

About Nordic Swan Ecolabel  
**Panels for exterior use**



Version 2.0 • date – date

CONSULTATION

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## Contact information

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

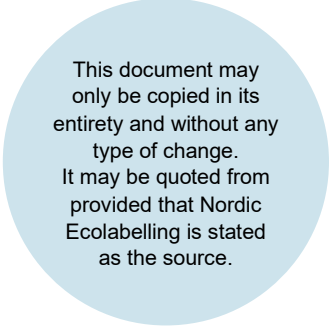
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## What is a Nordic Swan Ecolabel panel or cladding for exterior use?

Nordic Swan Ecolabelled panels and cladding for exterior use have a reduced environmental and climate impact throughout their lifecycle – and strict requirements for materials, chemicals and quality promoting circular economy.

Nordic Swan Ecolabelled panels and cladding for exterior use:

- Are made of a high proportion of renewable and/or recycled materials and/or responsible sourced virgin mineral raw materials.
- Wood-based panels consist of timber that is legally harvested and certified under a traceability system. Furthermore, at least 70% of the timber is sourced from certified forestry.
- Meet strict requirements for chemicals used in production and for surface treatment. This means, for example, that per- and polyfluoroalkyl substances (PFAS) and halogenated flame retardants cannot be added.
- Have reduced climate impact which is achieved by meeting strict requirements for energy consumption.
- Are of good quality and properties are documented. This means that the panels and cladding comply with harmonised standards in accordance with the Construction Products Regulation (EU/305/2011) or voluntary CE marking according to ETA.
- Have an expected lifespan of at least 50 years.

## Why choose the Nordic Swan Ecolabel?

- Exterior panels and cladding may use the Nordic Swan Ecolabel trademark for marketing. The Nordic Swan Ecolabel is a very well-known and well-reputed trademark in the Nordic region.
- The Nordic Swan Ecolabel is a simple way of communicating environmental focus and commitment to customers.
- The Nordic Swan Ecolabel clarifies the most important environmental impacts and thus shows how a company can cut emissions, resource consumption and waste management.
- Environmentally suitable operations prepare exterior panels and cladding for future environmental legislation.
- Nordic Ecolabelling provides businesses with guidance on the work of environmental improvements.
- The Nordic Swan Ecolabel not only covers environmental issues but also quality requirements, since the environment and quality often go hand in hand. This means that a Nordic Swan Ecolabel licence can also be seen as a mark of quality.

## What can carry the Nordic Swan Ecolabel?

The product group includes panels or cladding for exterior use designed to provide protection from the weather, aka outer climate shield of a building. Panels or cladding are mounted on to the outside of the building construction without any relevant loadbearing function for building structures. Panels designed for use in production of outdoor furniture, playgrounds, and exterior design is also part of the criteria.

The products must fall into one of the categories below:

1. Panels made from renewable raw materials according to EN 13986 suitable for service class 3 (exterior use).
2. Panels based on renewable raw materials other than wood.
3. Laminate such as HPL (High Pressure Laminate) or compact laminate according to the EN 438 series.
4. Wood plastic composite (WPC) according to EN 15534
5. Cement-based panels according to EN 12467, category A (exterior use).
6. Mineral wool panels (where the main function is not thermal insulation).
7. Boards or planks use for cladding, either of surface treated solid wood according to EN 14915 suitable for use class 3 or consisting of the panel types indicated in any of the other points.

A maximum of 10% by weight of the panel or cladding may consist of materials that are not required by the criteria. This allows panels to contain a limited amount of materials for which there are no requirements.

If the panel is sold with a unique fixing system/installation bracket/support frame (often in aluminium) this is part of the criteria. Screws, bolts, small mounting brackets, clips and similar is not part of the criteria.

### **The product group does not include the following products:**

- Panels and mouldings for interior use. Panel and mouldings for interior use can be labelled according to criteria for 010 Panels and mouldings for interior use\*.
- Solid wood with naturally long durability (no surface treatment), chemically or thermally modified wood may be Nordic Swan Ecolabelled, according to criteria for 086 Durable wood for outdoor use\*
- Pressure-impregnated solid wood with metals such as chromium, copper or arsenic.
- Panels or cladding materials used/marked for outdoor decking or fencing. Several types of materials for decking or fencing can be labelled according to criteria for 086 Durable wood for outdoor use or 073 Outdoor furniture, playground, and part equipment\*
- Hard covering products such as tiles, block, slab, slates (roof or wall slates), clinker made of natural stone, agglomerated stone, ceramic, fired clay or precast concrete/cement. Hard covering products can be labelled according to EU Ecolabel criteria for Hard Covering products\*

- Masonry units defined in the EN 771 series and clay roof tiles and fittings defined in EN 1304.
- Magnesium oxide panels.
- Fully prefabricated wall elements e.g., wall systems complete with structural framing, water/air/vapor barrier(s), insulation, and interior/exterior panels.
- Glass-, aluminium-, steel-, plastic- and sandwich panels and cladding. The function of a sandwich panel is often also insulating against cold or heat.

