pigments are exempted. Although clear conclusions on the safety of nanopigments cannot be drawn[40], release by decomposition of facades is very limited and the nanoparticles are probably mainly embedded in the paint matrix rather than released as individual nanoparticles[41,42]. Paint pigments consist of particles of individual crystals up to aggregates of several crystals. It is generally more effective to use pigments with smaller particles than larger to get the same colour. Inorganic pigments used in the paint industry, which can occur in nanosize, include carbon black and iron oxides[43]. Carbon black used in paints is very finely ground and has a particle size of approximately 10–30 nm[44]. Iron oxide pigments can include only nanosize particles, or only a fraction of the particles may be nano. Inorganic nanopigments are also added to products for a number of purposes other than colouring. Nano-titanium dioxide, for example, is used to provide a self-cleaning effect in paint.

Naturally occurring inorganic fillers

Traditional fillers are permitted. Naturally occurring fillers, e.g. from chalk, marble, dolomite and limestone, are exempted from registration in accordance with Annex V, point 7 of REACH, as long as these fillers are only physically processed (ground, sieved and so on) and not chemically modified. An exemption for inorganic fillers has been added as long as they are covered by Annex V, point 7 of REACH.

Synthetic amorphous silicon dioxide

Synthetic amorphous silica (SAS) is a manufactured silica (SiO2) that has been used in industrial, consumer and pharmaceutical products for decades[45]. SAS is a nanomaterial according to the European Commission's definition and is exempted from the requirement due to a lack of alternative substances.

Polymer dispersions

Polymer dispersions have also been exempted from the requirement. In the follow up report from the EU Commission[46] to the second "Regulatory Review on

[40] Hynes J, Novotný T, Nic M, Kocurkova L, Prichystalová R, Brzicová T, Bernatikova S (2018) Literature study on the uses and risks of nanomaterials as pigments in the European Union. European Chemicals Agency.
[41] Mackevica A, Hansen, SF (2016) Release of nanomaterials from solid nanocomposites and consumer exposure assessment – a forward-looking review. Nanotoxicology, 10(6), 641–653. https://doi.org/10.3109/17435390.2015.1132346
[42] Nowack B, Hincapié I, Sarret G, Larue C, Legros S (2013) Environmental fate of nanoparticles from façade coatings. NanoHouse Dissemination report Nº 2013-03. https:// DOI: 10.13140/2.1.2206.3040
[43] Industrial Organic Pigments; W. Herbst, K. Hunger; Third edition 2004; pp. 120–124
[44] Coatings Handbook; Thomas Brock, Michael Groteklaes, Peter Mischke; 2000; p. 128
[45] https://www.asasp.eu/images/Publications/Nano_-_SAS_factsheet_-_201209.pdf
[46] 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

Nanomaterials" from 2012[47] 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 is therefore chosen to explicitly mention that polymers are exempted from the definition in paint and varnishes.

O29 Volatile organic compounds

Volatile organic compounds (VOC), including volatile aromatic compounds (VAH), may be present in the chemical product to a maximum of 1% by weight.

VAHs may be present in the adhesive to a maximum of 0.1% by weight.

Exemptions:

- Chemicals used for surface treatments are exempted from the requirement and must instead fulfil requirement O33.
- In adhesives volatile organic compounds (VOC), including volatile aromatic compounds (VAH), may be present to a maximum of 3% by weight.
- Resin used in the production of laminate is exempted from the requirement provided that the laminate flooring meets the emission requirements O34 and O40.

Volatile organic compounds (VOC) are defined as any organic compound having an initial boiling point less than or equal to 250°C measured at a standard pressure of 101.3 kPa. This definition is the same as in the Paints Directive (2004/42/EC).

✉ Declaration from the adhesive manufacturer/supplier that the requirement is fulfilled, in accordance with Appendix 6.

Background

Volatile organic compounds (VOC) are of particular concern due to their inherent properties. They can be absorbed through the lungs and skin and cause damage to various organs. Prolonged exposure to certain organic solvents can cause chronic damage to the brain and nervous system, while other organic solvents can cause cancer or reproductive damage. Nordic Ecolabelling therefore limits VOC levels in adhesives. Resin used in the production of laminate is exempted from the requirement, but the laminate must meet later requirements for VOC emissions to ensure that the resin cures properly.

O30 Free formaldehyde

The content of free formaldehyde (from formaldehyde not deliberately added or from formaldehyde-releasing substances) must not exceed 0.02% by weight (200 ppm) in the chemical product.

For adhesive products, up to 0.2% by weight (2000 ppm) of free formaldehyde is permitted. The requirement applies to the pure adhesive before mixing with any hardener.

Resin used in the production of laminate is exempted from the requirement if the laminate fulfils requirement concerning emissions of formaldehyde (see requirement O34 and O40).

[47] 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

✉ A declaration from the manufacturer/supplier of the chemical product that the requirement is fulfilled, in accordance with Appendix 6.

Background

Formaldehyde is a toxic and allergenic substance (H317) that has carcinogenic effects (H351). Some free formaldehyde is permitted as an impurity and in adhesive, as it is difficult to avoid this. The purpose of the requirement is to restrict the content of formaldehyde in products in order to limit formaldehyde emissions. Nordic Ecolabelling does not want to request a specific test for this, because that would be too extensive and costly for each chemical product. Nordic Ecolabelling wants to be able to ask for a test if there is any uncertainty about the declaration.

Most of the formaldehyde present in adhesives occurs as free formaldehyde. However, formaldehyde can also originate from the components in the adhesive (such as preservatives). Adhesives emit formaldehyde during both polymerisation and the curing phase. Free formaldehyde reacts when the adhesive is applied to wood or other components, and when the adhesive has cured/dried formaldehyde can be released through degradation processes. It is possible to control and set requirements for the amount of free formaldehyde in the adhesive, in a mixture or in dried glue, but not for what actually occurs when the adhesive is applied to a surface. This is chiefly because neither the adhesive manufacturer nor Nordic Ecolabelling are able to control or influence the choice of wood/material to which the adhesive is applied

4.6.2 Requirements specific to Surface treatments

O31 Application method and quantity applied – surface treatment

The following information must be given for each surface treatment system used:

a) Name of surface treatment product and manufacturer of surface treatment product

b) Quantity applied (g/m^2), number of coats and application method(s) used

c) The following efficiency rates must be used when calculating VOC quantities in subsequent requirements:

- Automated spray with no recycling: 50%
- Automated spray with recycling: 70%
- Spray application, electrostatic: 65%
- Spray application, bell/disk: 80%
- Roller coating: 95%
- Curtain coating: 95%
- Vacuum coating: 95%
- Dipping: 95%
- Rinsing: 95%

The efficiency rates are standard values. Other efficiency rates may be used if they can be documented.

✉ Description from the performer of the surface treatment of each surface treatment system used, in line with the requirement.

Background

Information about applied quantities, number of coats and method of application is required to calculate applied quantities of VOCs in subsequent requirements.

O32 Environmentally harmful products and substances in surface treatments

Chemical products used in surface treatment systems (e.g. fillers, oils, stains, lacquers) must fulfil one of the following two alternatives.

a) None of the chemical products are classified as environmentally harmful according to the table below.

or

b) The quantity of environmentally harmful substances applied in the surface treatment system may be no more than 60 g/m^2, calculated in a wet state.

UV-curing surface treatment products are exempted from a) and b) if the requirement O24 is fulfilled.

If alternative b) is used, the formula below must be used first to calculate the amount of environmentally harmful substances in the respective surface treatment product (%):

100*H410 + 10*H411 + H412

H410 is the concentration of substances classified as H410 in percent.

H411 is the concentration of substances classified as H411 in percent.

H412 is the concentration of substances classified as H412 in percent.

All environmentally harmful substances that are present in the unhardened chemical products, and are classified according to the table below, are to be included in the calculation.

Hazard class	Hazard category and hazard phrase in line with CLP Regulation 1272/2008
Toxic to aquatic organisms	Chronic 1 with H410
	Chronic 2 with H411
	Chronic 3 with H412

The quantity of environmentally harmful substances applied in the coating system is then calculated as follows:

$$\text{Applied quantity of respective product (g/m2)} \times \frac{\text{Proportion of environmentally harmful substances in product (\%)}}{\text{Surface treatment efficacy (\%)}}$$

When calculating quantity applied, the same efficacy rates are used as those stated in O31.

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

For tinting systems, a worst-case calculation is made for the colour with the most tinting paste in the base paint containing the most environmentally harmful substances.

✉ A safety data sheet for all chemical products in compliance with current European legislation (Annex II of REACH, Regulation (EC) No. 1907/2006).

- ✉ Alternative b) requires a declaration from the manufacturer/supplier of the surface treatment product stating the content of environmentally harmful substances. Appendix 6 can be used. For each constituent classified substance, the concentration in the chemical product must be stated as a percentage by weight. Confidential details from the chemical manufacturer in the form of content declarations/formulations can be sent directly to Nordic Ecolabelling.

- ✉ Alternative b) requires details of the number of coats, the application method and the quantity applied per coat, stated as g/m^2 flooring. Appendix 7 can be used.

Background

The various types of floor covering are often surface treated to ensure a durable, easy to clean surface. Wood flooring in particular is often supplied with a surface treatment to ensure a hard-wearing surface, and thus a long service life for the floor. The surface treatment largely takes the form of water-based lacquers, acid cured lacquers, UV lacquers and oils. Within the lacquers there are primers, sealants, undercoats and top coats that are used alone or together in systems.

The weighting factors for environmentally harmful substances are drawn from chemicals legislation and are a good way of balancing the different degrees of potential environmental harm: H410 is weighted with a factor of 100 since it is the most environmentally harmful, H411 is weighted with a factor of 10 and H412, which is the least environmentally harmful, is multiplied by a factor of 1, i.e. no weighting is applied.

The classification H400, which is acutely toxic to aquatic organisms (not chronically), ought not to be relevant for products for the surface treatment of floor coverings. This classification is used where there is a clear risk of major concentrated emissions on site or where products for industrial cleaning, decreasing etc. reach the drainage system and/or surface water. The classification H413 (suspected harmful to aquatic organisms) is harmful to such a low extent that it has been excluded from the requirement.

UV products contain acrylates, which are being reclassified as environmentally hazardous or receive stricter classifications. The acrylates change properties in the hardening and bind to the surface coating, so they do not pose an environmental hazard in the finished product. Without the exemption, only UV products with lower concentration of acrylates would meet the requirement. This has negative consequences as it leads to longer curing time and more energy-intensive curing. A surface that has not hardened becomes less resistant, which makes the Nordic Ecolabel's quality and durability requirements more difficult to meet

Furthermore, most of the studies behind the reclassifications of acrylates monomers are conducted by individual manufacturers and lead to a so-called “self-classifications”. “Self-classifications” are to be opposed to harmonised classifications which are legally binding for all manufacturers in the EU. “Self-classifications”, until they become harmonised, can be seen as voluntary scientific contributions. Chemical product manufacturers do not have steerability over these but can choose to bend the rules by buying acrylate monomers from manufacturers not using the same scientific data. In this case, to avoid unfair comparisons between chemical products manufacturers, and because of the

arguments previously mentioned, it was suggested to grant an exemption to acrylate monomers in UV curing systems provided they fulfil the more risk-based requirement included in O24 Classification of chemical product.

O33 Quantity of applied volatile organic compounds (VOC) in surface treatments

In each surface treatment system, the chemical products used must not lead to a total amount of applied VOCs exceeding 2 g/m² treated surface.

The applied amount of VOCs is calculated using the following formula:

$$\text{Applied quantity (g/m2)} \times \frac{\text{Proportion VOC in surface treatment (\%)}}{\text{Surface treatment efficacy (\%)}}$$

It is the VOC content of the chemical products in their uncured form that must meet the requirement. If the products require dilution, the calculation must be based on the content in the diluted product.

