

About Nordic Swan Ecolabelled

Construction and facade panels



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Consultation

NB - The consultation only includes requirements for renewable materials and products based on renewable raw materials

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

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.ecolabel.dk

Iceland

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

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Finland

Ecolabelling Finland
Urho Kekkosen katu 4-6 E
FI-00100 Helsingfors
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@svanemarket.no
www.svanemarket.no

Sweden

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

Summary

The revision of the criteria for Building and facade panels (draft for consultation), only includes a narrower range of product types in the existing criteria, namely:

- Construction panels, mouldings, and glulam products for indoor use, from renewable materials

Existing requirements which include the product types that contains non-renewable raw materials or products intended for outdoor use is not part of this revision - i.e. that these requirements are unchanged in the upcoming generation 7 of the criteria. Revision of these requirements and product types will follow.

The key environmental impact of panels and glulam products for indoor use from renewable materials is linked to raw materials and energy consumption in the production of the products. Relevant environmental impacts are also associated with the use of chemicals, emissions of formaldehyde and organic solvents and product quality.

The extraction of renewable raw materials can have major effects, especially on biodiversity, and the requirement for the use of virgin and recycled materials has been tightened in the draft of the new criteria. For example, there are new absolute requirements for the use of recycled raw materials in particleboard and MDF panels as well as updated requirements for the use of certified raw materials and traceability – requirements for the use of recycled raw materials support the circular economy.

Energy-efficient production of products is important to reduce the impact on the environment and the climate. The requirement limits for energy consumption have therefore been tightened and divided up per panel/product type such as MDF, OSB, HPL and particleboard.

The adhesives usually used in the production of wood-based panels and glulam contain formaldehyde. Formaldehyde is a toxic chemical substance that Nordic Ecolabelling wishes to limit in the working environment and, not least, the indoor climate. The requirement limits for emissions of formaldehyde have therefore been tightened for laminate panels, HPL and compact laminate. New innovation requirements also encourage the use of adhesives that are not based on urea-formaldehyde.

The criteria have been expanded to include the engineered wood products cross laminated timber (CLT) and glued laminated timber (glulam) as these products are very similar to wood-based panels in construction (raw materials and chemicals). 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.

1 Environmental impact of Panels and glulam products for interior use, from renewable materials

Nordic Ecolabelling assesses environmental impacts throughout the product's life cycle. This chapter provides a description of the specific environmental impacts of panels, an RPS analysis and how the product group relates to the UN's Sustainable Development Goals and to the circular economy.

1.1 Environmental impact

With panels and mouldings from renewable materials, the environmental impact is related to resource use/raw materials, energy consumption and carbon footprint, biodiversity and chemicals. During production there may be emissions of substances that are harmful to health and the environment in connection with processing the materials, gluing and surface treatment processes, and production and packaging waste. In addition to the materials and production itself, there are other aspects that affect the environmental impact, such as quality and waste management.

Below is a more detailed description of the environmental impact related to raw materials, energy and climate, chemicals and emissions and waste.

Raw materials

The extraction of renewable raw materials can have major effects, especially on biodiversity. It is therefore important that this is done in a sustainable way that preserves key natural habitats and ensures available resources for future generations. This includes certification schemes such as FSC, PEFC and organic cultivation for the extraction of wood raw material or other renewable raw materials.

Other ways to reduce the environmental impact associated with raw materials are to use recycled materials, both pre- and post-consumer, waste products from other wood processing industries or collected waste. This is also important in a circular economy. A challenge of using recycled material can be the content of harmful chemicals from, for example, impregnated wood, adhesives or surface treatments, and it is difficult to know, with post-consumer material in particular, what harmful substances may be included. A prerequisite for material recovery is good sorting options. The sorting of pure wood fractions has already begun, but new solutions are needed in order to utilise treated wood. Typical panel products that can be labelled in this product group, such as laminate or MDF, have a composition of wood raw material and chemicals that are difficult to separate from each other in a recycling process. However, advances are being made in this area. There is an example of a manufacturer that has developed a method for separating materials and chemicals in an MDF panel¹. In Norway, Forestia is building a new factory that will remove and clean away heavy metals, plastic fragments and chemical compounds from the wood². Developments in this area could thus make recycled wood raw material more accessible in the future.

¹ <https://www.unilin.com/en/recycling-mdf> (accessed 15.06.2022)

² <https://www.innovasjon Norge.no/no/om/nyheter/2022/forestia-far-80-millioner-til-ny-fabrikk/> (accessed 05.07.2022)

Chemicals

A number of chemicals have poor environmental and/or health properties. Particularly relevant aspects related to chemicals are the content of substances classified as environmentally hazardous, CMR (carcinogenic, mutagenic and reprotoxic), substances with endocrine disrupting effects, and content of VOC. By setting strict requirements concerning chemicals used in production and for surface treatment, the effect of chemicals on humans and the environment can be reduced.

Chemicals used in industrial processes may have undesirable properties, but as alternatives are difficult to find, they must still be permitted. In panel production, adhesives are a good example of this. Traditionally, adhesives based on formaldehyde or isocyanates are used, which are substances with poor health properties. Setting requirements concerning emissions in the working environment and from the finished panel, as well as the content of formaldehyde in the adhesive or other chemicals used in production or surface treatment, ensures both a good working environment and low emissions to the indoor environment. A new type of lignin-based adhesive has also been developed, which is suitable for certain panel types and does not produce such emissions³. Nordic Ecolabelling is very positive about this and hopes that the development of such new adhesives will continue.

Emissions

Substances used in adhesives or surface treatments can cause emissions to air in the use phase. VOC emissions to air can also occur from the production itself, where volatile compounds are used and can lead to a poor working environment. Other emissions to air are linked to energy sources and can include particle emissions, NO_x and SO_x. When using wet processes, in particular, there may be emissions to water of material that depletes the oxygen in the water during degradation, known as COD emissions. This creates poor living conditions for aquatic organisms.

Climate

There are many aspects that affect the climate impact of panels. The use of renewable raw materials is generally positive, but it is important to ensure that the raw materials are extracted in a sustainable way, both to ensure biodiversity, but also to reduce the climate impact of such operations. Forests play an important role in regulating the climate.

Reducing energy consumption in the production itself and the energy sources used has a significant impact on the climate. For panels, the production of the adhesive and its input raw materials can also have a relatively large effect on the climate impact as it is an energy-intensive process. Quality aspects, such as surface treatment and the need for maintenance, can also affect the impact on the climate. This is related to the service life of the product.

³ <https://www.storaenso.com/en/products/bio-based-materials/neoligno-by-stora-enso/particle-board> (accessed 05.07.2022)

Waste

Some types of panels may be suitable for material recovery and reuse, but panels are often sent for incineration at present. Wood-based panels have a generally high calorific value and are suitable for combustion and energy recovery. There is an increasing focus in society on circular aspects and work is underway on new processes for material recovery^{4, 5}.

1.2 RPS

In the previous revision, a MECO analysis and an RPS analysis were carried out for wood-based products and laminate (HPL). An RPS analysis is an internal tool used by Nordic Ecolabelling in the assessment of the environmental impact and of where Nordic Ecolabelling must set requirements. It stands for Relevance, Potential and Steerability. For more details on what an RPS analysis entails, please refer to the Nordic website⁶. Areas with high and medium RPS are areas where Nordic Ecolabelling sets requirements, while areas with low RPS tend not to be targeted with requirements.

The results of previous MECO and RPS analyses are deemed not to have changed significantly today. The analysis can be viewed in Appendix 4.

The requirements set out in this document are the result of the RPS analysis, where requirements are set in the areas where the environmental impact is greatest, Nordic Ecolabelling has good opportunities to set requirements that can differentiate between products on the market, and credible supporting documentation exists.

1.3 UN Sustainable Development Goals

On an overall level the Nordic Swan Ecolabel contributes to Goal 12, “Ensure sustainable consumption and production patterns”. The Nordic Swan Ecolabel strives to reduce the environmental impact of production and consumption. This ensures sustainable production, control of the supply chain and provides end users with sustainable products. Nordic Swan Ecolabelled products are manufactured all over the world. Wherever the Nordic Swan Ecolabelled product is made, the strict environmental requirements for production go beyond legislation. This promotes more environmentally-friendly production methods – in developing countries too.

The criteria for Panels and glulam products for indoor use, from renewable materials contribute to Goal 12 as follows:

- Requirements for certified sustainable wood raw material and traceability, energy requirements for drying of wood and/or production of the panel and requirements that stimulate the use of recycled material contribute to sustainable management and efficient use of natural resources.

⁴ <https://www.unilin.com/en/recycling-mdf> (accessed 15.06.2022)

⁵ <https://www.innovasjon Norge.no/no/om/nyheter/2022/forestia-far-80-millioner-til-ny-fabrikk/> (accessed 05.07.2022)

⁶ <https://www.nordic-ecolabel.org/nordic-swan-ecolabel/criteria-process/> (accessed 05.07.2022)

- Quality requirements and consumer information requirements on maintenance and use promote a longer service life and also help to ensure optimum use of resources.
- Restrictions on chemicals that are harmful to health and the environment, which are present in the production of panels and in surface treatments, reduce the spread of undesirable substances and promote the potential for material recovery in the future.
- Restrictions on chemicals that are harmful to health and the environment and emission requirements also contribute to a healthy indoor climate.

Although Nordic Ecolabelling mainly contributes to Goal 12, Target 3.9 is also included. Target 3.9 addresses the reduction of harmful effects caused by chemicals and the reduction of pollution and contamination. Comprehensive and demanding criteria for chemicals, e.g. a ban on chemicals that are classified as environmentally hazardous, carcinogenic, mutagenic and toxic for reproduction, requirements concerning COD emissions, and other requirements governing emissions from panels and chemicals, e.g. VOC from adhesives and formaldehyde emissions, all contribute towards this target.

1.4 Circular economy and climate

The Nordic Swan Ecolabel is a good tool for promoting a circular economy. The entire product life cycle from raw materials to production, use, disposal and recycling is assessed in the development of the requirements. This holistic approach to the life cycle is essential for a circular economy. More information about how the Nordic Swan Ecolabel generally contributes to a circular economy can be found on our website⁷. Factors relating to the circular economy are often closely linked to factors that contribute to a reduced climate impact. Both of these aspects are therefore described below for Nordic Ecolabelling's requirements for panels:

- The criteria promote the use of renewable, sustainable and recovered raw materials, which leads to more efficient and sustainable use of resources.
- Reduced energy consumption cuts greenhouse gas emissions. The criteria therefore set requirements concerning maximum energy consumption in the production of panels and raw materials such as paper. The use of renewable and recycled raw materials also reduces overall energy consumption indirectly, and the impact on the climate is reduced.
- Protecting key habitats for biodiversity also helps to reduce the climate impact; for example, forest areas play a role in regulating the climate. There are therefore requirements that ensure sustainable extraction of wood raw material.
- Strict chemical requirements lead to the substitution of hazardous substances and avoid the recycling of harmful substances.

⁷ Fact sheets

- Quality requirements and consumer information and maintenance instructions promote a longer service life and reduce the need for new products. This leads to more efficient use of resources and a reduced climate impact.
- The use of recycled raw materials also cuts waste.

2 Other labelling schemes and management systems

There are a number of other labelling schemes operating in the field of construction materials. Of the other Type 1 ecolabels (equivalent to the Nordic Swan Ecolabel) in Europe, Blue Angel has criteria for panels in the criteria “Low-Emission Floor Coverings, Panels and Doors for Interiors Made of Wood and Wood-Based Materials”⁸. Other types of label in the Nordic market, which often only cover one parameter, are FSC/PEFC (raw materials), M1 (indoor climate) and Dansk Indeklima Mærkning. In construction products, there are also several manufacturers that have EPDs (Environmental Product Declarations) and Cradle to Cradle certification. There are several building certifications in the Nordic region, such as Sunda Hus, BREEAM and LEED, that set requirements for construction materials.

In addition to voluntary certification schemes, construction products are regulated by the EU’s Construction Products Regulation (EU/305/2011). The Construction Products Regulation sets out rules for the sale and documentation of CE marked construction products. The CE mark confirms that the construction product has been manufactured and checked in accordance with a harmonised product standard or a European assessment document. Most types of panels are covered by a harmonised product standard such as EN 13986: Wood-based panels for use in construction and EN 14322: Wood-based panels – Melamine faced boards for interior uses.

3 Justification of the requirements

This section presents proposals for new and revised requirements, and explains the background to the requirements, the chosen requirement levels and any changes since generation 6. The appendices referred to in the requirements can be found at the end of the criteria document.