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

If there is a desire for ecolabelling other types of panels than those covered by the product group definition, 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.

Nordic Ecolabelling determines whether a product can be Nordic Swan Ecolabelled and under which criteria a product can apply for a licence.

## How to apply

### Application and costs

For information about the application process and fees for this product group, please refer to the respective national web site. For contact information see first in this document.

### What is required?

The application consists of an application form/web form and documentation showing that the requirements are fulfilled.

Each requirement is marked with the letter O (obligatory requirement) and a number. All requirements must be fulfilled to be awarded a licence.

The text describes how the applicant shall demonstrate fulfilment of each requirement. There are also icons in the text to make this clearer. These icons are:

- ☒ Enclose
- 📄 Upload
- ↑ Upload
- ↓ Download
- 📄 State data in electronic application
- 📄 Requirement checked on site

## **Licence validity**

The Nordic Swan Ecolabel licence is valid providing the criteria are fulfilled and until the criteria expire. The validity period of the criteria may be prolonged or adjusted, in which case the licence is automatically prolonged, and the licensee informed.

Revised criteria shall be published at least one year prior to the expiry of the present criteria. The licensee is then offered the opportunity to renew their licence.

## **On-site inspection**

In connection with handling of the application, Nordic Ecolabelling normally performs on-site inspection visit/-s to ensure adherence to the requirements. For such an inspection, data used for calculations, original copies of submitted certificates, test records, purchase statistics, and similar documents that support the application must be available for examination.

## **Queries**

Please contact Nordic Ecolabelling if you have any queries or require further information. See first in this document for contact information. Further information and assistance (such as calculation sheets or electronic application help) is available. Visit the relevant national website for further information.

## **Summary**

The Nordic Ecolabelling criteria for panels and cladding for exterior use have been revised to generation 2. Nordic Swan Ecolabelled panels and cladding for exterior use have reduced environmental and climate impact throughout the lifecycle through procurement of controlled renewable and mineral raw materials and reduced energy consumption. Environmental impact is also reduced using chemicals that meet strict requirements in both production and any surface treatment. Good quality and a long product lifespan have direct positive effect on the environmental impact. The possibility of recycling of panels also minimises negative impacts on the environment when the products has reached its end of life.

The extraction of both renewable and mineral raw materials can have major effects, especially on biodiversity and on the landscape, and the requirement for the use of certified virgin renewable materials and documented recycled materials has been tightened in the draft version of the new criteria. A new requirement has been introduced for responsible sourcing of mineral raw materials such as stone, volcanic rocks, silica, and sand.

Energy-efficient production of products is important to reduce the impact on the environment and the climate. Requirements on energy consumption have therefore been tightened and divided up per individual type of panel such as wood-based panels, HPL, wood plastic composite (WPC) or cement-based panels. The manufacturing of cement, for cement-based panels, uses significant quantities of energy and is a large source of carbon dioxide emissions. Specific energy requirements have therefore been introduced for the production of

cement. Reducing the impact from cement helps to reduce the overall impact of a cement-based panel.

The adhesives and resins usually used in the production of wood-based panels and HPL contain formaldehyde which is a toxic chemical substance that Nordic Ecolabelling wishes to limit together with e.g. per- and polyfluoroalkyl substances (PFAS) and halogenated flame retardants. New innovation-requirements also encourage the use of chemical products free from ingoing substances classified as SVHC or CMR, and adhesives that are not based on urea-formaldehyde.

The criteria have also been updated from a circular economy point of view. New requirements for high share of renewable raw materials in different types of materials and durability/expected lifespan of the panel, have been introduced. Manufacturer of panels must offer a system for taking back old used panels, faulted products or panels not used in the construction process.

The criteria have been expanded to include wood plastic composite (WPC) as this product type has several good facade properties such as e.g. long lifespan and surface treated solid wood. Cross laminated timber (CLT) has been removed to criteria for panels for interior use.

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 which the product is marketed with.

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

## 1 Environmental impact of the panels and cladding for exterior use

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 and biodiversity.

### 1.1 Environmental impact

This product group consist of many different types of panels with different types of engineering properties manufactured from different types of material. These panels are primarily used as façade materials on houses and buildings as well as being used in the production of outdoor furniture, playgrounds, and exterior



design. The overall environmental impact for all type of panels<sup>1,2,3,4,5</sup> is related to:

- Resources/use of raw materials,
- Energy consumption in the production of panels. Energy savings have an important role to play in reducing global warming and climate change,
- Use for chemicals in the production of panels such as resins and surface treatment,
- Quality and expected lifespan,
- End of life.