✉ Safety data sheet for each chemical product used in the surface treatment system in compliance with current European legislation (Annex II of REACH, Regulation (EC) No. 1907/2006).

✉ Declaration from the manufacturer/supplier of the chemical products in the surface treatment system, detailing the amount of VOCs in each product, in accordance with Appendix 6.

✉ A calculation from the performer of the surface treatment showing that the requirement is met, appendix 7 can be used.

Background

The reason for this requirement is that VOCs contribute to the formation of ozone and have adverse health effects in the workplace and the indoor environment.

4.6.3 Occupational hazard

O34 Emissions to air from production of laminate

This requirement is automatically fulfilled if the laminate used in the floor covering is Nordic Swan Ecolabelled in accordance with the criteria for Panels and mouldings for interior use, generation 7 or later (see requirement O14).

Laminates produced with resins containing formaldehyde and phenol must adhere to the following hygienic limit values for emissions to air in the workplace*:

- The average value during an 8-hour period must not exceed:
  - 0.3 ppm (0.37 mg/m³) for formaldehyde
  - 2 ppm (8 mg/m³) for phenol.
- The average value during a reference period of 15 minutes must not exceed:
  - 0.6 ppm (0.74 mg/m³) for formaldehyde
  - 4 ppm (16 mg/m³) for phenol.

** If the legislation in the country in question has lower limit values than those stated in the requirement, the legal limit values must be fulfilled.*

✉ Test report showing compliance with the requirement. The report shall contain information about measurements, sampling programs, measurement methods and measurement frequency. For analysis methods, see Appendix 1.

✉ Alternative documentation showing the legal requirements of the country in which production takes place. If the legislation in the individual country has lower limit values than those stated in the requirement, no further documentation is necessary.

Background

Laminate consists of kraft paper and decor paper impregnated with resins containing phenol, formaldehyde and other substances. During the manufacturing process for the laminate, before the resin has fully cured, emissions to air of phenol and formaldehyde occur. The aim of the requirement concerning hygienic limit values for emissions to air in the workplace is to ensure that the air is measured and that levels are low. The limit values are at the same level as the legal requirements in Sweden and Germany, for example, and those set out by the EU Scientific Committee on Occupational Exposure Limits (SCOEL).

O35 Polyurethane

Protective measures must be taken to reduce workers exposure as much as possible when handling isocyanates and, when manufacturing and/or welding polyurethane-based (e.g., thermoplastic polyurethane) floor coverings or flooring underlays.

The Workplace Exposure Limits for air* concentrations of isocyanates in areas where employees are working without protective equipment are:

- MDI (CAS No. 101-68-8): Average over an 8-hour period must not exceed 0.005 ppm (0.05 mg/m3)
- TDI (CAS No. 584-84-9 and 91-08-7): Average over an 8-hour period must not exceed 0.005 ppm (0.04 mg/m3)

**If the legislation in the individual country has lower limit values than stated in the requirement, it is the limit values of the legislation that must be met.*

✉ A description of the safety measures taken and the statutory Workplace Exposure Limits for isocyanates in the country of manufacture of the polyurethane material. If the statutory limits are the same or more stringent than the threshold limit values in the requirement, no further documentation is required. If the statutory limits are less stringent, a description of how air concentration levels of isocyanates are measured must be submitted, along with a test report showing compliance with the threshold limit values specified in the requirement.

✉ A description of the safety measures taken when manufacturing as well as welding/installing the polyurethane-based product must be provided by the manufacturer.

Background

Polyurethane is formed through polyaddition between isocyanates and polyol. The isocyanates that are used for the manufacture of polyurethane foam are MDI (CAS No. 101-68-8) and TDI (CAS No. 584-84-9 and 91-08-7). Both these isocyanates are suspected of causing cancer and may cause sensitisation by inhalation and contact with skin. From an occupational health and safety

perspective, MDI is slightly better but gives the foam other technical properties and it is therefore not possible to completely replace TDI with MDI. Among other things, MDI gives the foam a higher density.

Polyurethane as a material is harmless, however if it is heated and reaches a certain temperature, it can start releasing isocyanates and it is important to limit worker's exposure to them. Hence, a description of the safety measures taken to minimise employee's exposure at the polyurethane manufacturing plant is required, and the hygiene threshold limit values for TDI and MDI must be observed. The threshold limit values set in this requirement are the same as those in the Norwegian Labour Inspection Authority's Regulations on measures and threshold limit values.[48] It is also required that the polyurethane-based floor covering manufacturer sends a description of the safety measures taken when manufacturing the product and when the installer welds it.

4.6.4 Energy and Waste

O36 Energy mapping

Flooring underlays composed of 100% pre- and/or post-consumer materials are exempted from this requirement.

An energy audit according to standards ISO 50002 or EN 16247-1 or equivalent, and an energy mapping of the floor covering or flooring underlays manufacturing plant must be conducted by a third party, alternatively verified by a third party.

Furthermore, an action plan resulting from the energy mapping/audit and with purpose to reduce energy consumption must be developed by a third party or verified by a third party.

If a new energy audit and a new energy mapping must be conducted again during the validity of the criteria, new action plans or other up-to-date documents must be sent anew as well. It is the license holder's responsibility to make follow-up plans so that this requirement is always fulfilled.

✉ The energy mapping report and the action plan for the floor covering or flooring underlays manufacturing plant must be sent as well as documentation that they have been done by a third party or alternatively verified by a third party. Documentation created to obtain energy management system certification ISO 50001 can also be sent as an alternative.

Background

Because the production of flooring is energy intensive, a requirement has been introduced to push the manufacturers towards reducing their energy consumption. Through energy mapping and energy audits, energy action plans can be implemented to identify issues related to low energy efficiency. They allow to set goals that can be considered as proven energy reduction commitments. By working with certifications of the manufacturing plant in accordance with e.g., ISO 50001, or other acknowledged energy assessment standards, the plant is recognized as working with international climate goals to reduce its energy demand and/or implement energy efficient measures by introducing operational changes.

[48] https://www.arbeidstilsynet.no/regelverk/forskrifter/forskrift-om-tiltaks--og-grenseverdier/8/1/

Moreover, requirement O37 energy consumption demands that a certain quantity of data and information is collected. The collection and its verification by both the applicant and the application handler can become time-consuming. An energy mapping performed by a specialised third party allows trustworthy and efficient data extraction, and open possibilities to set more comprehensive energy requirements in the future.

O37 Energy consumption

Flooring underlays composed of 100% pre- and/or post-consumer materials are exempted from this requirement.

An energy calculation is to be made according to the equation below:

$$E = \frac{A}{20} + \left(5 - \frac{B}{3\ (kWh/m^2)}\right) + \left(5 - \frac{C}{3\ (kWh/m^2)}\right)$$

The E score must reach at least:

- E shall be at least 11.0 for solid wood flooring, parquet flooring, bamboo flooring and cork flooring/underlays.
- E shall be at least 10.0 for laminate flooring and hybrid flooring.
- E shall be at least 9.0 for linoleum flooring, plastic flooring and underlays.

The E score does not have any measurement unit.

The following applies for the individual energy components:

Environmental parameters	Requirement / limit value
A = Proportion of renewable fuel (%)*	Minimum 25%
B = Purchased electricity	Maximum 15 kWh/m^2 per year
C = Fuel consumption	Maximum 15 kWh/m^2 per year

**Renewable fuel must not be based on palm oil, including by-products, residues and waste fractions from palm (e.g., Palm Fatty Acid Distillate: PFAD).*

The requirement for energy consumption includes all the floor covering or flooring underlays manufacturing plant's purchased energy in kWh per m² of product produced per year. The unit kWh/m² was chosen but it can be converted as follows: 1 kWh = 3.6 MJ.

An indicative list of activities that must be included and may not be included in the calculations of the energy consumption can be seen in in Appendix 8. Appendix 9 lists the heating values, i.e., energy content, of different fuels. A licence applicant/holder may also use its own specific fuel values.

Manufacturers that sell surplus energy, in the form of electricity, steam or heat, must deduct the quantity sold from the electricity consumption figure, or the fuel consumption figure respectively. Only fuel and electricity that is consumed in the manufacture of the floor coverings or flooring underlays may be included in the calculation.

Renewable electricity generated onsite (from solar PV panels, wind turbine or geothermal powerplant) is not purchased and may be left out from the calculations of B and E. Onsite means on the property or immediate vicinity of the manufacturing site.

✉ State which types of fuel have been used in the manufacture of the floor covering over the past year, and which fuels are renewable. In cases biodiesel or bioLPG is used as renewable fuel, it must be documented that it is not based on palm oil nor PFAD. State how much electricity has been used and how much floor covering or flooring underlays (m^2) has been produced over the past year. Appendix 8 can be used.

☒ State if an energy surplus has been deducted from the plant consumption. State how much renewable electricity is generated onsite (e.g., from solar panels, wind turbine and geothermal powerplant). Data from the energy mapping performed by a third party according to requirement O36 can be used. Appendix 8 can be used.

☒ Enclose the detailed calculations of A, B, C and E. Examples of calculation can be found in Appendix 10. The energy content of different fuels can be found in Appendix 9.

Background

The production of floor coverings comprises many steps that can be highly energy demanding and energy consumption is directly linked to the emission of greenhouse gases. Furthermore, whether the energy comes from renewable sources or is of fossil origin can have a great influence on the quantity of emission released into the atmosphere. Increasing the share of renewable energy/fuel used, lowering the overall energy consumption and having an energy efficient production reduces the overall environmental impact of the flooring production by diminishing its contribution to climate change. There is generally high environmental relevance (see RPS analysis) in setting requirements for energy consumption, for both ingoing materials and the final flooring product itself. As the manufacturing processes can differ from a flooring type to another, different limit values to fulfil the energy consumption requirement have been set. This enables direct energy efficiency comparisons between production lines within each flooring type.

The energy requirement comprises two parts. One part contains requirements for the use of electricity, fuel and renewable fuel. The other sets out a certain score that must be achieved in the energy formula. The energy requirement promotes low energy consumption in terms of electricity and fuel through limit values (the maximum fuel consumption has been tightened from 30 kWh/m^2 to 15 kWh/m^2), as well as a minimum fixed share of renewable fuels (25%). Renewable fuel is defined as non-fossil fuels (peat is not considered to be renewable). In this requirement, no account is taken to purchased "green electricity", i.e., renewable electricity traced with for example Guarantees of Origin or RECs (Renewable Energy Certificates). The reason is that Nordic Ecolabelling has not found enough evidence that purchasing green electricity leads to increased amount of renewable electricity in the energy system.[49,50] However, the requirement can be easier to meet if electricity produced from renewable energy is generated on-site.

The formula is designed such that a maximum total "E" is achieved as follows:

$$E = \frac{A}{20} + \left(5 - \frac{B}{3\ (kWh/m^2)}\right) + \left(5 - \frac{C}{3\ (kWh/m^2)}\right)$$

The E score does not have any unit. The mathematically correct equation can be seen above but has been simplified in the requirement to avoid confusion. Each term/subcomponent may be a maximum of 5. Each subcomponent contributes equally to the total E, making them all equally significant. This means that the

[49] Creative accounting: A critical perspective on the market-based method for reporting purchased electricity (scope 2) emissions - ScienceDirect
[50] Utredning-om-opprinnelsesgarantier-og-varedeklarasjoner-for-strom.-Endelig-rapport.pdf (osloeconomics.no)

lower energy consumption and the higher the proportion of renewable fuel are, the higher the E-score becomes. The functional unit for this product group being 1m^2, the data that must be reported to calculate factors B and C must have for unit kWh/m^2.