As previously described, the requirements set out in this document are the result of an RPS analysis (see Appendix 4). The requirements are set in the areas where the environmental impact is greatest, Nordic Ecolabelling has good opportunities to set requirements that can differentiate between products on the market, and credible supporting documentation exists.

⁸ Blue Angel: Low-Emission Floor Coverings, Panels and Doors for Interiors made of Wood and Wood-Based Materials, UZ 176, 2013

3.1 Product group definition

Products that may be ecolabelled in this product group (draft for consultation) must consist of renewable raw materials* and be intended for indoor use. The products must fall into one of the categories below:

1. Wood-based panels covered by the standard EN 13986 (Wood-based panels). Characteristics, evaluation of conformity and marking) in classes 1 and 2. The products that can be labelled are mainly for indoor use, but category 2 (protected external) products can also be labelled if they do not contain chemicals that make them resistant to biological attacks, e.g., from fungi and insects.
2. Melamine faced board that is covered by the standard EN 14322 (Wood-based panels – Melamine faced boards for interior uses).

The wood-based panels can have different applications such as walls, subfloors, ceilings, as well as being used in the production of furniture and interior design.

Examples of wood-based panels included:

- *Particleboard*
 - *MDF (Medium Density Fibreboard)*
 - *HDF (High Density Fibreboard)*
 - *MFB (Melamine Faced Board)*
 - *Plywood*
 - *OSB (Oriented Stranded Board)*
 - *LVL (Laminated Veneer Lumber)*
 - *SWP (Solid Wood Panel), Kerto LVL products are CE marked according to standard EN 14374.*
3. Laminate such as HPL (High Pressure Laminate) or compact laminate according to the EN 438 series. Only laminates for indoor use can be labelled according to these criteria**.
 4. Panels made of renewable materials other than wood, e.g. straw or linen, for indoor use in buildings/structures, furniture and interior fitments.
 5. Panels and mouldings, either of solid wood or consisting of the panel types indicated in any of the other points for indoor use. Panels and mouldings can be either untreated or surface-treated with e.g., varnish or paint.
 6. CLT (cross laminated timber) according to EN-16351 for indoor use
 7. Glulam (glued laminated timber) according to EN-14080 for indoor use

** Renewable raw material means a raw material that derives from biological materials that are continually being renewed in nature within a short number of years, such as grain and trees. It also includes products made from renewable raw materials such as paper. NB: in these criteria (draft for consultation), only the use of recycled material from renewable materials is permitted. Chemicals such as adhesives and surface treatments, as well as thin plastic foils, are exempted. This means that the raw material in the form of wood, paper or other renewable raw materials determines whether the panel is included in the product group and can carry the Nordic Swan Ecolabel.*

The product group does not include the following products:

- Outdoor panels (includes class 3 of EN 13986). Panels that are for outdoor use, consist of non-renewable materials or a mixture of renewable and non-renewable materials, e.g. cement-based panels, can be labelled according to the criteria for Construction and facade panels, and mouldings, generation 6**, until revised criteria for these panel types are available.
- Panels consisting of non-renewable materials or a mixture of renewable and non-renewable materials, e.g. plasterboard or fibre cement panels. However, these type of products can be labelled according to the criteria for Construction and facade panels, and mouldings, generation 6**.
- Panels that have an insulating function against heat or cold losses. Panels marketed as insulation panels or insulation products are therefore not included.
- Wet room panels
- Fully prefabricated wall elements
- Flooring. Flooring can be labelled according to the criteria for Nordic Ecolabelling of Floor coverings**.
- Kitchen worktops. Worktops for kitchens and bathrooms can be labelled according to the criteria for Nordic Ecolabelling for Furniture and fitments**.

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

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

If there are other types of panels or products, based on renewable raw materials and used in buildings, furniture and fitments, 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 revision of the criteria for Building and facade panels (draft for consultation), only includes a narrower range of product types in the existing criteria, namely:

- Construction panels, mouldings, and glulam products for indoor use, from renewable materials.

Existing requirements which include the product types that contains non-renewable raw materials or products intended for outdoor use is not part of this revision - i.e. that these requirements are unchanged in the upcoming generation 7 of the criteria. Revision of these requirements and product types will follow.

There are several reasons why this has been done. The previous product group definition was very broad and included many different types of panels and materials. The requirements would differ widely depending on the materials that made up the panel, so narrowing the definition will make the criteria more transparent and it will be easier for our applicants to find the right requirements. Products for indoor and outdoor use also have different RPS in key areas such as quality and emissions, which is another reason why Nordic Ecolabelling has chosen to divide them up. It is also considered important to revise requirements for issues such as emissions from wood-based products, as this area has seen and is still undergoing important updates in terms of both the limit values for formaldehyde emissions and test methods. The requirements for the other product types will therefore be revised at a later date and may still be labelled according to the current criteria.

A clearer description of the product types that can be Nordic Swan Ecolabelled has also been chosen, based on harmonised standards in relation to the EU Construction Products Regulation (EU/305/2011). In addition, panels that are not covered by harmonised standards can also be labelled, e.g. panels made of straw or linen or recycled packaging mainly consisting of paper/cardboard. Panels that are labelled must be intended for use in buildings, structures or furniture/fitments, etc.

Panels made of wood and mouldings, either of solid wood or board materials such as MDF, can also be labelled. Panels and mouldings can either be untreated or surface treated with e.g. lacquer or paint.

The possibility of labelling CLT and glulam has also been added according to the standards EN-16351 Timber structures – Cross laminated timber and EN-14080 Timber structures – Glued laminated timber. There have been discussions about whether this could be Nordic Swan Ecolabelled or not, as it cannot be defined as a panel. However, these products are very similar to wood-based panels in their construction (raw materials and chemicals) and the decision has been taken that these can now be labelled in these criteria.

The product group covers products for indoor use. As previously mentioned, products for indoor and outdoor use have different RPS in key areas such as quality and emissions. There is also often a need for biocides and other types of chemicals to ensure good durability in outdoor use. This is not specifically addressed in this revision. As of now, the product group only includes products for indoor use, although several of the standards referred to also include products for outdoor use. For example, only category 1 and 2 products in EN 13986 can be

labelled (category 2 – protected external) unless they have chemicals added to them to make them resistant to fungi and insects.

The product group definition specifies a number of different panel types and products that can be labelled, but if there are other panel types or products based on renewable raw materials that are not mentioned and there is a desire for the Nordic Swan Ecolabelling of the product, an assessment may be made about whether these can also be included. Nordic Ecolabelling always decides whether or not a product can be labelled and under which criteria a product can apply for a licence.

Worktops, e.g. for kitchens, can no longer be Nordic Swan Ecolabelled and marketed as Nordic Swan Ecolabelled under the criteria for Construction panels. These products must now be Nordic Swan Ecolabelled in accordance with the criteria for Furniture and fitments, as kitchens and kitchen furniture belong to this product group. Worktops often also contain plastic edging that is not covered by requirements in the criteria for Construction panels, but is subject to requirements in the criteria for Furniture and fitments.

3.2 Terms and definitions

Words/Terms	Definitions
ADt	ADt is dry, solid content of pulp and paper. ADt for pulp is 90%, while ADt for paper means a solid content of 94%.
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.
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.
Dry conditions (Service Class 1)	Conditions corresponding to Service Class 1 of EN 1995-1-1 (Eurocode 5) which are characterised by a moisture content in the material corresponding to a temperature of 20°C and a relative humidity in the surrounding air only exceeding 65% for a few weeks per year.
Self-generated energy	Self-generated energy refers to energy (electricity and heat) not purchased from an external supplier. For example, if the panel production has an energy surplus that is sold as electricity, steam or heat, the sold amount can be deducted from the energy consumption. Internally produced fuel sources and residual products are not regarded as self-generated energy.
FSC	Forest Stewardship Council Certification scheme for forestry and traceability in the supply chain.

<p>Recycled material from renewable materials</p>	<p>Recycled material is defined under ISO 14021 in the categories of pre-consumer and post-consumer and includes both mechanical and chemical recycling.</p> <p>“Pre-consumer” is defined as material that is reclaimed from the waste stream during a manufacturing process. Production waste (scrap, rework, regrind) that can be returned directly to the same process in which it was generated is not counted as recycled pre-consumer material.</p> <p>“Post-consumer” is defined as material generated by households or commercial, industrial or institutional facilities in their role as end-users of a product that can no longer be used for its intended purpose. This includes materials from the distribution chain.</p> <p>Materials that are approved as input in FSC Recycled and which are covered by the term Reclaimed in FSC are regarded as recycled material.</p> <p>NB: In these criteria only the use of recycled material from renewable materials is allowed.</p>
<p>Humid conditions (Service Class 2)</p>	<p>Conditions corresponding to Service Class 2 of EN 1995-1-1 (Eurocode 5) which are characterised by a moisture content in the material corresponding to a temperature of 20°C and a relative humidity in the surrounding air only exceeding 85% for a few weeks per year.</p>
<p>IFL</p>	<p>Intact Forest Landscape</p> <p>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.</p>
<p>Ingoing substances and impurities</p>	<p>Ingoing substances:</p> <p>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.</p> <p>Impurities:</p> <p>Residues from production, incl. raw material production, which remain in the chemical product at concentrations below 1000 ppm (0.1000% by weight).</p> <p>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.</p>
<p>IUCN</p>	<p>International Union for Conservation of Nature</p> <p>IUCN’s Red List is the world’s most comprehensive overview of the global conservation status of the planet’s species, including trees.</p>
<p>Laminate</p>	<p>Laminate means a process in which paper is used in the product, e.g. melamine, HPL or compact laminate.</p>

Nanomaterial	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 50% or more of the particles in number or size distribution, one or more external dimensions is in the size range 1–100 nm
PEFC	Programme for the Endorsement of Forest Certification Certification scheme for forestry and traceability in the supply chain
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).

3.3 Overview of the requirements

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

Requirement area	Requirement/Material	Requirement	Responsibility for documentation
Description of product and production process	General requirements	O1	Product manufacturer
Product requirements	Quality and properties Information requirements	O2 O3–O4	Product manufacturer
Raw materials			
Wood raw material	Wood, cork and bamboo	O5 O6	Product manufacturer/Subcontractor Product manufacturer
	Recycled wood raw material	O7	Product manufacturer/Subcontractor
Other renewable raw materials	Other renewable raw materials	O8	Product manufacturer/Subcontractor
Paper	Raw material for paper	O9	Product manufacturer
Chemicals			
Chemicals – production and surface treatment	Antibacterial substances	O10	Product manufacturer and manufacturer/supplier of chemical product
	Nanomaterials	O11	Manufacturer/supplier of chemical product
	Preservatives	O12	Manufacturer/supplier of chemical product
Chemicals in production	Classification of chemical products	O13	Manufacturer/supplier of chemical product
	Classification of ingoing substances	O14	Manufacturer/supplier of chemical product
	Prohibited substances	O15	Manufacturer/supplier of chemical product
	VOCs in adhesives	O16	Manufacturer/supplier of chemical product
	Free formaldehyde	O17	Manufacturer/supplier of chemical product

Chemicals – surface treatment	Plastic foiling	O18	Product manufacturer
	Classification of chemical products	O19	Manufacturer/supplier of chemical product
	UV curing surface treatment system	O20	Supplier/performer of surface treatment
	Classification of ingoing substances	O21	Manufacturer/supplier of chemical product
	Prohibited substances	O22	Manufacturer/supplier of chemical product
	Free formaldehyde	O23	Manufacturer/supplier of chemical product
	Application method and quantity applied – surface treatment	O24	Supplier/performer of surface treatment
	Volatile organic compounds (VOC)	O25	Supplier/performer of surface treatment
Emissions			
Emissions from product	Formaldehyde emissions – wood-based products	O26	Product manufacturer
	Emissions from panels	O27	Product manufacturer
Emissions from production – COD	Emissions of COD from wet processes	O28	Product manufacturer
	Emissions of COD from pulp and paper production – HPL and compact laminate	O29	Manufacturer of pulp and paper
Emissions from production – working environment	Emissions to air from production – HPL and compact laminate	O30	Laminate manufacturer
	Emissions of wood dust	O31	Product manufacturer
Climate and energy			
Laminate	Pulp and paper production included in HPL and compact laminate	O32	Manufacturer of pulp and paper
	Laminate	O33	Laminate manufacturer
Wood-based panels	Wood-based panels	O34	Panel manufacturer
Panels from other raw materials	Panels – other renewable panels	O35	Panel manufacturer
CLT and glulam		O36	Product manufacturer and wood suppliers (drying process)
Solid wood panels and mouldings	Solid wood	O37	Product manufacturer and wood suppliers (drying process)
Innovation			
	Innovation requirements	O38	Product manufacturer
Other requirements			
	Maintenance of the Nordic Swan Ecolabel licence	O39–O40	Product manufacturer/licensee

3.4 Product description and product requirements

This chapter sets out product requirements such as quality requirements and consumer information requirements.