A table prior to the energy requirements clarifies which processes/steps are to be included in the energy consumption calculations. Since the further back in the supply chain the process is, the lesser the steerability becomes, it was decided to exclude all steps coupled to raw material extraction from the calculations. Meaning that energy consumption of processes associated with wood and crops harvesting as well as oil extraction may be disregarded when performing the calculation. Following the same reasoning, processes occurring at the end of the production line such as surface treatment and packaging must be included, as steerability is considerably higher.

For the sake of harmonization, it is required to include the energy consumption to manufacture the main binder in a plastic flooring or the main binder/HDF in a hybrid flooring. The same way it is required to take into consideration the energy consumption to manufacture the HDF in a laminate flooring or the different wood layer in a parquet into the calculations. However, as energy consumption of the manufacture of bought-out parts/layers that stands for less than 5 w% of the final floor covering may not be included in the calculations, energy consumption for the manufacture of structural and decorative papers in laminate flooring may be disregarded. Energy consumption in the manufacture of chemical products such as adhesives and lacquers may also be disregarded from the calculations.

Underlays are mostly products made from plastic polymers or renewable material such as cork and that is why, the same E-score limit value as the floor coverings of the same materials has been set. Moreover, because such products are not often produced by flooring manufacturers themselves, a derogation from this requirement has been implemented if the underlay is made of 100% recycled material.

It is often impossible to separate out energy consumption and ascribe it to a particular floor covering, since it applies to the whole factory. This means that the energy consumption data on which the requirement is based, and which is to be used for licensing is an annual average and is not necessarily the specific energy consumption linked to the particular Nordic Ecolabelled floor covering(s). Consequently, this requirement will be fulfilled only by the best factories in terms of energy consumption/efficiency.

O38 Handling of waste and production waste

The floor coverings or flooring underlays manufacturer must sort waste at source into the fractions that arise during production, including production waste.

Hazardous waste must be treated and dealt with in accordance with the regulations applicable in the country of manufacture.

Furthermore, a plan for handling waste must be drawn up and must include:

- The different waste fractions,
- Initiatives taken to reduce waste generation and to improve production efficiency,

- As well as a description on how the waste is dealt with (e.g., recycling, landfill and incineration). However, production waste must not be landfilled.

🔑 Requirement is also checked on site.

✉ Declaration of hazardous waste, if applicable, and a statement on how hazardous waste is handled in accordance with the regulations applicable in the country of manufacture. Waste handling plan featuring waste fractions, initiatives taken and how the waste fraction is dealt with. Alternatively, an ISO 14001 certificate for the manufacturing plant and an Eco-Management and Audit Scheme (EMAS) certificate for the company can be sent to show compliance with this requirement.

Background

The requirement concerning waste management includes requirements for generally good waste management. It is based on legislation in the Nordic countries, which discourages the use of landfill. Environmental and commercial/economic drivers steer companies towards material recovery or energy recovery from the waste, where possible. Hence, the waste requirement is judged to be fit for purpose in its revised form.

To further support/acknowledge manufacturers working with management systems, documentation showing that the plant is certified according to ISO 14001 as well as a certificate attesting that the company follow the Eco-Management and Audit Scheme (EMAS).

4.7 Packaging

O39 Packaging

The requirement applies to disposable packaging used for packaging of the individual product.

The following materials are prohibited in packaging:

- chlorinated polymers / plastics such as PVC
- metal*

** Exceptions are given for staples.*

The following applies to cardboard/paper and plastic:

- A minimum of 50% by weight of cardboard and paper must consist of recycled* material.
- A minimum of 50% by weight of plastic must consist of recycled* material.
- Plastic that is used must be able to be recycled in today's recycling systems.

** See section 4.2 Definitions.*

✉ Description showing that no disposable packaging is used or declaration from the manufacturer of the flooring product that PVC or metal has not been used in the packaging.

✉ For cardboard/paper: declaration from the supplier of the cardboard and paper packaging that a minimum of 50% by weight consists of recycled material.

✉ For plastic: declaration from the supplier of the plastic packaging that a minimum of 50% by weight consists of recycled material.

✉ For plastic: state the type of plastic used in the packaging.

Background

For a ban on chlorinated plastic, see O5 (PVC is also banned in the product). Nordic Ecolabelling does not want metal to be used for packaging as metal production is associated with a large climate and environmental impact. Exceptions are for any staples that can be used to staple cardboard or plastic together. Nordic Ecolabelling generally wants to stimulate the use of recycled materials and materials that can be recycled. Cardboard and paper can be recycled, but not all types of plastic can. Examples of plastic types where there are good material recycling systems today are Polyethylene (PE), Polypropylene (PP) and Polyethylene terephthalate (PET). Degradable/compostable plastic cannot be recycled in current systems, which means that e.g. PLA plastic cannot be used.

4.8 Use-phase requirements

4.8.1 Emission

O40 Emissions from floor coverings and flooring underlays

Emissions from floor coverings and underlays must not exceed the limit levels in the table below. The tests shall be carried out in accordance with the test method EN 16516 or ISO 16000-9 and on the final product.

Type of floor covering	**TVOC (C6-C16)** (mg/m^3)	**SVOC (C16-C23)** (mg/m^3)	**Formaldehyde** (mg/m^3)	**Carcinogenic VOC in category 1A and 1B** (mg/m^3)
Bamboo flooring, cork flooring and cork-based underlays	0,3	0,03	0,02	0,001
Solid wood flooring	0,3	0,03	0,02	0,001
Hybrid flooring and other underlays	0,2	0,02	0,01	0,001
Multi-layer wood and wood veneer flooring	0,1	0,02	0,02	0,001
Laminate flooring	0,1	0,02	0,02	0,001
Linoleum flooring	0,05	0,01	0,01	0,001
Plastic flooring and plastic underlays	0,02	0,01	0,01	0,001

Limit value after 28 days according to EN 16516 or ISO 16000-9. If the limit values in the table are met for a period shorter than 28 days, this is accepted.

Other analysis methods than those stated in the requirement may be used, provided that the correlation between the test methods can be verified by an independent third party.

✉ Analysis report, including measurement methods, results, and measurement frequency. It must be clearly stated which method/standard was used, the laboratory that conducted the analysis, and that the analysis laboratory is an independent third party, please refer laboratory requirements in Appendix 1.

Background

The requirement was introduced in the previous generation of the criteria since building materials can have a major impact on the indoor environment of a building. Since underlays are now included in the product group the emissions requirement also applies to underlays.

The requirement states the limits for emissions of TVOC (Total Volatile Organic Compounds), SVOC (Semi Volatile Organic Compounds) and formaldehyde for different materials used in floorings. In this revision, the emission limits for wooden flooring are differentiated according to the type of wooden floor (solid wood, parquet etc.), and limit values are introduced for bamboo, cork, hybrid and laminate flooring.

Except for TVOC limit for solid wood, all limit values have been tightened. The tightening is based on a review of results from emission testing of Nordic Swan Ecolabelled products and the limit values of other certification schemes like EU Ecolabel and BREEAM-NOR v.6.0. All TVOC, SVOC and formaldehyde limit values are equal to or below the limit values required for building products by BREEAM-NOR v.6.0 Exemplary level which is their strictest emission level. This means that all Nordic Ecolabelled wood floorings fulfil the emission requirements from the latest standard BREEAM-NOR v.6.0.

Formaldehyde levels are reduced from respectively 0,06 and 0,03 mg/m^3 down to 0,02 or 0,01 mg/m^3 depending on material. The formaldehyde limit level stated in the EU taxonomy is 0,06 mg/m^3. It is unclear whether floorings are covered by the taxonomy requirement and which test standards will be allowed for formaldehyde testing. Nordic Ecolabelling is following the ongoing work with the EU taxonomy. A requirement for testing of category 1A and 1B carcinogens is included in the EU taxonomy and such a testing requirement is therefore added in this generation of the criteria. Testing of emissions might be done according to the test method EN 16516 or ISO 16000-9 as in the previous generation of the criteria. Our license holders are using both methods. Both methods are also acceptable within BREEAM-NOR v.6.0.

4.8.2 Quality and durability requirements

O41 Product performance – third-party verification

For products not covered by a harmonised product standard (e.g., flooring underlays) the features and functions for which they are marketed for must be documented. One of the following options must be chosen:

- voluntary CE marking and declaration of performance according to an ETA (European Technical Assessment), or
- as an alternative to an ETA, the properties of the product can be declared via a corresponding third-party verification of the product's performance. Third-party verification must be approved by Nordic Ecolabelling.

✉ A declaration of performance must be submitted in accordance with an ETA or other third-party verification of the product's performance.

Background

Generally, manufacturers producing products covered by a harmonised standard in accordance with the Construction Products Regulation (EU/305/2011) can document the features and functions for which the products are marketed for, with, for instance, an example of CE marking and a declaration of performance. Indeed, laminate, linoleum and plastic flooring must follow the standard EN 14041:2004 - Resilient, textile and laminate floor coverings - Essential characteristics. However, wood flooring (solid wood, parquet and veneer) must follow the standard EN 14342:2013 - Wood flooring and parquet — Characteristics, evaluation of conformity and marking.

This requirement ensures that manufacturers producing products (e.g., underlays) which are not covered by a harmonised product standard can document the features and functions for which the products are marketed for, on the basis of standardised test results.

O42 Quality and Durability of floor coverings

Only the requirements associated with the specific type of flooring must be fulfilled.

The floor covering must be tested according to the relevant quality/durability standard(s) mentioned in the table in appendix 11. According to the classification standard from the same table in appendix 11, the floor covering must at least achieve the following use of class named in the table below:

Flooring	Limits
Wood veneer floor covering	— the level of use of class 23 for floorings intended for private use — the level of use of class 32 for floorings intended for commercial use.
Factory lacquer solid and multilayer wood floorings	— the level of use of class 23 for floorings intended for private use and for commercial use (see appendix 12).
Factory oiled, uncoated solid wood and uncoated multilayer wood flooring	
Cork tile floor coverings	— the level of use of class 23 for floorings intended for private use — the level of use of class 32 for floorings intended for commercial use.
Cork floor coverings	
Bamboo floor coverings	— Equilibrium Moisture Content: 8 % at 20 °C and 50 % relative humidity — Resistance to Indentation: ≥ 4 kg/mm2 for plain and side pressed floor coverings ≥ 9,5 kg/mm2 for high density floor coverings
Laminate flooring	— the level of use of class 23 for floorings intended for private use — the level of use of class 32 for floorings intended for commercial use.
Linoleum flooring	— the level of use of class 23 for floorings intended for private use — the level of use of class 32 for floorings intended for commercial use.
Plastic flooring (PVC-free)	— the level of use of class 23 for floorings intended for private use — the level of use of class 32 for floorings intended for commercial use.
Others (e.g., multilayer Modular floor coverings)	— the level of use of class 23 for floorings intended for private use — the level of use of class 32 for floorings intended for commercial use.

Other relevant standards might be accepted if the testing institute is able to provide documentation to show that the chosen test is equivalent and will give approximately the same results.

Testing must be performed by an independent, accredited testing institute. Internal test laboratories can be approved under given conditions, see Appendix 1.

The testing must be carried out in accordance with the applicable version of the standard. If a standard is revised and updated during the period of validity of the license, it is the licensee's responsibility to ensure that the requirements of the new applicable version of the standard are met.

In cases where the floor covering is intended for both private and commercial use, the product must meet the higher requirements, that is the ones that apply to commercial use.

✉ Technical data sheet, declaration of performance or other documents where the parameters, the standards/test methods and the level of use of class are clearly stated.

✉ A test report showing that relevant requirement levels have been met. It must be clearly stated which method/standard was used, the laboratory that conducted the analysis, and that the analysis laboratory is an independent third party. Other analysis methods than those stated in the requirement may be used, provided that the correlation between test methods can be verified by an independent third party.

Background

Increasing the service life reduce drastically the contribution from raw material extraction and production phases to the overall environmental impacts of floor covering. Indeed, less resource (oil, water, energy...etc.) is needed if a floor covering must be changed after 20 years, instead of every 2 years. Many parameters can affect the service life of a floor covering and two of them are, of course, the wear resistance of the top layer and the traffic occurring on them. It is worth noticing that the longer the floor covering's service life is, the larger the contribution of the use phase to the total environmental impact becomes (see Circular requirements).

In addition to the standards for general characteristics named in the requirement for CE marking, there are testing methods listed in European/international harmonised standards for the majority of flooring material types. Depending on the results obtained for each relevant parameter to be tested according to the flooring type specific test standard, the floor covering's use class will be determined.

References are made to the latest versions of the standards and test methods. For instance, veneer floorings must be tested according to standard EN 14354. Parquet floorings must be tested according to standard EN 13489. However, because the regular wear resistance test method for parquet considers only the thickness of the wear layer and the wood species used (according to CTBA's classification based on the Brinell hardness test, see appendix 12), it has been deemed relevant to set additional test requirements, notably on the lacquer used. If the parquet is not lacquered (oiled or unfinished), it must be possible to perform sanding and apply a finish if desired. Indeed, to comply with standard EN 13489, a parquet must be capable of undergoing renovation at least twice (see requirement on product information). For almost all flooring types, the most

important parameters for good durability as well as some additional parameters proving good quality have been identified and are required to be tested according to the right standard. For instance, laminate flooring, which are known to be sensitive to humidity, must be tested according to ISO 4760 (water tightness/topical water resistance).

The durability of bamboo floorings is not standardized. In this case, the industry reports the characteristics of the bamboo flooring (test results and test methods) without classifying the flooring. Due to the lack of standards, industry can adapt standards developed for other types of floorings to their necessities (e.g., FprEN 1534) or carrying out their out measurements, leading to different measures that are not comparable. Setting a minimum performance, is therefore, extremely difficult. If there is no harmonised European test standard, such as for bamboo flooring, floor coverings can be tested according to a test method chosen by an independent testing institute with the competence to conduct wear tests on flooring.

The different use classes are listed in the classification standard EN ISO 10874. This way, the use classes give the user a quick overview of the flooring material's durability and suitability for different environments (i.e., different traffic intensity). The use classes are divided into Domestic, Commercial and Light Industrial, with 3-4 intensity levels in each class (see table 2 in Appendix 11).

Nordic Ecolabelling requires that the floor covering at least reaches the use class of 23 if intended to use in private homes or, 32 if used in area with higher traffic.

O43 Quality and Durability of flooring underlays

Underlays must follow the standards for testing stated in the relevant technical bulletin, and meet the requirements listed in the table below.

Testing must be performed by an independent, accredited testing institute. Internal test laboratories can be approved under given conditions, see Appendix 1.

The testing must be carried out in accordance with the applicable version of the standard or technical bulletin. If a technical bulletin or standard is revised and updated during the period of validity of the license, it is the licensee's responsibility to ensure that the requirements of the new applicable version of the standard or technical bulletin are met.

If the underlay is intended to be used underneath several different types of flooring, only one of the relevant bulletins can be chosen to prove its good performance.

Underlay type	Standards/Technical Bulletin	Requirement level
Underlay materials under wood flooring. (Flooring types EN ISO 14354 and EN ISO 13489)	Technical Bulletin from European Parquet Federation (FEP).[51] The test methods are described in the standard EN 16354 "Laminate floor coverings - Underlays - Specifications, requirements and test methods".	Underlays intended for private use must fulfil the minimum requirements.
Underlay Materials under Laminate Floor Coverings.	Technical Bulletin from European Producers of Laminate Flooring (EPLF).[52]	

[51] https://drive.google.com/file/d/1g82Y5cBEWFVZjumWXdgq9Eh1ltE4Vt9R/view
[52] https://eplf.com/storage/files/tb_-_eplf_underlay_materials_under_laminate_floor_coverings_2019-02_en_.pdf

(Flooring type EN 13329)	The test methods are described in the standard EN 16354 "Laminate floor coverings - Underlays - Specifications, requirements and test methods".	Underlays intended for commercial use must fulfil the higher requirements.
Underlay Materials under Multilayer Modular Floor Coverings. (Flooring types EN 16511).	Technical Bulletin from Multilayer Modular Flooring Association (MMFA).[53] The test methods are described in the technical bulletin.	

In cases where the underlay product is intended for both private and commercial use, the product must meet the higher requirements, that is the ones that apply to commercial use.

The performance of underlay materials used under other flooring types (e.g., plastic and linoleum floorings) must be tested according to test methods described in a relevant standard or selected by an independent test institute. The selected test method must consider the intended use area of the floor. For instance, corkment underlays must follow the standard EN 12455.

✉ Technical data sheet, declaration of performance or other documents where the parameters, the standards/test methods and the level of use of class are clearly stated.

✉ A test report showing that relevant requirement levels have been met. It must be clearly stated which method/standard was used, the laboratory that conducted the analysis, and that the analysis laboratory is an independent third party. Other analysis methods than those stated in the requirement may be used, provided that the correlation between test methods can be verified by an independent third party.

Background

Underlays, or underlayment, are products installed directly underneath the floor covering and intended to enhance the properties of the whole construction (floor covering + underlays). Through different properties such as, vapour barrier or click support, they can extend the service life of the floor covering. They can also improve the consumer's life quality because of their ability to level out irregularities and their intrinsic sound dampening properties.

As it is also important that the underlays is of good quality, a standard including test methods for many different parameters has been developed. This standard is EN 16354 and is intended for underlays used under laminate floorings. However, several trade associations such as EPLF (European Producers of Laminate Flooring), FEP (European Parquet Federation) and MMFA (Multilayer Modular Flooring Association) has created technical bulletins or guidelines on how to test underlays, all based on standard EN 16354 ("Laminate floor coverings - Underlays - Specifications, requirements and test methods"). These technical bulletins all contain a table that state what requirements and which level can be set. Nordic Ecolabelling set the highest requirements on underlays intended to be used in commercial area while underlays used under a consumer's floor need to fulfil the minimum requirements.

However, the choice of underlay can depend, for instance, on the kind of substrate (concrete, wood-based…etc.) on which the underlay and floor is

[53] https://mmfa.eu/wp-content/uploads/2020/12/TB1-Underlay-Materials-under-MMF-Floor-Coverings_2020-12_EN.pdf

installed. Meaning, there does not have to be a direct correlation between a specific flooring and a specific underlay product. Moreover, not all trade associations have written their own technical bulletin or guideline on underlays. That is why, for underlays that may be used under plastic or linoleum flooring, there is the possibility of testing according to a test method described in a relevant standard or selected by an independent test institute. Corkment underlays, that are usually used under plastic and linoleum flooring, must follow the standard EN 12455.

O44 Wet room approval

Floor coverings marketed and sold for wet rooms are to be approved for their intended use in wet rooms according to the national industry standard:

- approved as a surface layer in wet rooms and/or
- approved as a waterproof barrier in wet rooms, (acting as a barrier behind ceramic materials and natural stone)

Installation instructions tailored to wet rooms are to accompany the flooring and be made available on the manufacturer's website.

✉ Approval according to national industry standards.

✉ Installation instructions that accompany the flooring and are available on the website.

Background

The product information requirement remains unchanged from the previous version, since the requirement is judged to be relevant and fit for purpose. Wet rooms are rooms subjected to water or high relative humidity. Wet rooms are among the most critical rooms in a building, with any imperfections in the waterproofing posing a major risk of moisture damage to surrounding structures. Water damage costs a huge amount every year. Reliable construction solutions and professional performance are essential for problem-free and waterproof wet rooms.

Alongside industry rules on construction, performance and installation, there is an industry standard for approval of flooring materials and waterproof barriers. Wet room approval and approved labelling can be obtained once a product has been tested and judged to meet the requirements in the national industry standard for plastic flooring in wet rooms.

it is important that the fundamental requirements for wet room approval are fulfilled for flooring intended for use in wet rooms. A new requirement has therefore been introduced, such that plastic flooring marketed and sold for wet rooms is to be tested and approved according to national industry standards. These are stated, for example, in:

- Golvbranschens branschstandard för golvbeläggning av plast i våtutrymmen (The flooring industry standard for plastic flooring in wet rooms) (Sweden).

- Gulvfakta utgiven av Gulvbranchen (Flooring facts issued by the flooring industry) (Denmark).

- Anbefalt Våtromsprodukt från FFV – Fagrådet for Våtrom (Wet room products recommended by FFV – Expert Committee for Wet Rooms) (Norway).

The requirement also states that instructions for proper installation in wet rooms are to accompany the product and be available on the manufacturer's website.

4.9 Circular requirements

O45 Warranty and spare parts

Underlays are exempted from this requirement.

Warranty:

A 10 year-warranty must be provided with the purchase of a floor covering.

The warranty must apply from the delivery date and must be communicated to the customer. The warranty must be included in the product price.

By warranty is meant an agreement between buyer and seller that goes beyond the legal guarantee and where the seller/manufacturer must offer to repair or replace parts that are damaged or not working properly.

Spare parts:

For floor coverings sold in planks, in tiles or in any other finished individual items equipped with a click-system, spare parts must be made available at no extra cost within the warranty period of the product (10 years).

The spare part does not have to be identical to the original part but must be able to replace the original part and fulfil its function. Information about spare parts availability must be communicated to the customer.

Information/recommendation of keeping spare floor covering elements in stock for possible event of repair and/or replace/re-install must be provided (See requirement O49).

✉ A copy of the warranty that indicates the terms and conditions of the extended product guarantee shown in the consumer information documentation and meeting the requirement must be provided.

✉ Description of parts that are important for the product's function, which spare parts are offered and how this is communicated to the customer.

Background

A Nordic Swan Ecolabel product must have a good quality, and together with requirements related to durability, warranty is a factor that signals the product's lifetime and says something about what the customer can expect from the product. However, warranty should not be equated with longevity alone, which is affected by many factors, including how careful and often the product is used. A warranty is something that goes beyond the legal warranty and is an agreement between buyer and seller. The legal guarantee is regulated by law in contrast to a warranty. A warranty can be designed in many different ways, but Nordic Ecolabelling has set as a minimum requirement that it must go beyond the legal guarantee and that it must include replacement/repair if something breaks or does not work properly. It is not intended that marks from normal wear and tear should be covered by the warranty. It is important to emphasize that the warranty must cover more than what is covered by the legal guarantee.

The extended warranty of the products should be on the same basis of the mandatory limited guarantee in accordance with the CE marking. Information about the coverage should be indicated. The guarantee is preferable to contain information about who is covered, what the consumers responsibilities under the warranties are, what the company will do if any of the covered events occur, what is not covered and what should the consumers do if they have a problem.

The Nordic Swan Ecolabel can help to influence this in a positive direction by making spare parts available or being able to produce them when needed for at least 10 years after the product has been discontinued. Requirements for warranty and spare parts can stimulate manufacturers to make good quality products and choose suppliers who also supply high quality materials and parts. This is important for the product to have a long lifespan.

O46 Labelling and traceability

To increase the chance of product reuse or recycling of the materials included in the product, certain measures to ensure traceability between the floor covering/underlays and the manufacturer or license holder must be in place.

Labelling:

- Underlays, and floor coverings that are not glue down or that can be loose-lay installed, must be labelled with the name of the manufacturer or the name of the license holder, eventually the name of retailer, the name of the product and a batch code/production code (e.g., on planks or tiles). Marking systems, such as QR code and more advanced technologies are also approved.