O1 Description of the product

Applicants must provide the following information about the product:

- Trade name(s) and brand name(s)

- Description of the product(s) and materials/raw materials (such as wood, paper, straw, etc.) included. The total weight of the product and the weight of the constituent materials/raw materials must be stated. Product sheets or equivalent that describe all materials/raw materials must be included in the application.
 - Description of production methods/treatment techniques. Description of subcontractors, including the name of their business, production site, contact and the production steps carried out.
 - Names of chemical products used in the production and any surface treatment (including products used by any subcontractors).
- For each product: Detailed description of the points above. Product data sheets can be submitted as part of the documentation. Use a flowchart to describe the production process.

Background

A description of the product's material composition and production processes provides important information for determining whether the product is eligible for the Nordic Swan Ecolabel, the requirements that must be met, and who (e.g. subcontractors) must document the requirements.

O2 Quality and properties

Products covered by a harmonised standard

Products covered by a harmonised standard in accordance with the Construction Products Regulation (EU/305/2011) must document the features and functions with which the product is marketed. As documentation, an example of CE marking and a declaration of performance must be submitted in accordance with the Construction Products Regulation.

Products not covered by harmonised standard

Products not covered by a harmonised product standard can document the features and functions of the product with one of the following options:

- 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.
- For products covered by a harmonised product standard, state which product standard(s) the product is covered by and submit the declaration of performance.
- For products that are not covered by a harmonised standard, a declaration of performance must be submitted in accordance with an ETA or other third-party verification of the product's performance.

Background

The requirement has not been amended except that it is no longer possible to document the requirement with "quality test with integrated internal business control". In our experience, this opportunity was not used and it was also unclear what could and could not be approved.

The purpose of the requirement is to ensure a correlation between the features and functions that the product is marketed with and the declaration of performance prepared in accordance with the Construction Products Regulation. At the same time, the requirement must ensure that construction panels and other products not covered by a harmonised product standard can document the features and functions with which the product is marketed, on the basis of standardised test results.

O3 Maintenance

For products that are used as the outermost layer on e.g. a wall or ceiling or otherwise have a surface directly facing the consumer, the following must be included:

- Cleaning instructions
- Information on maintenance that includes which care products are suitable for the product (paints, oils, etc.) and how often these products should be used.

The information can either be supplied with the product or consumers can be referred to information on the manufacturer's website.

- Cleaning and maintenance instructions and how these are communicated to the customer.

O4 Information for consumers

Consumer means both private consumers and professional operators.

The following product information should accompany the product and/or be available for download on the manufacturer's website:

- How the product is to be stored before assembly, e.g. at the construction site.
- Instructions for assembly and instructions for any surface treatment after installation.
- If the manufacturer has a system for taking back the product, e.g. old panels or panels that were not used in the construction process, information on this should be provided.
- Information about which materials are used (raw materials and chemicals).
- Specify the standards by which the product is tested.

The information must be available in the language of each country in which the Nordic Swan Ecolabelled product is marketed.

- Product information intended for customers.

Background

It is important that instructions concerning assembly and maintenance are included to ensure that the panel is used correctly and to contribute to the service life of the product. In order to improve the opportunities for correct waste sorting, information about ingoing raw materials must also be included, as well as whether the manufacturer takes back old panels or panels that were not used in the construction process.

3.5 Raw materials

The requirements in this chapter concern extraction of raw materials such as wood, bamboo or other renewable raw materials that are included in panels and glulam products.

- O5 applies to all products containing virgin wood raw material, including wood raw material in paper that is part of a laminate.
- O6 applies to products in which wood raw material is used, e.g. in the form of solid wood, wood chips, shavings or as recycled wood raw material.
- O7 applies to recycled wood raw material.
- O8 applies to other renewable raw materials, such as straw or linen.
- O9 applies to raw materials in paper (kraft paper and decor paper) in laminate

O5 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.
- Declaration from the applicant/manufacture/supplier that tree species listed on a)–d) are not used in the product.

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

- Valid FSC/PEFC Chain of Custody certificate from supplier/applicant/manufacture 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/manufacture/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/manufacture/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 panels, mouldings and glulam 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 I 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 2018⁹,¹⁰ and by redd-monitor.org in 2019¹¹. Greenpeace International has terminated its membership of FSC for the reason that the certification body

⁹ <https://danwatch.dk/undersogelse/dokumentfalsk-og-millionboeder-danske-byggemarkeder-saelger-trae-forbundet-til-ulovlig-hugst-i-amazonas/>

¹⁰ <https://danwatch.dk/undersogelse/baeredygtighedsmaerke-er-ingen-garanti-for-baeredygtigt-trae/>

¹¹ <https://redd-monitor.org/2019/08/29/evicted-for-carbon-credits-new-oakland-institute-report-confirms-forced-evictions-for-green-resources-plantations-in-uganda/>

no longer fulfils its goals of protecting forests and human rights¹². 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 2002¹³. 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.

O6 Traceability and certification

The requirement applies to wood raw material, cork and bamboo used in the product. For wood raw material in paper that is part of a laminate, see O9 and O10.

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.

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

¹² <https://www.greenpeace.org/international/press-release/15589/greenpeace-international-to-not-renew-fsc-membership/>

¹³ <http://www.intactforests.org/world.webmap.html>, accessed January 2020

requirement concerning Chain of Custody certification. For a definition of recycled raw material*.

Certified wood raw material, bamboo and cork

A minimum of 70% by weight 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 and MDF panels, a minimum of 75% of the wood raw material in Nordic Swan Ecolabelled particleboard and MDF panels must consist of 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 present evidence in the form of a balance sheet from the manufacturer's accounting system showing a correct statement of the allocated input and output of certified raw materials, recycled material and material from "controlled" sources for their production plant and resulting Nordic Swan Ecolabelled products.

**see Terms and definitions.*

- The names (species names) of the wood raw material, bamboo and cork that are 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.

Background

The requirement has been tightened and it is now required that the manufacturer of the Nordic Swan Ecolabelled product must hold Chain of Custody certification (or only use recycled raw material). The certified share has increased to 70%, while the remainder must be covered by the CoC system and be controlled wood/from controlled sources. Alternatively, recycled material can be used.

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 for the production of particleboard and MDF panels is largely recycled/waste wood. Requiring a minimum of 75% of the wood raw material in Nordic Swan Ecolabelled particleboard and MDF panels to be made from recycled raw material keeps wood waste in the cycle of the circular economic process.

07 Chemicals – recycled material in wood-based panels

Recycled material in wood-based panels must meet the requirements of the European Panel Federation's (EPF) Standard for delivery conditions of recycled wood, 2002.

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

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.*

- ☒ For wood-based panels: Certification of compliance with the EFP's Standard for delivery conditions of recycled wood, 2002, or subsequent versions, and any equivalent documentation/test report, e.g. in line with the German Waste Wood Ordinance of 2002 or later, showing compliance with the requirements of the standard.

Background

The requirement is set in order 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.

08 Renewable raw materials other than wood raw material

Other renewable raw materials include hemp, linen, bagasse and similar lignocellulose material.

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

The renewable raw materials must be waste* or residual products* from other production systems, e.g. straw from grain production.

** 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.*

- ☒ Name and geographic origin of the renewable raw materials.
- ☒ Description of the raw material showing that it is a residual or waste product.

Background

Nordic Ecolabelling is positive about the use of renewable materials, but wishes to receive information about the species used and 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 or residual products from other production

09 Raw materials in paper (kraft paper and decor paper) in laminate

The requirement applies to paper wood raw material used in laminate.

If the paper used carries the Nordic Swan Ecolabel and/or the EU Ecolabel, the requirement concerning paper raw material is considered to be fulfilled.

Species name

The applicant/manufacturer of the panel (containing laminate) or paper supplier must state the name (species name) of the fibre raw material used in the paper.

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.

The applicant or manufacturer of laminate must have FSC/PEFC CoC certification.

Applicants/manufacturers who only use recycled material*, which is not FSC/PEFC recycled, in the Nordic Swan Ecolabelled product, are exempted from the requirement concerning CoC certification.

**For a definition of recycled raw material, see Terms and definitions.*

Certified fibre raw material

A minimum of 70% by weight of the fibre raw material used in the Nordic Swan Ecolabelled laminate must come from forests that are managed in accordance with sustainable forestry management principles that meet the requirements of the FSC or PEFC Chain of Custody schemes, and/or be recycled raw material.

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

The applicant/manufacturer must present evidence in the form of a balance sheet from the manufacturer's accounting system showing a correct statement of the allocated input and output of certified raw materials, recycled material and material from "controlled" sources for their production plant and resulting Nordic Swan Ecolabelled products. Recycled fibre material must be covered by EN 643 delivery notes if FSC/PEFC Recycled claims are not used.

- Name (species name) of the fibre raw material used.
- The applicant/manufacturer must present a valid FSC/PEFC CoC certificate, which includes all fibre raw material used in the Nordic Swan Ecolabelled product.
- Recycled raw material must be covered by EN 643 delivery notes if FSC/PEFC Recycled claims are not used.
- 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.
- Valid licence certificate for the Nordic Ecolabel and/or EU Ecolabel.

Background

The requirement has been tightened and it is now required that the manufacturer of the Nordic Swan Ecolabelled product must hold Chain of Custody certification (or only use recycled raw material). The certification share has increased to 70%, while the remainder must be covered by the Chain of Custody system and be controlled wood/from controlled sources. Alternatively, recycled material can be used. See also background to O6.

3.6 Chemicals

The requirements in this chapter apply to chemical products used in the production of the Nordic Swan Ecolabelled product, such as adhesives, resins and waxes, as well as to surface treatments. The chapter is divided into 3 sub-sections:

- Requirements that apply to all chemicals, both chemicals used in production, including chemicals used in the production of laminate, and surface treatments, section 3.6.1
- Requirements concerning chemicals in the production of the Nordic Swan Ecolabelled product, such as adhesives, resins and waxes, Section 3.6.2
- Requirements concerning chemical products used for surface treatment, Section 3.6.3

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 in Sections 3.6.1 and 3.6.2.

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.

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.

3.6.1 Requirements for all chemical products – production and surface treatment

O10 Antibacterial substances

Chemical products and nanomaterials* with antibacterial or disinfectant properties must not be added during production or to the finished product.

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.

** In accordance with the definition of a nanomaterial adopted by the European Commission on 18 October 2011 (2011/696/EU), see Definitions.*

- 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.
- Declaration from the manufacturer/supplier of the chemical product that the product does not contain nanomaterials with antibacterial or disinfecting properties.

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.

O11 Nanomaterials

The chemical product must not contain nanomaterials* (see Definitions).

Exemptions apply for:

- Pigments**
- Naturally occurring inorganic fillers***
- Synthetic amorphous silica****

** In accordance with the definition of a nanomaterial adopted by the European Commission on 18 October 2011 (2011/696/EU), see Definitions.*

*** This exemption does not include pigments added for purposes other than colouring.*

**** This applies to fillers covered by Annex V point 7 in REACH.*

***** This applies to non-modified synthetic amorphous silica.*

- A declaration from the chemical manufacturer that the chemical product does not contain any nanomaterial.

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^{14, 15, 16, 17, 18, 19}. 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. The European Commission's definition of nanomaterials from 18 October 2011 (2011/696/EU)²⁰ is used.

Most nanomaterials on the market today have either been in use for decades, or have recently been manipulated into nanoforms of existing materials²¹. For example, carbon black nanoparticles and amorphous silicon dioxide (SiO₂) have been used in previous centuries. Titanium dioxide (TiO₂), has long been used as a dye in bulk form, but is now manufactured as a nanomaterial for other purposes²². Other types of engineered nanomaterials are expected to enter the market in the future²³.