Traceability:

- Floor coverings sold directly from Business to Business (B2B): the floor coverings must be fully traceable back to the license holder or flooring manufacturer. A register or a database that keeps track on floor coverings installed in temporary or more permanent buildings projects must exist or be created by the license holder. In cases where the floor covering is purchased by intermediaries and/or via retailers, such as hardware stores, it must be possible for the entrepreneurs (e.g., floor installers) to willingly report to the license holder where the product has been installed so the project can be added to the register or database.

✉ Picture or description of how the labelling is done and explanation on how the traceability between the license holder and the product is ensured.

✉ Floor coverings sold through B2B projects: Extracts from the register or database showing where the Nordic Ecolabel floor coverings are installed must be sent. Routines describing how all installed floor coverings are added to the database or register must be sent and specify how the database or register is made available to floor installers. See example of register in appendix 13.

Background

As stated earlier in the criteria document, a way to drastically reduce the total environmental impact of a product is to reuse previous resources such as pre- or post-consumer recycled material. A way to guarantee access to known resources of good quality is if flooring manufacturers were able to close the materials loop by taking back their own damaged, or even, worn-out products. Furthermore, by taking back their own products, the producers can either further extend the floor lifespan (through repair) or, remove the most environmentally impactful

scenarios from the end-of-use phase (landfill and incineration) if the whole product can be recycled and re-enter the manufacturing process.

There are however many challenges to overcome before a flooring manufacturer can claim to have a fully operational take-back system. The first step that need to be taken is the one guaranteeing full traceability between the product and the manufacturer no matter where or when the flooring is installed. Both time and space parameters add some difficulty. Indeed, floor coverings are intended to have a long service life and can often change ownership especially in some area of use. Finally, there are many actors involved during the whole service life of a flooring and all of them must be informed to ensure that the installed flooring find its way back to the right producer. The fact that some flooring must be glued down, because of higher safety and functionality requirements of some area of use, adds a technical challenge.

In Sweden, the legislation requires that, for each construction project, a journal containing information such as, the product manufacturer, the name of the product, the main components and in some cases their exact place and volume in the building, is created and handled, generally, by the project owner. A similar legislation is to be implemented by Denmark and Norway in the coming years. Finland, however, has not investigated this aspect yet. In Sweden, assessments systems or databases such as Sunda Hus, Byggvarubedömningen or Produktkollen can be used to keep track of the information or documentation provided by the different manufacturers and actors involved in the project. More advanced systems like BIM (building information models) could be used to store this kind of information.

Some work regarding the aspects of traceability and labelling of products is also ongoing at the commission at a European level and is part of the revision of the Construction Products Regulation. The creation of a digital product passport to accompany construction products is one of the new decisions and its development is handled by the CEN standard working group CEN TC 134 / WG10. The standardisation work is also part of an industry initiative called CISUFLO[54] (circular sustainable floor coverings) and has come quite far when it comes to textile floor coverings, according to the information provided by the german certification GUT regarding the project e-PRODIS (PRODuct Information System).[55] However, this work is not expected to be finished before 2025. Regardless, labelling and marking technologies have been developed recently but the marker, chip or code itself is still more difficult to incorporate in glued down floors. That is why, it is required that underlays and not permanently glued down flooring are marked and labelled in a way so that even separate planks or tiles can be sent back to the manufacturers when/if necessary.

Flooring installed in projects where both the flooring manufacturer and the purchaser or procurer are directly in contact can be traceable. Flooring manufacturers can use their databases to keep track of these installed floorings. Flooring traceability becomes more difficult for housing projects where a property owner is the purchaser and most likely the temporary product owner. Traceability becomes even more complicated for the flooring manufacturer when private consumers are involved as they usually buy from retailers. That is why,

[54] https://www.cisuflo.eu/
[55] https://gut-prodis.eu/en/

the requirement states that the manufacturer/license holder must have a database or register listing where the floor coverings sold directly from Business-to-Business, only, are installed. However, it should be possible for flooring installers to willingly report to the license holder where the product has been installed so the project can be added to the register or database.

Both these measures render Nordic Ecolabelled flooring more circular by increasing their chance to find their way back to their manufacturer, despite their long service life.

O47 Reparability

Underlays are exempted from this requirement.

a) For floor coverings that are glued down it must be possible to refurbish/refinish the top layer of the floor covering by sanding followed by reapplying surface coating. A maintenance plan/schedule must be offered to the customer with the purchase of floor covering.

b) For floor coverings that are not glued down, the flooring must be designed for disassembly with a view to facilitate repair, reuse and recycling. Disassembly and replacement operations must be capable of being carried out using common and basic manual tools.

Floor coverings that can be both installed as permanently glued down and in a floating/loose-lay fashion must fulfil both Reparability requirements a) and b).

✉ a) A Description of a generic maintenance plan/schedule stating the different measures that can be taken over the years to prolong the service life of the floor covering must be made available to the customer (see example in Appendix 13). The maintenance plan may be included in the maintenance instructions or any other document providing product information.

✉ b) A copy of the repair document or any other material where the information on design for repair must be provided. Simple and illustrated instructions regarding the disassembly and replacement of damaged elements must be provided.

Background

There are several ways to promote circularity. Processes having the most effects on reducing a product's overall environmental impact from the end-of-use phase tends to have very tight or short material loops. Indeed, processes such as product reuse, renovate and repair comprise few steps, have few stakeholders involved and do not require the use of a lot of resources (e.g., raw materials, energy or water). That is why, circular design, which is about designing a product so that parts can be replaced or so that the product can be more easily repaired/renovated, has been increasingly used by manufacturers.

In the case of flooring, it has been shown that extending their service life by renovation instead of buying new products (linoleum, plastic and wooden floors) leads from 79% up to 90% CO_2-emission savings and from 90% up to 95% energy-savings depending on the product type.[56] Furthermore, the report including these results and written by IVL also mentions the lack of incentive actions from different stakeholders to promote refurbishment over purchasing of new floorings. Nordic Ecolabelling requires that a maintenance plan is offered with the purchase of floor covering. Example on how a rough maintenance plan/schedule could look like can be seen in Appendix 13. The maintenance plan

[56] https://www.ivl.se/download/18.4c0101451756082fbad78/1603698658279/B2385.pdf

can be included in other instruction documents such as the common “Care instructions”.

Floorings that are installed in a floating/loose-lay fashion are usually made of individual components (plank or tiles) equipped with a click or an interlocking system that enables easy separation/disassembly and easy removal from the sub-floor. Nordic Ecolabelling requires a copy of the repair document or any other material with the information on design for repair for the floor covering.

Simple illustrations mean mainly sketches or rough drawings. If the consumer does not feel in the position to carry out the replacement, most of the companies that provide floor coverings have a customer service. Information on how to contact the customer service must be included. This requirement, as well as the requirement for warranty and spare parts, the requirement for labelling and the requirement on product information enable to take into consideration all parameters needed to promote reuse/repair/renovate.

O48 Recyclability

Underlays are exempted from this requirement.

a) The flooring manufacturer must guarantee to recover production waste and take back purchase returns, incorrect deliveries, faulted products and so on. The take back service must be communicated to customers (See O49 product information).

b) For floor coverings other than wood floorings (solid wood, multi-layer wood and wood veneer), the manufacturer must have a technology enabling recycling of the material into new floor coverings. Meaning that in case the flooring cannot be repaired/refurbished anymore, it must be possible to process the removed floor covering so the post-consumer material obtained can be used in the manufacturing of new floor coverings.

✉ a) Description of the processes to reuse production waste and to take back damaged/defective products, incorrect fit or deliveries and so on.

✉ b) Documentation/flow-charts that show how the worn-out and torn-out floor covering can be turned into new floor coverings after reprocessing.

Background

Circular economy does not only mean focus on closed resource loops for the individual product system. Joint circular resource systems may also be the solution. The Nordic Swan Ecolabel shares this approach. Hence, floor covering circularity can be steered by flooring manufacturers not only at the earlier stage of a product’s life cycle, i.e., by designing/labelling/tracking, but also at the production phase and above all, at the end-of-use phase by actually taking back used floor coverings. The former can be addressed by having a plan to recover internally the waste generated during production (material recovery or energy recovery in the case of wood-based floorings). The latter implies to take the steps from producing reparable/recyclable products to actually repair/recycle these. Purchase returns, incorrect deliveries and faulty products can be send back and easily handled by the floor producers. However, it can be a challenge to develop a process to transform worn-out floorings or post-consumer material in new resource of sufficiently good quality so it can re-enter the manufacturing process and be part of new floorings again. Floor manufacturers like Forbo, Unilin or

Tarkett have already developed processes so that their own torn-out floorings or other post-consumer material can be used to make new floors. Nevertheless, the access to these resources is complicated and their quantity in new floor coverings is limited by logistics challenges as well as challenges coupled to material quality/purity.

Nordic Ecolabelling requires that flooring manufacturers have developed a process to reuse/recycle production waste, purchase returns, incorrect deliveries and faulty products, as well as in some cases, worn out products to prove they work with material efficiency and contribute to a more circular industry. This must be communicated to the customer (O49 Product information).

O49 Product information

The Nordic Ecolabelled product must be sold with the relevant consumer information on the packaging or any other documentation accompanying the product. Only the requirements associated with the specific type of product have to be fulfilled.

Recommendations for the installation:

- Recommended upper limit for the subfloor's relative humidity and temperature when laying the floor covering.
- floating installation is recommended whenever possible. Reference must be made to the necessary preparation of the underlaying surface, and the auxiliary materials needed. For instance, suitable Nordic Ecolabelled Flooring underlays are to be recommended, if possible.
- if a glued down installation is recommended due to the possible longer duration, recommendation of using a Nordic Ecolabelled adhesive/glue or a low emission adhesive must be included. Method for in case the flooring must be welded together.
- illustrated assembly and disassembly instructions as stated in the requirement O47 Reparability.

Recommendation for the surface treatment for uncoated floor coverings and floorings needing an oiled surface:

- Recommended type/quantity of oil or lacquer for oiled and untreated wood floorings so they can achieve their intended durability. See requirement Durability of floor coverings O42 for more information.
- Recommended finish products (e.g., oil, lacquer and other surface treatments) in case of flooring refurbishment. If there are suitable Nordic Ecolabel finish products, these are to be recommended.
- information about how the service life of the flooring can be extended through renovation e.g., sanding and surface treatment.

Recommendations for the use, cleaning and maintenance of the product.

- The flooring's areas of use are to be stated. See requirement Durability of floor coverings O42 for more information.
- Recommended cleaning method including cleaning products. If there are suitable Nordic Ecolabel cleaning products, these are to be recommended.
- Maintenance plan/schedule according to requirement Reparability O47.

Information related to reparability:

- Recommended repair methods to restore the floor coverings after having suffered some damage (scratches, broken click, stain, etc…) according to requirement Reparability O47.

- Information about the duration of the extended warranty. Information/recommendation of keeping spare floor covering elements in stock for possible event of repair and/or replace/re-install must be written. See requirement Warranty and spare parts O45 for more information.
- Information on how to contact the customer service should be included in the document. The contact information refers to the phone, email address or even postal address of the license holder/flooring manufacturer.

Information related to end-of-use of the product:

- Instruction on how packaging waste must be sorted.
- Instruction on how the flooring/underlay must be handled or sorted when the customer wants to remove it.
- If there is a take-back system in place, the customer must have the possibility to reach (e.g., via phone number or email address of the customer service) the floor covering's manufacturer and use the system.

✉ Enclose a copy of the product information given to customers.