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:

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

¹⁴ 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

¹⁵ 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=aHR0cDovL2Fzc2VtYmx5LmNvZS5pbmQvbnVncveG1sL1hSZWYvWDJILURXLWV4dHluYXNwP2ZpbGVpZD0xOTczMCZsYW5nPUVO&xsl=aHR0cDovL3NlbWFudGljcGFjZS5uZXQvWHNsdc9QZGYvWFJIZi1XRRC1BVC1YTUwYUJERGLnhzbA==&xsltparams=ZmlsZWlkPTE5NzMw>

¹⁶ 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. 16 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

¹⁷ 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

¹⁸ 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

¹⁹ 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
<https://eur-lex.europa.eu/legal-content/SV/TXT/PDF/?uri=CELEX:32011H0696&from=EN>

²⁰ 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

²² 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

²³ 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 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 drawn²⁴, 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^{25,26}. 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 oxides²⁷. Carbon black used in paints is very finely ground and has a particle size of approximately 10–30 nm²⁸. 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 decades²⁹. SAS is a nanomaterial according to the European Commission's definition and is exempted from the requirement due to a lack of alternative substances.

O12 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)	≤ 100 ppm (0.01% by weight)
Total amount of isothiazolinones	≤ 500 ppm (0.05% by weight).

²⁴ 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.

²⁵ 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>

²⁶ Nowack B, Hincapié I, Sarret G, Larue C, Legros S (2013) Environmental fate of nanoparticles from façade coatings. NanoHouse Dissemination report N° 2013-03. [https:// DOI: 10.13140/2.1.2206.3040](https://doi.org/10.13140/2.1.2206.3040)

²⁷ Industrial Organic Pigments; W. Herbst, K. Hunger; Third edition 2004; pp. 120–124

²⁸ Coatings Handbook; Thomas Brock, Michael Grotklaes, Peter Mischke; 2000; p. 128

²⁹ https://www.asasp.eu/images/Publications/Nano_-_SAS_factsheet_-_201209.pdf

- ☒ A declaration from the chemical manufacturer or supplier.
- ☒ 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. The exemption is the same as in generation 6 for bronopol, isothiazolinones and CMIT/MIT, while IPBC is new to the list. 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.

3.6.2 Requirements concerning chemicals in production

The requirements in this chapter concern chemicals used in the production of the Nordic Swan Ecolabelled product itself (panels, mouldings, CLT and glulam), such as adhesives, resins or additives.

O13 Classification of chemical products

Chemical products 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	H400
	Aquatic Chronic 1	H410
	Aquatic Chronic 2	H411
	Ozone	H420
Acute toxicity	Acute Tox 1 or 2	H300
	Acute Tox 1 or 2	H310
	Acute Tox 1 or 2	H330
	Acute Tox 3	H301
	Acute Tox 3	H311
	Acute Tox 3	H331
Specific target organ toxicity – single exposure/repeated exposure	STOT SE 1	H370
	STOT RE 1	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:

- Classification H351 for adhesive products containing methylene diphenyl diisocyanate (MDI).
 - Classifications H350, H341, H301, H311 and H331 for adhesive products and resins containing formaldehyde (CAS no. 50-00-0). Formaldehyde emissions are regulated in a separate requirement.
 - 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).
 - UV curing products are exempted from classification H411 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.
- 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 general waste are handled, including information about who receives the general waste.

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.

The requirement has been amended to also include the classifications Toxic to the environment (H400, H410, H411 and H420). The previous generation of the criteria contained a requirement limiting the amount of environmentally hazardous ingoing substances in the chemical products used in the production of the Nordic Swan Ecolabelled product. This requirement has been replaced by a complete ban on the presence of chemical products in any of the environmentally hazardous classifications listed in the requirement.

Exemptions:

An exemption is made for adhesive products containing methylene diphenyl diisocyanate (MDI). There are currently no substitute products that are widely available in the market.

The exemption for adhesives containing formaldehyde is only granted if later requirements 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 harmonised 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 harmonised classification, but there may still be producers who use this self-classification alongside the harmonised 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.

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.

O14 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

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

Exemptions apply for:

- Adhesive 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 a separate requirement.
 - 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 with time limits up to and including 31.12.2024.
- A declaration from the chemical manufacturer or supplier.
- 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 also 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.

Exemptions are also needed in this requirement for methylene diphenyl diisocyanate (MDI), formaldehyde, phenol and melamine. See more background about this in the previous requirement.

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 coated with TMP. There are currently no replacement substances for titanium dioxide and TMP, but work is underway to replace TMP in the industry. The exemptions are therefore time-limited.

O15 Prohibited substances

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

- Substances on the Candidate List*
- Substances that have been judged in the EU to be PBT (Persistent, Bioaccumulative and Toxic) or vPvB (very Persistent and very Bioaccumulative)**
- Halogenated organic compounds. Exemptions apply for Bronopol, IPBC and CMIT/MIT (3:1). These are set out in a separate requirement.
- Butylhydroxytoluene (BHT, CAS No. 128-37-0)
- Aziridine and polyaziridines
- Bisphenols
- APEO (alkylphenol ethoxylates) and APD (alkylphenol derivatives/alkylphenols) ***
- Phthalates

- Pigments and additives based on lead, tin, cadmium, chromium VI and mercury, and their compounds
- 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.

** The Candidate List can be found on the ECHA website:
<http://echa.europa.eu/candidate-list-table>*

*** PBT and vPvB in accordance with the criteria in Annex XIII of REACH*

**** Alkylphenol derivatives are defined as substances that release alkylphenols when they break down.*

- A declaration from the manufacturer/supplier of the chemical product.
- 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 is essentially the same as in generation 6 of the criteria, but is tightened in certain respects, e.g. bisphenols are generally banned (and not just Bisphenol A). In addition, the requirement concerning endocrine disruptors has changed.

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.

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 ecosystems³⁰. 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

³⁰ 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).

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.

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.

Alkylphenols, alkylphenol ethoxylates and/or alkylphenol derivatives

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

Bisphenols

Bisphenol A is used as a monomer in epoxies, paints, varnishes and adhesives. While there was previously a ban on Bisphenol A (BPA), CAS no. 80-05-7), the ban now applies to bisphenols in general. The reason why the ban now covers all bisphenols is that other bisphenols, such as Bisphenol F and S, can be used as a replacement for BPA. In the screening programme for environmental toxins in water, sediment and biota in Norway, Bisphenol A, F and S have been found³¹. These are substances that have the same properties as Bisphenol A³². Bisphenol A can be released into the environment from the production process. BPA is identified as damaging to the eyes, irritating to the respiratory tract, skin sensitizing and may also affect reproductive performance. The substance may be endocrine disrupting and is toxic to aquatic organisms. Bisphenol A is used, for example, with Epichlorhydrin to produce Bisphenol-A-(epichlorhydrin) epoxy resin (CAS no. 25068-38-6), which is classified as allergenic and environmentally hazardous. The ban seeks to exclude the use of epoxy resins where BPA is included.

³¹ Screening programme 2013: New bisphenols, organic peroxides, fluorinated siloxanes, organic UV filters and selected PBT substances, Norwegian Environment Agency, Report M-176/2014

³² <https://tema.miljodirektoratet.no/no/Tema/Kjemikalier/Miljogifter/Bisfenol-A/>

Phthalates

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.

Aziridines and polyaziridines

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.

Pigments and 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.

O16 Volatile organic compounds in adhesives

Volatile organic compounds (VOC), including volatile aromatic compounds (VAH), may be present in the adhesive to a maximum of 3% by weight.

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

Resin used in the production of laminate is exempted from the requirement that the laminate must meet later requirements for VOC emissions.

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.

Background

The requirement remains unchanged. 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

laminates must meet later requirements for VOC emissions to ensure that the resin cures properly.

O17 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 laminates is exempted from the requirement if the laminate fulfils later requirements concerning emissions of formaldehyde.

- A declaration from the manufacturer/supplier of the chemical product that the requirement is fulfilled.

The content of free formaldehyde in chemical products used in the production of the panel/moulding must be up to 0.2% by weight (2000 ppm) with the exception of adhesive products mixed with hardener. For adhesive products mixed with a hardener, up to 0.2% by weight (2000 ppm) of free formaldehyde is permitted in the final mixture.

Background

The limit values for free formaldehyde have been made stricter compared with the previous criteria, generation 6. For chemical products other than adhesives, the limit value has been tightened from 0.2% to 0.02% by weight. The exemption for adhesive mixed with hardener has also been removed to harmonise with the criteria for Furniture and fitments, generation 5. The adhesive must contain no more than 0.2% free formaldehyde by weight, with the requirement applying to the pure adhesive.

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

Some in the industry have been asking why Nordic Ecolabelling has a requirement for maximum content of free formaldehyde in adhesives, when there are later requirements for emission of formaldehyde. Nordic Ecolabelling wishes to retain the requirement, as low levels are generally a good thing, and it can also be important with regard to the working environment. In our experience, the requirement has also provided positive environmental and health benefits, since there are adhesives on the market that do not meet this.

3.6.3 Surface treatment

The requirements in this chapter apply to surface treatment products such as lacquers, oils, paints and stains. Any filler used is also covered by the requirements. It should be noted that chemicals used for surface treatment must also meet the requirements in Section 3.6.1.

There are also requirements for foiling with plastic.

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 in Sections 3.6.1 and 3.6.2.

O18 Plastic foiling

The type of plastic used for wrapping the surface must be stated.

Foiling with chlorinated plastics such as PVC is not permitted.

Adhesives used for foiling must fulfil the requirements in Sections 3.6.1 and 3.6.2.

State plastic type for foiling.

Background

Panels can be foiled with a thin layer of plastic. This provides a durable surface and can thus extend the life of the product. It can also reduce the use of chemicals for surface treatment. Previously, no requirements were set for such plastic foiling, and the requirement is new for this generation. A ban on PVC is a requirement that Nordic Ecolabelling includes in many criteria. The environmental impact of PVC is associated primarily with waste management, the use of additives and dioxin emissions, for example in the manufacture and incineration of PVC. The latest membrane cell technology is considered to be the most environmentally-sound means of production, but the membranes are coated with PFAS and this represents a potential source of PFAS contamination to the environment. The mercury method is still used for the production of chlorine at some plants^{33, 34}

O19 Classification of chemical products

The chemical products used for surface treatment must not have any of the classifications in the table below.

³³ Chlorine and Building Materials: A Global Inventory of Production Technologies, Markets, and Pollution, Phase 1: Africa, The Americas, and Europe, Healthy Building Network, 2018

³⁴ Chlorine and Building Materials: A Global Inventory of Production Technologies, Markets, and Pollution, Phase 2: Asia, Healthy Building Network, 2019

CLP Regulation 1272/2008		
Hazard statement	Hazard class and category	Hazard code
Toxic to the environment*	Aquatic Acute 1	H400
	Aquatic Chronic 1	H410
	Aquatic Chronic 2	H411
	Ozone	H420
Acute toxicity	Acute Tox 1 or 2	H300
	Acute Tox 1 or 2	H310
	Acute Tox 1 or 2	H330
	Acute Tox 3	H301
	Acute Tox 3	H311
	Acute Tox 3	H331
Specific target organ toxicity – single exposure/repeated exposure	STOT SE 1	H370
	STOT RE 1	H372
Respiratory sensitisation	Resp. Sens. 1, 1A or 1B	H334
Carcinogenic ¹	Carc. 1A or 1B	H350
	Carc. 2	H351
Germ cell mutagenic ¹	Mut. 1A or 1B	H340
	Mut. 2	H341
Reproductive toxicity ¹	Repr. 1A or 1B	H360
	Repr. 2	H361
	Lact.	H362

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

* Exceptions are made for UV curing surface treatment products classified as environmentally hazardous if requirement O20 is fulfilled.

Note that responsibility for correct classification lies with the manufacturer.

- 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 of the chemical products used in the surface treatment (system).

Background

The requirement has been amended to also include the classifications Toxic to the environment (H400, H410, H411 and H420), H334 and H362. The previous generation of the criteria contained a requirement limiting the amount of environmentally hazardous ingoing substances in the chemical products used in the surface treatment of the Nordic Swan Ecolabelled product. This requirement has been replaced by a complete ban on the presence of chemical products in any of the environmentally hazardous classifications listed in the requirement. Classification H334 (Allergenic, Respiratory sensitisation) has been added for work environment reasons and to harmonise with the Nordic Ecolabelling criteria for Furniture and fitments. H362 is a classification that did not exist when the criteria were previously revised. 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.

There is an exemption for UV curing surface treatment products that are classified as environmentally hazardous. UV products have several advantages

as they provide a durable surface and contain a low amount of solvents. Later requirements are placed on the amount of VOC applied, which promotes water-based UV products.

UV products contain acrylates, and more and more acrylates are being classified as environmentally hazardous or given stricter classifications. Acrylates and photo initiators are two vital components for UV products to cure. 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. Setting requirements on e.g. the maximum amount of environmentally hazardous substances applied means that only UV products with a 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 also becomes less resistant and thus offers poorer quality.

O20 UV curing surface treatment system

UV curing surface treatment products must be applied to the material in 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.

- Description of the process and how waste and residual waste are handled, including information on who receives the residual waste from the performer of the surface treatment.

Background

The requirement above 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.

O21 Classification of ingoing substances

Ingoing substances in the chemical product that is used for the surface treatment 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
Toxic for reproduction 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.

Exemptions apply for:

- Photo initiators classified as H351, H341 or 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 with time limits up to and including 31.12.2024.
 - Mequinol (CAS no. 150-76-5) classified as H361
 - The hardener in two-component UV products can be exempted from the requirement if the following is met: it must be documented that the workers are not exposed to the components, e.g. by using safety equipment when mixing or that the mixing takes place automatically without exposure of the workers and that the application of the finished two-component system is done in a closed system.
- 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).
- A declaration from the manufacturer of the chemical product(s) used in the surface treatment.
- Exemption for two-component products: description of the application system and how workers are protected from exposure.

Background

The requirement has been tightened to now include Category 2 substances. An exemption applies for photo initiators. They may be present in UV products. They are present in small amounts but are necessary to speed up the hardening process.

An exemption has also been introduced for the hardener in two-component UV products if it can be documented that workers are not exposed and application takes place in closed systems. After curing, the hardener no longer has these properties. Nordic Ecolabelling generally wants to limit the use of chemicals with these properties as much as possible, but in some cases, it is difficult to find good substitutes. As these are industrial processes that take place under controlled conditions, the consumer will not be exposed to these substances.

Exemptions have also been added for titanium dioxide (CAS no. 13463-67-7), 1,1,1-Trimethylolpropane (TMP, CAS no. 77-99-6) and mequinol (CAS no. 150-76-5). Titanium dioxide is a white pigment that is used in many different types of products, including being used in almost all pigmented surface treatments. 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 coated with TMP. Mequinol is used as a diluent in binders for UV surface treatments. All three substances are necessary for use in surface treatment products and have recently been classified as CMR category 2, either as a harmonised classification or self-classification. There are currently no good substitutes and exemptions have therefore been given. However, the exemption for TMP is time-limited since the industry is working to substitute the substance.

O22 Prohibited substances

The chemical product must not contain the following substances:

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

- Halogenated organic compounds with the following exceptions:
 - The preservatives bronopol, IPBC and CMIT/MIT (3:1). These are addressed in a separate requirement, see O14.
 - Halogenated organic pigments that comply with the Council of Europe recommendation “Resolution AP (89) 1 on the use of colourants in plastic materials coming into contact with food”, point 2.5
 - Epoxy acrylate used in UV curing surface treatment products
- Aziridine and polyaziridines
 - 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.
 - Bisphenol A used in the production of epoxy acrylate is not covered by the requirement.
- APEO (alkylphenol ethoxylates) and APD (alkylphenol derivatives)/alkylphenols ***
- Phthalates
- Pigments and additives based on lead, tin, cadmium, chromium VI and mercury, and their compounds
- Volatile aromatic hydrocarbons (VAH). They are permitted in the chemical product as an impurity at a level of not more than 1% by weight
- Endocrine disruptors: Substances on the EU member state initiative “Endocrine Disruptor Lists”, List I, List II and List III. See links below.
 - An exemption is made for BHT that is included in UV curing lacquers and paints. If BHT receives a harmonised classification that means the substance does not meet the requirements in the criteria document, the exemption will lapse.

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.

** The Candidate List can be found on the ECHA website:
<http://echa.europa.eu/candidate-list-table>*

*** PBT and vPvB in accordance with the criteria in Annex XIII of REACH*

**** Alkylphenol derivatives are defined as substances that release alkylphenols when they break down.*

- ☒ Safety data sheet for each chemical product used in surface treatment in compliance with current European legislation (Annex II of REACH, Regulation (EC) No. 1907/2006).
- ☒ Declaration from the manufacturer of the chemical product(s) used in the surface treatment.

Background

The requirement is largely the same as in Section 3.6 with the exception of VAH. In addition, there are now specific exemptions that are relevant for surface treatment products.

Volatile aromatic hydrocarbons (VAH)

The previous generation of the criteria limited the amount of VAH only in adhesive products. The limit has now been changed to also cover chemical products for surface treatment. This is the case in other Nordic Ecolabelling criteria, e.g. Furniture and fitments. Volatile aromatic hydrocarbons (VAH) are volatile organic compounds where one or more benzene rings are contained within the molecule, e.g. toluene, benzene and xylene. VAHs are very stable and have a specific impact on the environment and human health, including damage to DNA. Exposure to these products should be minimised. For this reason, no more than 1% by weight is permitted in the chemical product.

Paint pigments:

Halogenated paint pigments are used in the paint industry and an exemption is made if they meet the EU's requirements concerning colourant pigments in food packaging under Resolution AP (89) item 2.5. PCBs have been found in analyses of paints containing organic pigments. PCBs are not added but can be formed in the production process by reactions between different chlorinated solvents and the organic pigment. Nordic Ecolabelling does not really want to allow PCBs, but since it is not possible to set a zero limit for the pigments, Nordic Ecolabelling has chosen the same level that is approved in food packaging (Resolution 89 point 2.5). This threshold has been set because it is an established method in the industry and the low threshold allowed in food packaging is considered strict enough for indoor surface treatment products. The exemption for these pigments is necessary to enable the manufacturers to make products with good colour fastness and not use pigments that are even more damaging to the environment.

Epoxy acrylate in UV curing surface treatment products

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 surface finishing 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 surface treatment 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.

BHT in UV curing lacquers and paints

BHT is included in the EU member state initiative “Endocrine Disruptor Lists”, List II Substances under evaluation for endocrine disruption under EU legislation. BHT has an important function in UV curing lacquers and paints and is difficult to replace, therefore an exemption has been introduced with a maximum limit in the chemical product. Nordic Ecolabelling does not want to prohibit the use of UV curing lacquers and paints, as they have other positive properties. If BHT receives an official harmonised classification that is not permitted in these criteria, the exemption is no longer valid.

Exemption for aziridine/polyaziridines

Aziridines and polyaziridines are on the list of prohibited substances as they are often classified as CMR. Polyaziridines are used as crosslinks in surface treatment systems. Product developments are constantly being made in the field of surface treatment, including the development of new types of aziridines as crosslinks. If it can be documented that the aziridine compound used is not classified as carcinogenic, mutagenic or reprotoxic by any manufacturer or ECHA, it is exempted from the requirement.

O23 Free formaldehyde

The content of free formaldehyde in each individual chemical product used for surface treatment must not exceed 0.2% by weight (2000 ppm).

- Declaration from the manufacture of the chemical product(s) in the surface treatment system.

Background

For further background information about free formaldehyde, see Section 3.6.3.

O24 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/m²), 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

The requirement is new since the previous generation of the criteria did not take into account the efficiency of the application method. This change has been made to harmonise with other Nordic Ecolabelling criteria, e.g. Furniture and fitments and Floor coverings. Information about applied quantities, number of coats and method of application is required to calculate applied quantities of VOCs in subsequent requirements.

O25 Amount of volatile organic compounds (VOC) applied

The chemical products that are used must meet one of the following alternatives in each surface treatment system:

- a) The total VOC content must not exceed 5% by weight
- b) The total amount of VOCs applied must not exceed 10 g/m² treated surface.

The applied amount of VOCs in option b) is calculated using the following formula:

$$\frac{\text{Applisert mengde av overflatebehandlingsprodukt} \left(\frac{\text{g}}{\text{m}^2}\right) \times \text{Andel VOC i overflatebehandlingsproduktet} (\%)}{\text{Overflatebehandlingsens virkningsgrad}(\%)}$$

For both these alternatives, 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.
- ☒ A calculation from the performer of the surface treatment showing that alternative b) in the requirement is met if the surface treatment system does not meet alternative a).

Background

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

The limit values remain unchanged in the requirement, since they are still considered to be strict. One change that has been made is inclusion of the efficiency rate of the application method. This is described in more detail in the background to the previous requirement.

3.7 Emissions

The requirements in this chapter apply to different types of emissions. Emissions from the product (3.7.1), from the production process (COD 3.7.2) and in the working environment (3.7.3) are subject to requirements. The requirements differ depending on the type of product.

3.7.1 Emissions from product

- Wood-based products containing formaldehyde-based adhesives must fulfil O26.
- Sheet material coated with laminate (including melamine) and panels based on renewable raw materials other than wood must fulfil O27.

O26 Formaldehyde emissions – wood-based products

The requirement does not include HPL, compact laminate, sheet material coated with laminate (including melamine), and panels based on renewable raw materials other than wood.

The requirement applies to the raw wood-based product.

Wood-based products containing formaldehyde-based adhesives must comply with one of the following limit values:

- a) Emissions of formaldehyde shall on average not exceed 0.062 mg/m³ air according to test method EN 717-1 or
- b) Emissions of formaldehyde shall on average not exceed 0.124 mg/m³ air according to test method EN 16516.

** It is unclear whether construction panels are covered by the EU taxonomy. Nordic Ecolabelling is following the development.*

- ☒ 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. 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.

Background

Adhesive systems containing formaldehyde are often used in the manufacture of wood-based panels. Action has been taken to reduce emissions of formaldehyde from the panels as a finished product. Formaldehyde is a toxic, sensitising and carcinogenic substance and Nordic Ecolabelling wants to restrict its use to the greatest extent possible from an occupational health and safety point of view and to reduce emissions in the use phase.

The EU's classification system for emissions of formaldehyde from wood-based panels is defined in the harmonised standard EN 13986. The current lowest emission class is E1, where the limit values are a maximum of 0.124 mg/m³ according to test method EN 717-1. Work is underway on a new common statutory lower limit value in the EU. Nordic Ecolabelling is monitoring this work and will review all criteria with requirements for formaldehyde emissions when the limit value has been decided.

On 1 January 2020, Germany introduced a new legal requirement which means that the reference method for measuring formaldehyde emission has been

changed from the previous EN 717-1 to EN 16516. If the method EN 16516 is used, the limit value is the same as that for E1, 0.124 mg/m³. If, on the other hand, EN 717-1 is used as a method, the panel must meet a limit value of half E1 (0.062 mg/m³). Method EN 16516 was not included in the earlier generation of the criteria, but it has now been added since the new legal requirement in Germany will probably mean that this method will become standard for external testing in Europe. Tests according to EN 16516 give a higher result than EN 717-1, but there is no exact correlation between the methods yet.

Nordic Ecolabelling has changed the requirement so that it only refers to methods EN 717-1 and EN 16516 with the same limit values as the legal requirement in Germany. Other test methods may be approved if an independent third party (e.g. a test institute) has established a correlation. The change gives a stricter level for wood-based panels that are tested in accordance with EN 717-1, and will have the greatest impact on MDF/HDF, which previously had its own slightly higher limit value. It is unclear whether the requirement will be stricter for panels that are tested in accordance with EN 16516. Nordic Ecolabelling wishes to have the same limit values as the German legal requirement, since a Nordic Swan Ecolabelled product would otherwise not automatically be legal in Germany.

O27 Emissions from panels

Emissions from panels coated with laminate (including melamine), HPL, compact laminate, surface-treated panels/mouldings and panels based on renewable raw materials other than wood, such as straw or linen, must meet the limit values in the table below.

The test shall be carried out in accordance with the test method EN 16516.

Substance or group of substances	Limit value after 28 days* (µg/m ³) according to EN 16516.
TVOC (C6-C16)	160
SVOC (C16-C23)	30
Formaldehyde	20

** If the limit values in the table are met for a period shorter than 28 days, this is accepted.*

- ☒ 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. 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.

Background

The requirement was introduced in the previous generation of the criteria, since building materials have a major impact on the indoor environment of a building, and it is important to ensure that Nordic Swan Ecolabelled panels contribute to a good indoor environment. In this generation, the requirement limit for emissions of formaldehyde has been tightened from 30 to 20 µg/m³. This tightening is based on a review of results from emission testing of Nordic Swan Ecolabelled products and the limit values of other certification schemes. A limit value of 20 µg/m³ formaldehyde is the same as the limit set in BREEAM-NOR v.6.0 Exemplary level. There are

certifications for the indoor environment that have tighter limit values – Eurofins Indoor Air Comfort Gold and Greenguard Gold, for example, have limit values of 10 and 9 $\mu\text{g}/\text{m}^3$ formaldehyde, respectively. A shift to 20 $\mu\text{g}/\text{m}^3$ formaldehyde is considered sufficiently strict for this generation of the criteria, which sets many other requirements in areas other than the indoor environment. These include tougher chemical requirements, which also ensure low emissions from the finished product.