Background

Nordic Ecollabelling knows that the end-user also has steerability. They often have the will to do the right thing from an environmental perspective and that's why, they should be given the possibility to do so. Hence, flooring manufacturers need to inform them of what actions they can make to either, extend the service life of the product, or to dispose of it in the right manner when it is worn out.

This includes technical instructions and recommendations to ensure the good performance of the product, maintenance and cleaning instructions, repair manuals, general customer service information as well as sorting instructions. It is important that the customer is aware of the flooring manufacturer's sustainability work and service purchased with the floor covering. Extended warranty, possibility to repair/renovate through the creation of a maintenance schedule and possibility to use take-back systems must be clearly communicated.

4.10 Innovation

O50 Innovation

The applicant/manufacturer must fulfil at least two (in total) of the following innovations coupled to the four different areas in the table below:

Area	Requirement
Chemicals	Chemical products, such as adhesives and surface treatment products, used in the production of the Nordic Swan Ecolabel product are Nordic Swan Ecolabel.
	The binder in the chemical product (e.g., adhesive or surface treatment) used in the production of the Nordic Swan Ecolabel product is made of renewable raw materials and fulfil requirements O14.
	None of the ingoing substances that are contained in the chemical products used in the production of the Nordic Swan Ecolabel product are classified as SVHC or CMR.
	The quantity of environmentally harmful substances, calculated in a wet state, applied in the surface treatment system is below than 40 g/m^2.
	The concentrations of substances classified as CMR and/or environmental hazardous, in the final cured/hardened chemical product (such as acrylate monomers and photoinitiators in UV-cured chemical products) used in the production of the Nordic Swan Ecolabel product, is below 100 ppm according to analytical tests performed by a third party.

	The quantity of applied VOCs in the surface treatment system does not exceed 1g/m^2.
	TVOC and SVOC values for the Nordic Ecolabel product are at least 50% lower than the thresholds given in requirement O40.
Raw materials and Biodiversity	100% by weight of the wood raw material, bamboo and cork used in the Nordic Swan Ecolabel product (production line) comes from forests that are managed in accordance with sustainable forestry management principles/recycled wood raw material as defined by FSC or PEFC and is covered by a valid Chain of Custody certificate in accordance with the FSC/PEFC schemes.
	Linoleum, laminate, plastic, hybrid floorings or underlays contain at least 20% pre- and/or post-consumer recycled material.
	All fillers used in plastic, linoleum floorings and underlays are sourced as pre- or post-consumer recycled material.
	None of the additives used in the Nordic Ecolabel product are classified as environmentally hazardous according to CLP.
Climate	The action plan to optimize energy consumption/efficiency developed after the last energy audit has been fully implemented in accordance to recognized energy management system (all actions have been taken and changes made are already operational).
	Energy consumption for the manufacture of chemicals used in the construction of the final floor covering (e.g., adhesive, resin, filler and surface treatment) has been included in the energy consumption calculation.
	The E-score from the energy consumption requirement is at least: - 14 for solid wood, - 13 for parquet flooring, laminate flooring, hybrid flooring, bamboo flooring and cork flooring, - 11 for linoleum flooring, plastic flooring and underlays.
	The share of electricity produced from renewable energy sources (e.g., solar panels or its own wind turbine) and generated at the manufacturing site stands for at least 10% of the plant annual electricity consumption.
	100% of the purchased electricity is ecolabelled according to Bra Miljöval, EKO Energy or similar*.
Circular Economy	Floorings that need to be glued down are made fully traceable through the use of new technologies without affecting their recyclability.
	The solid wood or multilayer parquet is certified according to the FEP Parquet Refinishable Program administered by the European Parquet Federation (FEP).[57]
	The register or database created for requirement O46 also contains information about the flooring material composition, alternatively flooring recipe name according to the manufacturer's systems.
	Manufacturer of wood floorings (solid wood, parquet or veneer) have developed a process to recycle/reuse these products and the new Nordic Ecolabel flooring contains at least 10% recycled/reused flooring material.
	The pre- and post-consumer recycled fractions used in the Nordic Ecolabel product are regularly tested for relevant SVHC and CMRs.
	The flooring manufacturer has a fully operational take-back system and new floorings contains more than 10% of post-consumer recycled flooring material from reprocessed own products collected via the system.

** Ecolabels for electricity must follow Nordic Ecolabelling's guidelines for certification systems. Bra Miljöval-el/Good Environmental Choice and EKOEnergy follow the guidelines and are approved.*

✉ Documentation in relation to the above-mentioned alternatives in the requirement.

Background

Nordic Ecolabelling sees this requirement as a mean to promote manufacturers who take innovative action and who strive in various ways to reduce the environmental impact of their products in the different life cycle's stages.

[57] FEP is launching its Parquet Refinishable Program | Parquet.net

The innovations are categorised according to the 3 of the 4 pillars from the environmental platform developed by Nordic Ecolabelling. The four pillars are defined as the four different focus area the Nordic Ecolabelling is striving to write clear, concrete and meetable requirements on. These pillars are “Chemical”, “Biodiversity”, “Climate” and “Circular economy”. For the product group floor covering, the pillar “Biodiversity” is difficultly applicable except when sourcing wood and other renewable raw materials. That is why, it was replaced by “Raw materials”.

The floor covering industry is very committed to sustainability. For instance, flooring manufacturers, especially in the Nordic countries, have become a driving force to accelerate the shift from a linear economy to a more circular one. It seems logical to reward their commitment by giving them a hint on what Nordic Ecolabelling might look at in a near future. Two points must be fulfilled, and the manufacturer can decide which measure they wish to fulfil. This offers flexibility.

5 Licence maintenance

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

O51 Customer complaints

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

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

✉ Upload your company’s routine for handling and archiving customer complaints.

Background

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

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

O52 Traceability

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

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

✉ Please upload your routine or a description.

Background

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

If your company does not have a routine for product traceability, it is possible to upload a description of how your company perform these activities. During the on-site visit, Nordic Ecolabelling will check that the product traceability is implemented in your company as described.

6 Changes compared to previous generation

- The criteria have been updated so that all requirements set on textile flooring have been removed and specific requirements have been updated or added to include flooring underlays.
- All substances classified as CMR, regardless of the classification category, are now forbidden.
- Origin and traceability must now be documented for all raw materials, regardless of if they are virgin or recycled, as well as fossil-based or renewable.
- The product manufacturer must now have an energy consumption reduction and effectivization strategy.
- A new requirement set on product packaging has been implemented stating that it must contain recycled material.
- Requirements on warranty, spare parts availability, labelling and traceability, reparability and recyclability have been added to increase the products' circularity.
- A new concept of requirement called "Innovation requirements" has been added to reward license holders which have come further in their sustainability work regarding one particular area compared to other license holders or best-in-class on the market.

Below is a short list of the key changes compared with the previous version of the criteria:

Comparison between requirements from generation 7 with requirements from previous generation 6

Proposed requirement gen. 7	Req. gen. 6	Same req.	Change	New req.	Comment
O1 Description of the product and material composition	O1	X			The requirement has been rewritten.
O2 Description of the production chain and the manufacturing process	O1	X			The requirement has been rewritten.

O3 Overview of chemical products				X	New requirement to clarify chemical products used during the manufacturing process.
O4 Share of renewable/recycled raw materials	O2		X		The requirement has been tightened. Fillers are no longer exempted.
O5 Chlorinated plastics in floor coverings and flooring underlays	O3	X			
O6 Nordic Swan Ecolabelled laminate and wood-based panels				X	Requirement added to facilitate application handling of laminate flooring.
O7 Tree species – restrictions	O4		X		The requirement has been updated with Nordic Ecolabelling's requirements concerning tree species that are prohibited or restricted.
O8 Traceability and certification	O5		X		The manufacturer of the product is required to be CoC certified.
O9 Chemicals in reused wood and recycled material in wood-based panels				X	New requirement for testing of chemicals in recycled wood raw material.
O10 Flax (linen) and other bast fibres	O7	X			The requirement has been updated.
O11 Origin				X	Requirement added set on other raw material.
O12 Recycled fibres - test for harmful substances				X	Requirement added set on other raw material.
O13 Chemicals in recycled leather				X	Requirement added set on recycled leather.
O14 Raw materials for bio-based polymers				X	Requirement added set on renewable materials used in the production of polymers.
O15 Emission to water from production of foams	O16	X			The requirement has been updated.
O16 Blowing agents in foams	O18	X			The requirement has been updated.
O17 Rubber, synthetic latex (SBR) and natural latex	O17	X			The requirement has been updated.
O18 Recycled plastic, rubber and foam - Traceability				X	
O19 Chemicals in recycled plastic, rubber and foam	O14	X			Same requirement.
O20 Additives – prohibited substances				X	
O21 Wood fibre and plastic				X	
O22 WPC - Additives – prohibited substances				X	
O23 Antibacterial substances	O24	X			The requirement has been updated.
O24 Classification of chemical products	O19	X			The requirement has been updated.
O25 Classification of ingoing substances	O20		X		All CRM classifications are now prohibited.
O26 Preservatives	O21	X			The requirement has been updated.

O27 Prohibited substances	O22		X		Some more substances and categories of substances are now forbidden.
O28 Nanomaterials	O25		X		The requirement has been updated and some exemptions removed.
O29 Volatile organic compounds	O23		X		The requirement has been updated.
O30 Free formaldehyde				X	Additional requirement on formaldehyde to reduce emission from the products.
O31 Application method and quantity applied – surface treatment	O30	X			The requirement has been updated.
O32 Environmentally harmful products and substances in surface treatment	O31	X			The requirement has been updated.
O33 Quantity of applied volatile organic compounds (VOC) in surface treatments	O32	X			The requirement has been simplified.
O34 Emissions to air from production of laminate				X	
O35 Polyurethane	O11		X		Requirement added set on products containing polyurethane.
O36 Energy mapping				X	It is now required that the manufacturer has performed an energy mapping and works according to an action plan.
O37 Energy consumption	O36		X		Multiple changes. The requirement has been adjusted and tightened. More processes are to be taken into account.
O38 Handling of waste and production waste	O37	X			The requirement has been updated.
O39 Packaging				X	
O40 Emissions from floor coverings and flooring underlays	O33		X		The requirement has been tightened.
O41 Product performance – third-party verification				X	Requirement added for products not steered by harmonised standards.
O42 Quality and durability of floor coverings	O38		X		The requirement has been updated and made more comprehensive.
O43 Quality and durability of flooring underlays				X	
O44 Wet room approval	O40	X			Same requirement.
O45 Warranty and spare parts				X	
O46 Labelling and traceability				X	
O47 Reparability				X	
O48 Recyclability				X	
O49 Product information	O39		X		The requirement has been updated and more information must be provided.
O50 Innovation				X	New concept of requirements.
O51 Customer complaints	Quality and regulatory	X			

	requirements.				
O52 Traceability	Quality and regulatory requirements.	X			

Appendix 1 Laboratories and methods for testing and analysis

General requirements for test and analysis laboratories

Tests must be carried out in a correct and competent way. The analysis laboratory/test institute must be impartial and professional.

If accreditation is not separately required, the test and/or analysis laboratory must comply with the general requirements of the EN ISO 17025 standard for the quality control of test and calibration laboratories or have official GLP status.

The applicant's own testing laboratory may be approved for analysis and testing if:

- the authorities monitor the sampling and analysis process, or if
- the manufacturer has a quality management system encompassing sampling and analysis and has been certified to ISO 9001 or ISO 9002, or if
- the manufacturer can demonstrate agreement between a first-time test conducted at the manufacturer's own laboratory and testing carried out in parallel at an independent test institute, and that the manufacturer takes samples according to a set sampling plan.