The limit values for VOC and SVOC have not been tightened and therefore remain the same. The review of results from emission testing of Nordic Swan Ecolabelled products and the limit values of other certification schemes indicated that the limit values for the Nordic Swan Ecolabel remain strict and relevant.

In the previous generation of the criteria, wood-based panels with surface treatment had to meet specific limit values for emissions of TVOC, SVOC and formaldehyde. This requirement has been removed, since it is deemed enough for wood-based panels to meet the above requirement concerning emissions of formaldehyde, and for any surface treatment to fulfil the tough chemical requirements specified. Also contributing to low emissions is the requirement stating maximum VOC amounts that may be applied. When reviewing the limit values set by other certifications, none was found that set specific requirements for surface treated products. This also makes it difficult to assess the level of the limit values previously set.

3.7.2 Emissions from production – COD

O28 Emissions of COD from wet processes

The requirement covers wet processes in panel production. COD (Chemical Oxygen Demand) emissions to water must be maximum 20 g COD/kg product (unfiltered sample).

A description of the preparation and analysis methods is given in Appendix 1.

- Measurement results including information on sampling programmes and measurement methods for the past 12 months and measurement frequency.

O29 COD emissions from the production of paper and pulp used in HPL and compact laminate

The requirement applies to paper and pulp that is included in HPL and compact laminate.

COD (Chemical Oxygen Demand) emissions to water must be less than the stated COD value in the table below. A description of the preparation and analysis methods is provided in Appendix 1.

The COD is calculated by adding up COD emissions from pulp and paper:
COD mass (kg/ADt) + COD emissions paper machine (kg/ADt).

For paper produced from mixtures of chemical, recycled fibre and mechanical pulps, a weighted limit value is calculated from the proportion of the various pulp types. In the weighted calculation, the percentage of COD emissions from the paper machine must be set to 1 kg/ADT. For example, for 60% unbleached chemical mass and 40% recycled pulp, the calculation is: $(14-1 \times 0.6) + (4-1 \times 0.4) = 7.8 + 1.2 = 9.0 \text{ kg/ADT}$

Pulp types	Total COD emissions for both pulp and paper (kg/ADt)
Unbleached chemical pulp	14.0
CTMP pulp	19.0
TMP/groundwood pulp	7.0
Recycled fibre pulp	4.0

- ☒ Information about the types of pulp used in the production of paper.
- ☒ If pulp that has been checked in accordance with Nordic Ecolabelling's Basic Module for paper is used: Description of the producer, production site and name of the pulp.
- ☒ Description of the sampling procedure including measurement methods and measurement results in the last 12 months from the producers of the paper and pulp.
- ☒ Calculation from the producers of the paper and pulp showing that the total emissions of COD are below the relevant limit value in the requirement.

Background

The requirement is unchanged compared with generation 6 of the criteria, except that COD from the production of paper and pulp has been clarified with regard to the different types of pulp used in the paper.

Panel production using a wet process and pulp and paper production produce emissions to water of oxygen-demanding organic matter (COD). Microorganisms consume oxygen to break down the organic matter. This may lead to low oxygen concentrations in the water and, in some cases, anaerobic conditions. A benefit of panels produced using a wet process is that they usually do not contain any adhesive – the lignin already in the wood is enough to hold the material together. Nordic Ecolabelling therefore wishes to allow panel production with a wet process, but it is important to ensure low levels of COD emissions.

Nordic Ecolabelling's Basic Module for paper also contains requirements concerning other emissions, such as emissions of nitrogen and phosphorus. It has been decided, however, only to set requirements for COD in these criteria. COD emissions also correlate with other emissions. If the emission of COD is low, emissions of other substances are thus also expected to be low.

3.7.3 Emissions from production – working environment

O30 Emissions to air from production of laminate in HPL and compact laminate

Laminate 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 programmes, 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. This generation of the criteria has a tighter requirement than before concerning emissions of formaldehyde, during both an 8-hour period and a reference period of 15 minutes. The new, stricter 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). The limit values for phenol in the previous generation of the criteria already matched the levels identified in the examined legislation, and they have therefore not been tightened.

O31 Emissions of wood dust

When producing products containing wood-based raw materials, emissions of inhalable wood dust to air in the workplace must not exceed 2 mg/m³.

If the legislation in the individual country has a lower limit value than stated in the requirement, the legal limit value must be complied with.

- ☒ Test report showing compliance with the limit value. The report shall contain information about measurements, sampling programmes, measurement methods and measurement frequency. For analysis methods, see Appendix 1.
- ☒ Alternative documentation showing the legal requirement in the country where 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

The requirement remains unchanged. The requirement seeks to ensure that working conditions in relation to dust emissions are acceptable, regardless of where the panel is produced.

3.8 Climate and energy

The requirements in this chapter concern energy consumption and energy sources. Different requirement limits are set based on the type of product, such as wood-based panel, laminate or glulam, and the parts of the production that

are covered will also vary. For example, energy consumption in the actual production is subject to requirements for construction panels, while for solid wood panels and mouldings, the focus is on the drying process and finishing.

The calculations must also include energy consumption for adhesive production. If no detailed information is available from the relevant adhesive manufacturers, a standard value of 15 MJ/kg of adhesive may be used. Energy consumption in the production of any surface treatment should not be included. For certain product types, the calculation must cover total energy consumption for drying and the actual production of the product, e.g. glulam. If it proves difficult to obtain data on energy consumption from all subcontractors in drying and processing, a standard value of 1500 MJ/m³ can be used. When converting to MJ/kg, the density of the specific product should be used in the first instance, but a value of 500 kg/m³ can be used if this is not available. Further descriptions of how the energy calculation should be carried out can be found in Appendices 2 and 3.

3.8.1 Laminate

For laminate, requirements are set for energy consumption in the production of kraft paper and paper pulp that is included in HPL and compact laminate, as well as energy consumption in the production of the laminate itself. A detailed description of how the calculation is to be made is given in Appendix 2 (pulp and paper) and Appendix 3 (panel production).

O32 Energy consumption in the production of kraft paper and pulp that is included in HPL and compact laminate

The requirement covers pulp and paper used in the production of kraft paper.

The requirement does not cover the production of decor paper.

The following requirements must be met:

$$P_{\text{electricity}(\text{total})} < 2.5$$

$$P_{\text{fuel}(\text{total})} < 2.5$$

For paper consisting solely of TPM/GW* produced on-site, the limit value for $P_{\text{fuel}(\text{total})}$ is 1.25

P is the energy score for the paper and pulp production. The energy scores from the production of both the paper and the pulps are included in $P_{\text{electricity}(\text{total})}$ and $P_{\text{fuel}(\text{total})}$. A more detailed description of how the calculation should be carried out can be found in Appendix 2.

TPM/GW = Thermomechanical pulp/groundwood

- If pulp that has been checked in accordance with Nordic Ecolabelling's Basic Module for paper is used: Description of the producer, production site and name of the pulp.
- Calculation from the producers of the paper and pulp showing that the point limit is fulfilled. A calculation sheet has been developed for the energy calculation, which can be obtained from Nordic Ecolabelling.

O33 Energy consumption – laminate production

Energy consumption in the production of laminate must not exceed the following limit values:

Panel type	Energy consumption MJ/kg panel
Compact laminate HPL ≥ 2 mm included	14 MJ/kg
Other types of laminate ≤ 2 mm HPL ≤ 2 mm included	8 MJ/kg

A detailed description of how to perform the calculation is given in Appendix 3.

- ☒ Calculation showing compliance with the requirement. The calculation must contain information about the quantity of panels produced, electricity and fuel consumed, and which fuel sources have been used.

3.8.2 Wood-based panels

O34 Energy consumption – wood-based panels

Energy consumption in the production of the panel must not exceed the limit values given in the table below:

Panel type	Energy consumption MJ/kg panel
Particleboard	6 MJ/kg
MDF and HDF	7 MJ/kg
Wood-based panels – wet process	13 MJ/kg
OSB	4 MJ/kg
Plywood	9 MJ/kg
LVL	9 MJ/kg
SWP	5 MJ/kg

If a wood-based panel type is laminated, the wood-based panel must fulfil the requirement limit here, while the laminate must fulfil the requirements for laminate in O33. Melamine-coated wood panels must fulfil the requirement limit here.

Mouldings in equivalent materials as shown in the table are also covered by the requirement limits.

A detailed description of how to perform the energy calculation is given in Appendix 3.

- ☒ Calculation showing compliance with the requirement. The calculation must contain information about the quantity of panels produced, electricity and fuel consumed, and which fuel sources have been used.

3.8.3 Panels in other raw materials

O35 Energy consumption – panels in other renewable raw materials

Energy consumption in the production of panels based on other renewable raw materials, such as straw or linen, must not exceed 1 MJ/kg.

A detailed description of how to perform the calculation is given in Appendix 3.

- ☒ Calculation showing compliance with the requirement. The calculation must contain information about the quantity of panels produced, electricity and fuel consumed, and which fuel sources have been used.

3.8.4 CLT and glulam

The requirements in this section concern cross laminated timber (CLT) as defined in EN-16351 Timber structures – Cross laminated timber, and glued laminated timber (glulam) as defined in EN-14080 Timber structures – Glued laminated timber. EN-14080 covers the following products: Glued laminated timber (glulam), glued solid timber, glulam with large finger joints and block glued glulam.

O36 CLT and glulam (cross and glued laminated timber)

Products covered by this requirement are CLT as defined in EN-16351 and various types of glulam covered by EN-14080.

The energy consumption in production must not exceed 5 MJ/kg.

A detailed description of how to perform the calculation is given in Appendix 3.

- Calculation showing compliance with the requirement. The calculation must include information about suppliers, the quantity from each supplier and the consumption of electricity and fuel, as well as the fuel sources used.

3.8.5 Solid wood panels and mouldings

O37 Solid wood panels and mouldings

The energy consumption for drying, sawing and planing wood that is included in solid wood panels and mouldings must not exceed 1350 MJ/m³.

The limit value can be met per supplier or as an overall average of the suppliers.

- Calculation showing compliance with the requirement. The calculation must include information about suppliers, the quantity from each supplier and the consumption of electricity and fuel, as well as the fuel sources used.

Background

The most environmentally friendly energy is the energy that is not used. Energy-efficient production is generally important in reducing the environmental impact from the use and production of energy. In a complex world where lack of energy might become more prominent in the future, it is important that everyone makes an effort to reduce their own consumption. Energy consumption also directly affects greenhouse gas emissions. Energy-efficient production and lower energy consumption will thus also reduce greenhouse gas emissions. Nordic Ecolabelling is therefore committed to setting requirements concerning maximum use of energy wherever possible. The RPS analysis shows that there is generally high environmental relevance in setting requirements for energy consumption, for both ingoing materials and the panel production itself. Several of the production lines use processes that involve a great deal of heat or pressure. Differentiated energy requirements have been set, as the production processes differ, which thus also results in differences in energy consumption. It will also make it possible to separate out the production lines that perform well on energy within each product type.

For panels based on renewable raw materials, a high proportion of renewable fuels is often used. This may be from waste wood that is not of sufficient quality to be included in the panels. But there are also manufacturers that use electricity or fossil raw materials in the form of gas or oil.

In panels where paper makes up a high proportion of the material composition, the paper contributes a significant part of the panel's total energy load. There are therefore energy requirements for pulp and paper production for the paper types included in the panel, in addition to energy requirements for the actual panel production. The manufacturer of the pulp and paper must document the energy consumption. The requirement does not cover decor paper, as it is a little further back along the supply chain, making documentation more difficult to obtain. In addition, it constitutes a relatively small proportion of the product's ingoing paper. An HPL panel may contain around 50–60% kraft paper and 2–15% decorative paper. Energy requirements and calculation methods for pulp and paper are taken from Nordic Ecolabelling's Basic Module for paper. The Basic Module does not contain specific requirements for the type of paper used in laminate, kraft paper, and the reference value for the production of this paper type has therefore been specifically developed for and adapted to this product group.