Test method for COD emissions

COD content shall be tested in accordance with ISO 6060 (Water quality — Determination of the chemical oxygen demand) or equivalent. If another analysis method is used, the licensee must show that it is equivalent. An analysis of PCOD or BOD may also be used as verification if a correlation with COD can be demonstrated. The method for measuring TOC is ISO 8245 Guidelines for the determination of total organic carbon (TOC) and dissolved organic carbon (DOC).

Sample frequency: Emissions to water are calculated as the annual average value and are based on at least one representative daily sample per week. Alternatively, a sampling frequency set by the authorities may also be approved.

Sampling: Water samples must be taken after the process wastewater has been treated in any internal water treatment plant. The flow at the time of sampling must be indicated. If the process wastewater is externally purified with other wastewater, the analysis result should be reduced by the documented efficiency of the COD in the external water treatment plant. The analyses must be carried out on unfiltered and unsedimented samples in accordance with standard ISO 6060.

Working environment – emissions to air

Air measurements must be carried out in accordance with standardised test methods in this area, such as EN 689 Workplace exposure – Measurement of exposure by inhalation to chemical agents – Strategy for testing compliance with occupational exposure limit values; EN 482 Workplace exposure – Procedures for

the determination of the concentration of chemical agents – Basic performance requirements; or equivalent method approved by Nordic Ecolabelling.

EN 14042 Workplace atmospheres – Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.

Appendix 4 Directions for forestry certification

Nordic Ecolabelling sets requirements on the standards to which forestry is certified. These requirements are described below. Each individual national forestry standard and each certification system is reviewed by Nordic Ecolabelling as to fulfilment of the requirements. When a forestry standard is revised, it is re-reviewed.

Requirements on forestry standards

The standard must balance economic, ecological and social interests and comply with the Rio Declaration's forestry principles, Agenda 21 and the Forest Principles, and respect relevant international conventions and agreements.

The standard must contain absolute requirements and promote and contribute towards sustainable forestry. Nordic Ecolabelling places special emphasis on the standard including effective requirements to protect the forest from illegal felling and that the requirements protect the biodiversity of the forest.

The standard must be available to the general public. The standard must have been developed in an open process in which stakeholders with ecological, economic and social interests have been invited to participate.

The requirements related to forestry standards are formulated as process requirements. The basis is that if stakeholders agree on the economic, social and environmental aspects of the forestry standard, this safeguards an acceptable requirement level.

If a forestry standard is developed or approved by stakeholders with ecological, economic and social interests, the standard may maintain an acceptable standard. Accordingly, Nordic Ecolabelling requires that the standard balances these three interests and that representatives from all three areas are invited to participate in development of the forestry standard.

The standard must set absolute requirements that must be fulfilled for the certification of the forestry. This ensures that the forest management fulfils an acceptable level regarding the environment. When Nordic Ecolabelling requires that the standard shall "promote and contribute towards sustainable forestry", the standard must be assessed and revised regularly to initiate process improvement and successively reduce environmental impact.

Requirements on certification system

The certification system must be open, have significant national or international credibility and be able to verify that the requirements in the forestry standard are fulfilled.

Requirements on certification body

The certification body must be independent, credible, and capable of verifying that the requirements of the standard have been fulfilled. The certification body must also be able to communicate the results and to facilitate the effective implementation of the standard.

The purpose of certification is to ensure that the requirements regarding forestry standards are fulfilled.

The certification system must be designed to verify that the requirements of the forest standard are fulfilled. The method used for certification must be repeatable and applicable to forestry. Certification must be in respect to a specific forestry standard. The forest must be inspected prior to certification.

Requirements on Chain of Custody (CoC) certification

Chain of Custody certification must be issued by an accredited, competent third party (as for forest certification).

The system shall stipulate requirements regarding the chain of custody that assure traceability, documentation, and controls throughout the production chain.

If recycled fibre, wood shavings or sawdust are used, the pulp manufacturer must verify that this originates from recycled materials.

Requirements on organic production

With regard to certified organic fibre raw material or production that is in the transition to organic production, the vegetable raw materials must be produced and checked in accordance with Council Regulation (EEC) No 2092/91 or 834/2007, or produced and checked in an equivalent way according to an equivalent regulatory system such as KRAV, SKAL, IMO or OCIA.

NB! Bamboo may either be certified according to a sustainable forestry standard or organic production.

Documentation

Copy of forestry/ fibre raw material standard, name, address, and telephone number to the organization who has worked out the standard and audit rapports.

References to persons who represent stakeholders with ecological, economic and social interests who have been invited to participate.

Nordic Ecolabelling may request further documents to examine whether the requirements of the forestry standard and certification system in question can be approved.

Appendix 7, continuation:

Calculation example over applied sum environmentally harmful substances (O32) and application sum of VOC (O33) in surface treatment systems:

The manufacturer of flooring uses 3 products in the surface treatment system and roller coating technique is used (efficiency rate 95 %).

In surface treatment is used three products with following quantities:
Product A: applied with 10 g/m^2
Product B: applied with 20 g/m^2
Product C: applied with 10 g/m^2

First, the environmental hazardousness is weighted for each surface treatment chemical product according to the weight equation in O32:

Product	Content of env.hazardous substances (%)			
	H410	H411	H412	= weighted env.hazardous content (%) calculated with formula 100*H410 + 10*H411 + H412
A	0	1	0	10
B	0	18	0,5	180,5
C	1	5	1	151

Thereafter the sum of the applied environmental hazardous substances in the surface treatment system is calculated using the above presented weighted content for each product (with consideration taken for the efficacy of the application method). Equation below is used:

$$\text{Applied quantity of respective product (g/m2)} \times \frac{\text{Proportion of environmentally harmful substances in product (\%)}}{\text{Surface treatment efficacy (\%)}}$$

Hence:

Product	Applied quantity (g/m^2)	Weighted env.hazardous content (%), see above	Applied amount env.hazardous substances (g/m^2)
A	10	10	1
B	20	180,5	36,1
C	10	151	15,1
Total application of env. hazardous substances:			52,2 g/m^2
Total application of env. hazardous substances (considering application method efficacy):			54,9 g/m^2

The surface treatment system has therefore applied a weighted total sum env. hazardous substances of 54,9g/m^2 which fulfils the limit value of 60g/m^2.

Second, the quantity of applied volatile organic compounds (VOC) is calculated using the equation in the requirement O33:

Product	Applied quantity (g/m^2)	VOC % in product	Roller coating efficiency rate 95 %	$\text{Applied quantity (g/m2)} \times \frac{\text{Proportion VOC in surface treatment (\%)}}{\text{Surface treatment efficacy (\%)}}$
A	10	0,12	0,95	1,26
B	20	0,01	0,95	0,21
C	10	0,04	0,95	0,42
Quantity of applied volatile organic compounds (VOC) total				1,89

The surface treatment system has therefore the quantity of applied volatile organic compounds (VOC) total of 1,89 g/m^2 which fulfils the limit value of 2 g/m^2.

Appendix 8 Declaration of energy consumption

floor coverings/flooring underlays manufacturer:
Name of product:

Indicative list of activities that must be included and may not be included in the calculations of the energy consumption requirement:

Product type	Conditions for the electricity and fuel consumption (indicative list)	
	Included	**Not included**
Solid wood floorings	— drying, grinding and sawing — sizing and trimming — sanding — coating — packaging — and any other activity needed for manufacturing	— activities occurring at the lumber mill (e.g., sawing, edging, trimming, drying and planing of the logs/lumber) and before such as felling and limbing. — manufacture of adhesives, lacquers or any other in-can preparation — manufacture of bought-out parts/layers that stands for less than 5 w% of the final floor covering (for instance, the manufacture of structural and decorative papers in laminate flooring is not to be included). — energy consumed in the quality control activities. — indirect electricity and fuel consumption (e.g., heating outside the manufacturing plant, lighting, internal/external transportation, etc.).
Multi-layer wood floorings	— drying, grinding and sawing — sizing and trimming — sanding — pressing — coating — packaging — and any other activity needed for manufacturing	
Cork and cork tile floor coverings Bamboo floor coverings	— drying, grinding and sawing — sizing and trimming — sanding — pressing — manufacturing of the core board if used in its structure — coating — packaging — and any other activity needed for manufacturing	
Laminate floorings	— manufacturing of the core board — impregnation process of the décor, overlay and backing paper — pressing — sizing — packaging — and any other activity needed for manufacturing	
Linoleum flooring	— oxidation to linoleum cement — mixing — calendaring — drying and curing — finishing — cutting — packaging — and any other activity needed for manufacturing	
Plastic flooring	— manufacturing of the binder(s) — extrusion — mixing — calendaring — finishing	

	— pressing/shaping and cutting — packaging — and any other activity needed for manufacturing	
Others (e.g., multilayer Modular floor coverings, hybrid floorings)	— manufacturing of the core board, binder or any main layer standing for more than 25 % of the final flooring — gluing/laminating/pressing the different elements together — sanding, coating and/or finishing — cutting and shaping — packaging — and any other activity needed for manufacturing	
Underlays	— manufacturing of the final product	— Underlays composed of 100% pre- and/or post-consumer materials are exempted from requirement O37.

Please declare the following energy data, based on annual average figures. Different delimitations for the energy consumption calculation are relevant for different floor types:

Declare the electricity consumption used in the production of the floor covering or flooring underlays [kWh/MJ] and declare how much renewable electricity is generated onsite (e.g., from solar panels, wind turbine and geothermal powerplant):

_____

_____

Declare the fuel consumption for each fuel type used in the production of the floor covering or flooring underlays [kWh/MJ]:

_____

_____

_____

_____

Declare, if relevant, an energy surplus [kWh/MJ], and declare the production quantity of the floor covering or flooring underlays [m^2]:

_____

_____

Signature of floor covering/flooring underlay manufacturer

Date	Company
Signature by contact person	
Name of contact person	Phone

Appendix 9 Energy content of fuel

The energy content of fuel is calculated based on the table below:

Standard fuel values (1 kWh = 3.6 MJ):

Energy source/ Fuel type	Energy content FIN[1)] GJ/ton	Energy content SE[2)] GJ/ton	Energy content DK[3)] GJ/ton	Energy content NO[4)] GJ/ton	2012/27/EC Energy content* GJ
Petrol	44,3	43,7 (37,8 MJ/l)	43,8	43,9	44,0
Diesel	42,8	43,3 (35,3 MJ/l)	42,7	43,1	
LPG	46,2	46,0	46,0	46,1	45,2
Eo1 oil	42,8	40,6 (35,8 MJ/l, EO-1)	-	43,1	42,3
Eo5 oil	41,1 (sulphur<1 %)	43,1 (40,5 MJ/l, EO-5)	40,65 (fuel oil)	40,6	440,0
Natural gas	36,0 (GJ/1000 m^3)	44,1 (GJ/1000 m^3)	39,55 (GJ/1000 m^3)	40,3 (GJ/1000 Sm^3)	47,2
Power station coal	25,0	27,2	24,23	28,1	28,5
Pellets (7% W)	16,0	16,8	17,5	16,8	16,8
Peat	10,1 - 12,3	9,3 - 12,8 (50 % - 35 % W)	-	-	7,8 - 3,8
Straw (15% W)	13,5		14,5		
Biogas	23,0 (GJ/1000 m^3)		23,0 (GJ/1000 m^3)		
Wood chips (45% W)	10,5		9,3		13,8 (25 %W)
Waste wood	12,0	12,1 (30 % W)	14,7	16,25 - 18 (dry)	

** Energy efficiency directive, 2012/27/EC, Annex IV, «Energy content of selected fuels for end use».*

1) Statistikscentralen i Finland, Fuel classification 2013.

2) Värmeforsk, Miljöfaktaboken 2011.