Energy requirements for solid wood products such as panels and mouldings are new to this generation. Here, energy consumption is mainly related to the drying and processing of wood, such as sawing and planing, with the drying process as the process with the highest consumption. Nordic Ecolabelling has had limited information on which to base the requirements. Investigations have focused on literature, EPDs and contact with the industry. There are some EPDs, but it is difficult to compare the information available there and use it to find a relevant requirement level. Information from studies shows that sawmill energy consumption is about 1500 MJ/m³^{35, 36, 37}. It appears that there is great variation between different companies. A specific reason for this has not been identified, but the type of drying process used is most likely a key factor for energy efficiency. In a batch kiln, batches of sawn timber are placed inside, the doors are closed and the heating begins, with moisture also added to the air. Gradually during the process, the air humidity is changed to create a drier climate. In a progressive kiln, sawn timber is conveyed continuously through different climate zones. The climate is kept constant in each zone, with the wood moving through the different zones over the course of the drying time. Since the progressive kilns have a constant climate, they are ideal for the installation of heat exchangers, and will thus consume less energy. Because this is a continuous process, it also avoids the energy hungry warm-up period that is required in a batch kiln.

For products consisting of solid wood and adhesive, such as CLT and glulam, a new energy requirement has also been introduced. The requirement has been set on the basis of dialogue with stakeholders. It was also possible to label CLT in the previous generation of the criteria, but there was no specific requirement for this type of product.

3.9 Innovation

The requirement in this chapter covers various areas where Nordic Ecolabelling sees an opportunity to promote manufacturers that contribute to innovation, e.g. by using bio-based raw materials for adhesive production; to the circular economy

³⁵ Silje Wærp et al., *Livsløpsanalyser av norske treprodukter*, MIKADO, Sintef Byggforsk, 2009. Norway.

³⁶ Jungmeier, G. et al, *Allocation in Multi Product Systems – Recommendations for LCA of Wood-based Products*

³⁷ Henning Horn, 2008: ENØK i varme- og tørkeanlegg i trelastindustrien, Rapport 72, 2008, Treteknisk

or reduced greenhouse gas emissions; and to measures concerning biodiversity. One of the points must be fulfilled, and the manufacturer can decide which measure they wish to fulfil. This offers flexibility. Nordic Ecolabelling would also like to provide signals as to what may become mandatory in the next revision of the criteria.

O38 Innovation in production

The applicant/producer must fulfil at least one of the following options:

Area	Requirement
Chemicals	Adhesives and/or surface treatment products, such as paints, lacquers or stains, used in the production of the Nordic Swan Ecolabelled product are Nordic Swan Ecolabelled.
	No adhesives based on urea-formaldehyde or isocyanate are used in the production of the Nordic Swan Ecolabelled product.
	The binder in the adhesive used in the production of the Nordic Swan Ecolabelled product contains one or more components that are made of renewable raw materials.
Raw materials	A minimum 100% by weight of the wood raw material, bamboo and cork used in the Nordic Swan Ecolabelled 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.
	A minimum 50% by weight of the wood raw material, bamboo and cork used in the Nordic Swan Ecolabelled product (production line) is post-consumer* recycled wood/paper raw material.
Climate	The production (production line) of the Nordic Swan Ecolabelled panel, moulding and glulam is fossil-free*. * Fossil-free means that the energy used for the production of heat, steam or pressure on the production line is not based on fossil energy sources such as oil, diesel and natural gas. Electricity is not covered by the requirement.
	Energy consumption in the production of the Nordic Swan Ecolabelled panel is at least 10% lower than the limit values specified in requirements O33–O37.
	The manufacturer has its own energy production, e.g. solar panels, solar collectors or its own wind turbine, which is used for the manufacturing of the Nordic Swan Ecolabelled panels, mouldings or glulam. This does not apply to heat pumps.

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

Background

Nordic Ecolabelling sees this requirement as a means to promote manufacturers who take innovative action and who contribute in various ways to reducing the overall environmental impact from production, either related to the product itself or to the conditions on the production line.

The use of Nordic Swan Ecolabelled chemicals such as adhesives, paints, lacquers or stains is a good way to promote the use of chemicals that meet strict requirements concerning the content of substances that are harmful to health and the environment.

4 Licence maintenance

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

O39 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.

O40 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.

5 Changes compared to previous version

In this revision, a major change has been made to the product group definition, with the product group now divided up so that the requirements for products made from renewable materials have their own document. There will therefore

be some adjustments to the requirement numbers and structure. Below is a short list of the key changes compared with the previous version of the criteria. It is a good idea to use a table like this:

Comparison of requirements for Construction and façade panels in criteria version 6 and criteria version 7.

Proposed requirement generation 7	Requirement generation 6	Same req.	Changed	New req.	Comment
O1 Description of the product	O1	x			The requirement is more or less the same as in the previous generation.
O2 Quality and properties	O34	x			The requirement is similar to the previous generation, but one of the options for documenting the requirement has been removed.
O3 Maintenance	O35	x			The previous requirement has been divided into two (O3 and O4).
O4 Information for users	O35		x		The previous requirement has been divided into two and some new points have been introduced, including information about the manufacturer's take-back arrangement.
O5 Tree species – restrictions	O5		x	x	The requirement has been updated with Nordic Ecolabelling's requirements concerning tree species that are prohibited or restricted. The requirement concerning raw material used in paper production is new.
O6 Traceability and certification	O6		x		The manufacturer of the product is required to be CoC certified.
O7 Chemicals – recycled wood raw material				x	New requirement for testing of chemicals in recycled wood raw material.
O8 Paper raw material	O5		x		The requirement has been tightened in that the laminate manufacturer must be CoC certified and the limit for certified raw material is now 70%.
O9 Other renewable raw materials				x	Requirement introduced for other renewable raw materials.
O10 Antibacterial substances	O22	x			
O11 Nanomaterials	O23	x			
O12 Preservatives	O22		x		Requirement limit for MIT has been tightened

Proposed requirement generation 7	Requirement generation 6	Same req.	Changed	New req.	Comment
O13 Classification of chemical products	O19		x		Prohibition of chemicals classified as environmentally hazardous has been added.
O14 Classification of ingoing substances	O20		x		Prohibition against CMR category 2 added.
O15 Prohibited substances	O21		x		The requirement has been updated, e.g. referring the requirement for endocrine disruptors to other lists, and the substances that are prohibited have also been expanded, e.g. there is a ban on all bisphenols.
O16 Volatile organic compounds in adhesives	O26	x			
O17 Free formaldehyde	O28		x		The requirement limit for formaldehyde content has been tightened.
O18 Plastic foiling				x	
O19 Classification of chemical products (surface treatment)	O19		x		A ban on chemicals classified as environmentally hazardous has been added (with an exemption for UV curing products). Prohibition of H334 (allergenic) has been added.
O20 UV curing surface treatment system				x	
O21 Classification of ingoing substances (surface treatment)	O20		x		Prohibition against CMR category 2 has been added.
O22 Prohibited substances (surface treatment)	O21		x		See O16. Some other exemptions are granted.
O23 Free formaldehyde (surface treatment)	O28	x			
O24 Application method and amount – surface treatment				x	
O25 Amount of volatile organic compounds (VOC) applied	O27		x		The requirement limit has not been changed, but the calculation now takes the application method into account.
O26 Formaldehyde emissions – wood-based products	O32		x		The requirement applies generally for wood-based products that contain formaldehyde-based adhesives. The requirement limits have been tightened.
O27 Emissions panels	O33		x		The requirement limit for formaldehyde has been tightened.
O28 Emissions of COD from wet processes	O29	x			

Proposed requirement generation 7	Requirement generation 6	Same req.	Changed	New req.	Comment
O29 Emissions of COD from the production of pulp and paper – HPL and compact laminate	O9	x			The requirement remains unchanged, but with clarification on how the calculation should be made when several pulps are included.
O30 Emissions to air from laminate production – HPL and compact laminate (working environment)	O31	x			
O31 Emissions of wood dust	O3	x			
O32 Laminate – pulp and paper production – HPL and compact laminate (energy)	O12		x		The requirement has been updated in accordance with Nordic Ecolabelling's Basic Module for pulp and paper, generation 3. The nominal limit has been removed, and only relates to kraft paper.
O33 Laminate (energy)	O13		x		Requirement limits have been tightened.
O34 Wood-based panels (energy)	O14		x		The requirement limits have been tightened and divided up per panel type, such as MDF, particleboard and OSB.
O35 Panels – other renewable raw materials (energy)				x	New req.
O36 CLT and glulam (energy)					New req.
O37 Solid wood panels and mouldings (energy)				x	New req.
O38 Innovation				x	New req.
O39–O40			x		The requirements have been updated in accordance with Nordic Ecolabelling's current standard formulation.

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 2 Energy requirements for paper and pulp production

Energy calculation guidelines

Use of energy in the form of fuel and electricity is subject to requirements. Through information on the actual energy consumption during production in relation to set reference values, an energy point is calculated.

The energy calculation covers the entire paper product; both the paper production and the pulps used. Fillers in paper and transport of raw materials as well as within the factory area shall not be included in the energy calculation.

Non-integrated pulp mill

Electricity

The calculations must include both purchased and on-site produced electricity.

Electricity = on-site produced electricity + purchased electricity - sold electricity.

The calculation of electricity consumption must be based on invoices and readings from electricity meters. On-site produced electricity is documented using readings from electricity meters. The requirement covers all processes from debarking to drying the pulp. An exemption applies to electricity for offices or lighting in the factory area. The average electricity consumption can be used for all pulps if the pulp mill only produces pulps of equivalent quality using the same type of process.

Fuel

The calculation must include both purchased fuel and fuel produced at the plant, divided into renewable and fossil fuels. The pulp producer must report the fuel used for on-site generated electricity and should deduct the fuel for electricity before reporting it to the paper manufacturer. The paper manufacturer deducts the fuel consumption from internally produced electricity using a factor of 1.25 in its own energy calculation.

Fuel pulp = fuel produced at the plant + purchased fuel - sold fuel * (sold fuel and/or heat/0,8)

The amount of fuel purchased must be adjusted to the quantities at the start and end of the current year. Consumption of internally produced fuel from bark, shavings and other wood residues is calculated using the thermal values for the fuels used or measured.

**Excess energy*

Excess energy sold in the form of electricity, steam or heat is subtracted from the total consumption. The amount of fuel used to produce electricity or heat is calculated by dividing the sold electricity or heat by 0.8. This is equivalent to an average efficiency for the total production of electricity and heat.

Alternatively, the actual efficiency of the plant in the conversion of fuel to heat energy can be used.

Verification

An overview of the factory's energy supply system showing the number of boilers, with information about the boiler effect and which fuel is used.

Report on the amount of purchased, on-site produced and sold electricity.

Report on the amount of purchased, on-site produced and sold fuel/heat

Conversion factors and efficiency must be stated if thermal energy has been re-calculated to fuel.

The calculation sheet produced by Nordic Ecolabelling can be used.

Non-integrated paper mill

Electricity

The calculations must include both purchased and on-site produced electricity.

Electricity = on-site produced electricity + purchased electricity - sold electricity.

The calculation of electricity consumption must be based on invoices and readings from electricity meters. On-site produced electricity is documented using readings from electricity meters. The requirement covers all processes from pulping to drying the base paper. An exemption applies to electricity for offices or lighting in the factory area. The average electricity consumption can be used for all paper if the paper mill only produces paper of equivalent quality using the same type of process.

Fuel

All purchased fuel must be included in the calculations, divided into fossil and renewable fuels.

Fuel paper = purchased fuel - sold heat converted to excess energy*

The amount of purchased fuel must be adjusted to the quantities at the start and end of the current year.

**Excess energy*

Excess energy sold in the form of electricity, steam or heat is subtracted from the total consumption. The amount of fuel used to generate electricity or heat that is sold off is calculated by dividing the sold electricity or heat by 0.8. The coefficient of 0.8 is equivalent to the average energy efficiency for total heat and electricity production. Alternatively, the actual energy efficiency of the plant in the conversion of fuel to heat energy can be used.

Verification

An overview of the paper machinery's energy supply system showing the number of boilers, with information about the boiler effect and which fuel is used.

Report on the amount of purchased, on-site produced and sold electricity.

Report on the amount of purchased, on-site produced and sold fuel/heat

Conversion factors and efficiency must be stated if thermal energy has been re-calculated to fuel.

The calculation sheet produced by Nordic Ecolabelling can be used.