3) Energistyrelsen, Energy statistic 2012

4) Statistisk Centralbyrå. Notater Documents 30/2013. The Norwegian Emission Inventory 2013.

(% W) is the percentage by weight of water in the fuel and given the letter f in the formulas below. If nothing else is stated, f = 0% W and the ash content is average.

Formula for calculating the energy content of woodchips[58]:

The energy content of woodchips depends on the water content. An example of how to calculate the energy content of woodchips is given below.

[58] Reference: Centre for Biomass Technology, c/o dk-TEKNIK (tel. +45 39 555 999): Videnblad fact sheet 125.2 (in Danish) first published 29 June 1998, revised 26 March 1999.

The energy content of dry wood is 19.0 MJ/kg.

Energy is required to evaporate the water in the wood. This energy reduces the heat value of the woodchips. The energy content can be calculated as:

19.0 MJ/kg – 21.442 * f /100 = MJ/kg, where f is the water content in %W of the wood.

The factor "21.442" is the sum of water's heat of evaporation (2.442 MJ/kg) and the energy content of dry wood (19.0 MJ/kg).

If the applicant can refer to laboratory analyses of the heat value of a fuel, Nordic Ecolabelling may consider using this heat value for calculating the energy content.

Appendix 10 Example of energy consumption calculation

A company produces laminate floorings and wants to apply for the Nordic Ecolabel. The company had installed PV panels several years ago, but additionally it buys gas and biomass every year to provide the production lines with electricity and heat. The consumption of fuels and electricity as well as the energy consumption and production of flooring for the last three years is summarized in the Table below:

Electricity and fuel purchase, production and electricity generation of a company:

Year	Production floor (m^2)	Electricity purchase (kWh)	Renewable electricity generated onsite (kWh)	Fuel purchase	
				Gas (kWh)	Wood chip (t, f=20%)
2020	1 780 685	10 399 200	1 559 880	753230	956
2021	1 856 956	11 036 987	1 655 548	775369	965
2022	1 653 269	9 856 321	1 478 448	725849	949
Average	1 763 637	10 430 836	1 564 625	751483	957

Calculation of B:

The value for the B factor, the annual purchased electricity in kWh/m^2, can be calculated from Table 2: **B** = 10430836/1763637 = **5,9 kWh/m^2**. Indeed, as stated in the requirement O33, the renewable electricity generated onsite is not to be included in the calculation of B. According to the calculation, the value for B is **< 15 kWh/m^2** and meets the requirement.

Calculation of C:

The annual gas purchase in kWh/m^2 is: 751483/1763637 = 0,43 kWh/m^2. The annual wood chips purchase in kWh/m^2 is: (957000*14,7)/(3,6*1763637) = 2,22 kWh/m^2. Indeed, according to Appendix 11 and the standard fuel value for wood chips with a moisture content of 20% is: 19.0 – 21,442*20/100 = 14,7 MJ/kg. The factor of 3,6 is present to convert the value from MJ to kWh. The sum of the fuel purchase in kWh/m^2 is the value to be used as C in the formula: **C** = 0,43 + 2,22 = **2,65 kWh/m^2**. According to the calculation, the value for C is **< 15 kWh/m^2** and meets the requirement.

Calculation of A:

The share of renewable fuel purchased annually is: **A** = 2,22/(2,22 + 0,43) = **84%**. According to the calculation, the value for A is **> 25%** and meets the requirement.

Calculation of E:

Now that all factors have been calculated, E can be deducted: E = (84/20) + (5 – 5,9/3) + (5 – 2,65/3) = 4,2 + 3,0 + 4,1 = **11,3**. According to the calculation, the value for E is **> 10** (limit value for laminate flooring) and meets the requirement.

Appendix 11 Standards for quality and durability testing of floor coverings

Table 1 Standards to be used to test each floor covering type:

Flooring type	Standards/Test method	Classification
Wood veneer floor covering	Flooring must comply with and be tested according to standard EN 14354.	EN ISO 10874
Factory lacquer solid and multilayer wood floorings	Flooring must comply with and be tested according to standard EN 13489. Wood hardness of the surface layer must be tested. * Additionally, at least the following parameters must be tested: - Elasticity of the lacquer according to EN 13696. - Effect of a castor chair according to EN ISO 4918 Castor chair testing - EN 13442 Stain resistance.	EN ISO 10874 via EN 685 CTBA*
Factory oiled, uncoated solid wood and uncoated multilayer wood flooring	Flooring must comply with and be tested according to standard EN 13489. Wood hardness of the surface layer must be tested. * Good maintenance instructions and maintenance advice to prolong the lifespan of the flooring must be made available to the customer (see requirement O49 product information).	
Cork tile floor coverings	Flooring must comply with and be tested according to standard EN 12104.	EN ISO 10874
Cork floor coverings	Flooring must comply with and be tested according to standard EN 16511. At least the following parameters must be tested: - Wearing group according to EN 660-1 for wearing group - Effect of a castor chair according to EN ISO 4918 - Resistance to furniture leg movement according to EN ISO 16581 - Residual indentation according to ISO 24343-1.	
Bamboo floor coverings	Flooring must comply with and be tested according to standard EN 17009 or EN 14354. At least the following parameters must be tested: - Resistance to indentation according to EN 1534 EN - Elasticity of the lacquer according to EN 13696.	– See table in requirement O42 for classification and limits.
Laminate flooring	Flooring must comply with and be tested according to standard EN 13329. At least the following parameters must be tested: - Determination of impact resistance with small ball according to EN 17368d - Effect of a castor chair according to EN ISO 4918 - Resistance to scratches according to EN 438-2 - Resistance to micro-scratches according to EN 16094 - Topical moisture resistance according to ISO 4760 - Elements with acrylic based surface layer, electron beam cured according to EN 14978	EN ISO 10874

	- Elements with directly applied printing and resin surface layer according to EN 15468.	
Linoleum flooring	Flooring must comply with and be tested according to standard EN ISO 24011. At least the following parameters must be tested: - Effect of a castor chair according to EN ISO 4918 - Residual indentation according to ISO 24343-1 - Colour fastness to artificial light according to EN ISO 105-B02:1999 Method 3 or ASTM F1515.	EN ISO 10874
Plastic flooring (PVC-free)	Flooring must comply with and be tested according to standard ISO 19322 or EN 14565. At least the following parameters must be tested: - Effect of a castor chair according to EN ISO 4918. - Residual indentation according to ISO 24343-1 - Resistance to furniture leg movement according to EN ISO 16581 - Wear resistance according to EN 660-2 - Abrasion resistance according to ISO 5470-1.	EN ISO 10874
Others (e.g., multilayer Modular floor coverings)	Flooring must comply with and be tested according to standard EN 16511 or EN 17142. Additionally, at least the following parameters must be tested: - Resistance against abrasion according to EN 15468 - Resistance to furniture leg movement according to EN ISO 16581.	EN ISO 10874

** CTBA Revetments interiors Parquet 71.01[59] (see appendix 12).*

Table 2 Class of use according to standard EN ISO 10874

Area of use	Use class	Intensity level
Domestic (bedrooms, living rooms, entrance and corridors)	21	Moderate/light
	22	General/average
	22+	General
	23	Heavy
Commercial (hotels, offices, boutiques, schools, halls and department stores)	31	Moderate
	32	General
	33	Heavy
	34	Very heavy
Industrial (assembly, storage rooms and production halls)	41	Moderate
	42	General
	43	Heavy

[59] https://catalogue-bois-construction.fr/wp-content/uploads/2017/05/Performances-techniques-planchers-et-revetement-de-sol-int%C3%A9rieurs-1.pdf

Appendix 12 Relevant information from standard EN 685 (translation from French)

Classification of wood hardness according to the tree/wood species, and correlations between the use classes in the EN 685 standard and the thickness of the top wear layer depending on the tree/wood species used is found in CTBA Revetments interiors Parquet 71.01.

In Europe, since 1996, the NF EN 685 (or EN ISO 10874) standard identifies classes of use for floor coverings. These classes are identified by number and/or symbol. The tens digit corresponds to the nature of the room: 2 = domestic, 3 = commercial and 4 = industrial. The number of units corresponds to the intensity of the traffic: 1 = moderate, 2 = general, 3 = high and 4 = very high.

In France, this classification has been adopted for parquet floors in the XP B 53-669 standard. As part of the revision of the XP B 53669 standard, a coherent set of characterization of the finish was introduced. Parquet floors not coated with a finish and with a top layer as indicated in the Table below are classified as the following:

Correspondence between tree species hardness classes, minimum top layer thickness and floor coverings classes of use:

Tree species hardness classes	Class of unfinished parquet floors according to minimum top layer thickness (mm)			
	≥ 2,5	≥ 3,2	≥ 4,5	≥ 7
A[1)]	21	21	22	22
B[2)]	21	22	23	31
C[3)]	23	31	33	34
D[4)]	31	33	34	41

[1)] Class A corresponds to a hardness between 10 N/mm^2 and 20 N/mm^2. Tree species in this class are notably and conventionally: *Alnus*, *Pinus sylvestris*, *Picea abies* and *Abies*.

[2)] Class B corresponds to a hardness between 20 N/mm^2 and 30 N/mm^2. Tree species in this class are notably and conventionally: *Betula, Guarea cedrata, Larix decidua, Castanea sativa, Prunus avium, Juglans L., Pinus pinaster, Entandrophragma utile* and *Tectona grandis*.

[3)] Class C corresponds to a hardness between 30 N/mm^2 and 40 N/mm^2. Tree species in this class are notably and conventionally: *Pericopsis elata, Dicorynia guianensis, Carpinus, Quercus, Acer, Eucalyptus, Fraxinus, Fagus, Chlorophora excelsa, Tieghemella heckelii, Baillonella toxisperma, Distemonanthus benthamianus* and *Ulmus*.

[4)] Class D corresponds to a hardness greater than 40 N/mm^2. Tree species in this class are in particular and conventionally: *Afzelia, Myrocarpus fastigiatus, Handroanthus, Hymenaea, Intsia* and *Millettia laurentii*.

Appendix 13 Example of register and maintenance schedule

Table 1 Example of register for traceability requirement O46

Date: 2027/01/10							
Floor covering name	**Floor covering type**	**Recyclability**	**Take back service**	**Location**	**Installation date**	**Surface (m^2)**	**Floor covering recipe/composition (optional, see innovation requirements O50)**
Floor A	Plastic	Y	Y	Hospital X, Corridor, Level 2	2024	1000	
Floor B	Linoleum	Y	Y	School X, Classrooms	2024	500	
Floor C	Laminate	N	N	Shop X	2024	100	
Floor D	Parquet	Partially	Y	Hotel lobby X	2024	100	
Floor E	Hybrid	N	N	Shopping mall X	2024	1000	

Table 2 Example of a maintenance plan/schedule for requirement O47

Condition	**Action**	**Incidence for Domestic use**	**Incidence for Commercial use**	**Incidence for Highest traffic**
− Loose dirt − Bonded dirt − Care	Refresh (follow the maintenance and care instructions provided with the floor covering).	− 1-2 times a week − Weekly − Bi-monthly	− 3-5 times a week − Weekly − Monthly	− Daily − 2 times a week − Weekly
Stubborn stains	Revive (follow the maintenance and care instructions provided with the floor covering). Contact the flooring manufacturer if necessary.	Once a year	3-4 times a year	4-6 times a year
Scratches	Contact the flooring manufacturer to plan maintenance. Recoat is recommended or, Repair or Replace the affected part.	Usually after 5-10 years	Usually after 3-5 years	Usually after 2-3 years
Worn	Contact the flooring manufacturer to plan more extensive maintenance. Renew the surface coating or Repair/Replace the broken part is recommended or, Replace the flooring.	Usually after 10 years	Usually after 5 years	Usually after 3 years