Steam

If excess steam from another production process is used (e.g. from another industry), the energy content of the steam must be included in the calculation. In this case, Table 1, the steam table should be used. If steam from electric boilers is used, the energy content must be converted to fuel in the same way, but the energy content must be multiplied by 1.25.

Energy calculation, paper production

Energy score for paper production

Energy scores for $P_{\text{paper(electricity)}}$ and $P_{\text{paper(fuel)}}$ for paper production are calculated using the following formulas:

$$P_{\text{paper_electricity}} = \frac{\text{Electricity}_{\text{consumed}}}{\text{Electricity}_{\text{reference}}}$$

$$P_{\text{paper_fuel}} = \frac{\text{Fuel}_{\text{consumed}} - 1.25 \cdot \text{in-house generated electricity}}{\text{Fuel}_{\text{reference}}}$$

The following reference values for kraft paper must be used:

$$\text{Electricity}_{\text{reference}} = 1600 \text{ kWh/ADt}$$

$$\text{Fuel}_{\text{reference}} = 2100 \text{ kWh/ADt}$$

Verification

Calculation of energy score. The calculation sheet produced by Nordic Ecolabelling can be used.

Energy score when a mixture of different pulp types are used

The following formulas are used to calculate the energy score when a mixture of different pulp types are used:

$$P_{pulp_electricity} = \sum_{i=1}^n P_{pulp_electricity_i} \cdot pulp_i$$

$$P_{pulp_fuel} = \sum_{i=1}^n P_{pulp_fuel_i} \cdot pulp_i$$

$Pulp_i$ is the percentage of the individual pulp relative to the total pulp mixture. Due to wastage and differences in water content, the sum total of the pulp may be greater than 1. $P_{pulp(electricity)_i}$ is the energy score for electricity for pulp i . $P_{pulp(fuel)_i}$ is the energy score for fuel for pulp i .

Verification

Calculation of energy score. The calculation sheet produced by Nordic Ecolabelling can be used.

Total energy score for paper and pulp production

The total energy score for both electricity and fuel consumption for the paper production, including pulp production, is calculated using the formulas below:

$$P_{electricity} = P_{electricity_pulp} + P_{electricity_paper}$$

$$P_{fuel} = P_{fuel_pulp} + P_{fuel_paper}$$

The amount of fuel used to produce electricity in the pulp mill must be deducted by the paper manufacturer from the values received from the pulp producer using a factor of 1.25.

Worst case calculations must be included to show that each pulp recipe meets the requirements if no specific calculations are reported for each pulp mixture.

Verification

The documentation must include calculations with sub-totals. The base values used for consumed fuel and electricity must be stated. Worst case calculations must be included to show that each pulp recipe meets the requirements if no specific pulp-mixture calculations are reported for each pulp mixture present. The calculation sheet produced by Nordic Ecolabelling can be used.

Energy score for pulp production

Energy scores for $P_{pulp(electricity)}$ and $P_{pulp(fuel)}$ for paper production are calculated using the following formulas:

$$P_{pulp_electricity_i} = \frac{Electricity_{consumed}}{Electricity_{reference}}$$

$$P_{pulp_fuel_i} = \frac{Fuel_{consumed} - 1.25 \cdot in - house\ generated\ electricity}{Fuel_{reference}}$$

The table below shows the reference values for electricity and fuel:

Table 1 Reference values pulp

Process	Fuel kWh/t, Ref. value	Electricity kWh/t, Ref. value
Bleached chemical pulp	3600	650
Dried, bleached chemical pulp	4600	700
Unbleached chemical pulp	3200	550
Dried, bleached chemical pulp	4200	600
NSSC	3200	700
Dried NCCS	4100	750
CTMP	N/A	1500
Dried CTMP	900	1500
DIP	300	450
Dried DIP	1200	500
TMP	N/A	2200
Dried TMP	900	2250
Slip	N/A	2000
Dried slip	900	2050

Verification

Calculation of energy score. The calculation sheet produced by Nordic Ecolabelling can be used.

Table 2 Steam table

Enthalpy in gauged steam, h'' , as a function of absolute pressure, p or temperature, t. Enthalpy is divided by an efficiency of 0.9 and added to the heat consumption.

p Bar	t 0C	h'' KJ/kg	p bar	t 0C	h'' KJ/kg
0.50	81.3	2646.0	16.0	201.4	2791.7
0.60	86.0	2653.6	17.0	204.3	2793.4
0.80	93.5	2665.8	18.0	207.1	2794.8
1.00	99.6	2675.4	19.0	209.8	2796.1
1.20	104.8	2683.4	20.0	212.4	2797.2
1.40	109.3	2690.3	22.0	217.2	2799.1
1.60	113.3	2696.2	24.0	221.8	2800.4
1.80	116.9	2701.5	26.0	226.0	2801.4
2.00	120.2	2706.3	28.0	230.1	2802.0
2.50	127.4	2716.4	30.0	233.0	2802.3
3.00	133.5	2724.7	32.0	237.5	2802.3
3.50	138.9	2731.6	34.0	240.9	2802.1
4.00	143.6	2737.6	36.0	244.1	2801.7
4.50	147.9	2742.9	38.0	247.3	2801.1
5.00	151.8	2747.5	40.0	250.3	2800.3
6.00	158.8	2755.5	45.0	257.4	2797.7
7.00	165.0	2762.0	50.0	263.9	2794.2
8.00	170.4	2767.5	55.0	269.9	2789.9
9.00	175.4	2772.1	60.0	275.6	2785.0
10.00	179.9	2776.2	65.0	280.8	2779.5
11.00	184.0	2779.7	70.0	285.8	2773.5
12.00	188.0	2782.7	80.0	295.0	2759.9
13.00	191.6	2785.4	90.0	303.3	2744.6

14.00	195.0	2787.8	100.0	311.0	2727.7
15.00	198.3	2789.9	110.0	318.1	2709.3

Source: Thermal Engineering Data, which refers to Schmidt, E.: Properties of water and Steam in SI.Units, 1969. Springer-Verlag and R. Oldenbourg 1969.

Appendix 3 Energy calculations for production of panels, laminate, CLT and glulam

The following applies to the energy calculation in the production of wood-based panels, laminate, panels based on other renewable raw materials, CLT and glulam:

1. Energy consumption is calculated as an annual average for the entire business or the production line that is relevant for Nordic Swan Ecolabelled construction panels, laminate, CLT or glulam.
2. Energy consumption calculated as MJ/kg per panel/product must include the primary panel/product production and production of the main raw materials contained in the panel/product. The main raw materials are raw materials that make up more than 2% by weight of the finished panel/product (e.g. wood fibre and adhesive).

System delimitation for calculation:

- The calculation should not include the energy consumption for extraction of raw materials.
- For the panel/laminate/CLT/glulam production, the energy calculation should be based on data from raw material handling through to the finished panel/product, prior to any surface treatment. This means the calculation does not include timber cultivation and felling, but includes drying the wood, conveyor belt operation at the sawmill and production line, and the actual panel production. Transport at all stages and the energy consumed in the surface treatment process should not be included. The calculation must include lamination of the panel.
- For production of chemicals, such as adhesives, the energy calculation must be based on data from production of both the adhesive and the constituent raw materials. The energy content of the raw material should not be included. In the absence of specific energy data for the adhesive, a value of 15 MJ/kg for adhesive (ready-to-use solution) can be used. If multiple subcontractors are used for the same type of raw material, basing the calculation on the most frequently used supplier is allowed.
- Where fuel energy is concerned, energy from purchased fuel, internally-produced fuel and energy from waste products must be included. Self-generated energy and excess energy that is sold off should be stated, but does not count as consumed energy in the calculation. Self-generated energy refers to energy (electricity and heat) not purchased from an external supplier. Internally-produced fuel sources and residual products are not counted as self-generated energy.

Appendix 4 RPS analysis for wood-based panels and HPL

The RPS analyses have been taken from the revision of the background document for 010 Nordic Ecolabelling of Construction and facade panels, and mouldings, generation 6 (2014).

RPS analysis for wood-based panels

Overall priority	Area and level indication (high – medium – low) for R, P and S	Comments
High	<p>Resources – wood raw material High R, high P, high S</p>	<p>High RPS for requirement for sustainable or recycled wood raw material.</p>
	<p>Energy – material and panel production High R, medium to high P, medium to high S</p>	<p>High RPS has been identified for the energy impact of panel production and drying of wood raw material. The actual adhesive production also contributes a significant part of the energy impact. Here it is the production of the raw materials that requires energy, not the mixing of the adhesive. Steerability is therefore only medium, as there are several links further back in the product chain and the potential has been unclear.</p>
	<p>Chemicals – general High R, medium P, high S</p>	<p>The chemical requirements apply to all chemical products used in panel production. Here the assessment is that formaldehyde, VOC and isothiazolinones in the binders have the highest relevance. Also ensuring low content of problematic chemicals in surface treatments, e.g. VOC, flame inhibitors, heavy metals in pigments.</p> <p>Also a high RPS for requirements limiting the use of nanoparticles, for instance in surface treatments.</p>
	<p>Chemicals – formaldehyde High R, high P, high S</p>	<p>Here there is high RPS for requirements concerning formaldehyde, both in the form of reduced formaldehyde emissions in the use phase and reduced free formaldehyde in the chemical products used, e.g. adhesives.</p>
	<p>Quality and properties High R, high P, medium S</p>	<p>Here there is RPS for ensuring conformity between the properties and functions for which the panels are marketed and the performance declarations drawn up as part of the CE marking. There is also RPS for ensuring that panels not covered by harmonised product standards also have documentation for the properties and functions for which the panel is marketed.</p>
Medium	<p>Resources – bio-based adhesives High R, low P, low S</p>	<p>There is a low to medium RPS for requirements for bio-based adhesives. Work is ongoing to develop bio-based adhesives. These are not particularly widespread yet, and the potential and steerability are therefore judged to be low at the present time. This will be a possible future requirement.</p>
Low	<p>Resources – waste phase High R, medium to low P, low S</p>	<p>Wood-based panels have a generally high calorific value (17–20 MJ/kg) and are suitable for incineration with energy recovery. For some types of wood-based panels, material recovery will be relevant.</p>

RPS analysis for HPL panels

Overall priority	Area and level indication (high – medium – low) for R, P and S	Comments
High	<p>Resources – wood raw material High R, high P, high S</p> <p>Energy – material production (wood raw material) High R, medium to high P, medium S</p> <p>Energy – panel production High R, medium to high P, high S</p> <p>Chemicals – pigments, VOC, biocides and other High R, medium P, high S</p> <p>Quality and properties High R, high P, medium S</p>	<p>High RPS for requirement for sustainable or recycled wood raw material in the paper.</p> <p>In Nordic Ecolabelling's experience, there is RPS for energy for paper, and therefore specific energy requirements can be set for the paper used.</p> <p>Here, high relevance has been identified for energy impact from panel production. HPL panel production is a very energy-intensive production type. At the same time, high potential has been identified for reducing energy consumption in production.</p> <p>The chemical requirements are applied to all chemical products used in panel production. Here it is assessed that formaldehyde, VOC and isothiazolinones in the binders have high relevance, as does ensuring low content of problematic chemicals in the surface treatment, e.g. VOC, flame inhibitors, heavy metals in pigments. Also a high RPS for requirements limiting the use of nanoparticles, for instance in the surface treatments.</p> <p>Here there is RPS for ensuring conformity between the properties and functions for which the panels are marketed and the performance declarations drawn up as part of the CE marking. There is also RPS for ensuring that panels not covered by harmonised product standards also have documentation for the properties and functions for which the panel is marketed.</p>
Medium	<p>Energy – material production (resin) High R, low to medium P, medium to low S</p> <p>Chemicals – resins High R, low to medium P, medium to low S</p>	<p>High relevance has been identified in relation to energy impact from material production, including raw material extraction. All the constituent materials are highly processed, with correspondingly high energy consumption. The potential for energy reduction in the production of phenolic and melamine resin is unclear. The different HPL production systems use much the same material types without wide variations in material proportions.</p> <p>No potential or steerability has been identified for substituting the phenolic and melamine resins used, as these are essential for the panel type. However, requirements can be set to ensure low emission values during production.</p>
Low	<p>Resources – waste phase High R, medium to low P, low S</p>	<p>HPL panels have a generally high calorific value (17–20 MJ/kg) and are suitable for incineration with energy recovery. Material recovery is not considered very relevant for HPL, as the materials are strongly combined in the lamination process, making such recovery difficult. The lamination process is essential for the panel type, so no great potential for further resource requirements is envisaged, other than requirements for energy and sustainable or recycled wood raw material.</p>