## 1.2 Functional unit

This product group contains a wide variation of material types, production processes and functions among the different panels. A single functional unit for a 1m<sup>2</sup> facade panel would thus be impractical. It has therefore been decided to make the following general categorisation of functional units in the product group: wood-based panels, HPL panels, compact laminate panels, WPC panels, cement-based panels and mineral wool-based panels. The unit for each is 1 kg of the material/type of panel.

This approach is seen especially in relation to the energy requirement. The use of several functional units allows better controllability of the requirements. The criteria thus seek to identify the most environmentally favourable panels within each panel type, rather than directly comparing the panel types with each other.

The basis for selection of panel types is based on, among other things, a LCA tool (The construction Material pyramid<sup>6</sup>) that show and compares the environmental impact of a number of relevant material types used in 1m<sup>2</sup> façade panels/cladding. Data is based on EPDs and covers life cycle face A1-A3 (cradle-to-gate). All selected panel/cladding types has an impact below 20 kgCO<sub>2</sub> eq/m<sup>2</sup>.

## 1.3 RPS

Exterior panels and claddings environmental impact is mainly linked to resources/use of raw materials, energy and chemicals used in the production of panels, expected lifespan/quality and end of life.

The relevant environmental impacts found in the life cycle of panels for exterior use, are set out in a MECO scheme. A MECO describes the key areas that have impact on the environment and health throughout the life cycle of the product – including consumption of materials/resources (M), energy (E), chemicals (C) and other impact areas (O).

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<sup>1</sup> Katrine Raunkjær Stubdrup et. al: Best Available Techniques (BAT) reference document for the production of wood-based panels, European IPPC Bureau (2016)

<sup>2</sup> Nicolas F. et al: Influence of methodological choice on maintenance and replacement in building LCA, The international Journal of Life Cycle Assessment (2021).

<sup>3</sup> J.D.Silvestre et. al: Building's external walls in Life-Cycle Assessment research studies, Institut Superior Tecnico, Lisboa, Portugal (2015)

<sup>4</sup> Stylam Industries Limited: EPD, High Pressure Laminate - Compact Panels. EDP Danmark (2023)

<sup>5</sup> Chunheng Z. et.al: Comaprative environmental LCA of fiber reinforced cement panel between kenaf and glass fibers

<sup>6</sup> <https://www.materialepyramiden.dk/> (visited October 2023)

Nordic Ecolabelling sets requirements concerning the topics and processes in the life cycle that have a high environmental impact – also called hotspots. Based on the MECO analysis, an RPS tool is used to identify where ecolabelling can have the greatest effect. R represents the environmental relevance; P is the potential to reduce the environmental impact and S is the steerability on how compliance with a requirement can be documented and followed up. The criteria contain requirements in those areas in the life cycle that have been found to have high RPS, since there is potential to achieve positive environmental gains. For more details on what an RPS analysis entails, please refer to the Nordic website<sup>7</sup>.

Lifecycle stages	Area and assessment of R, P, S (high, medium, or low)	Comments
<b>Raw materials</b>		
	<b>Resources - wood raw materials</b> R: High P: High S: High	Wood raw materials used in panels and cladding has a high RPS. From a life cycle perspective, forestry is a key part of wood products' environmental impact, and it is also important that wood as a renewable raw material is grown / harvested and used in a sustainable way. Much of the world's forest loss is driven by conversion of natural forest to other land uses such as cattle farming, palm oil and soy plantations. Deforestation and degradation from illegal and unsustainable logging, fires and fuelwood harvesting can harm wildlife, jeopardize people's livelihoods and intensify climate change. Credible forest management certification contributes to a more sustainable wood / timber product industry by helping create market conditions that support forest conservation. Requirements for high share of certified wood raw materials and certified traceability ensures more sustainable forestry.
	<b>Resources - recycled raw materials</b> R: High P: Medium/High S: High	Use of recovered and recycled materials such as renewable fibres or mineral raw materials will reduce the negative environmental impact of all types of panels. Requirements for a minimum proportion of recycled materials in panels will reduce the need for virgin raw materials and thus save natural resources. The potential for using recycled materials is high in most type of panels even though recycled wood raw materials is also requested in the energy sector. A challenge of using recycled materials can be the content of harmful substances. Recycled materials therefor need to be tested in order to reduce the spread of substances of concern and promote the potential of material reuse in the future. The traceability for recycled materials is high due to widespread certification schemes for recycled raw materials.
	<b>Resources - mineral raw materials</b> R: High P: High S: Medium	The R and P for responsible sourcing of virgin mineral raw materials from quarries are high. The mineral industry has been working with both traceability- and biodiversity management and rehabilitation plans for several years. Certification schemes for sustainable mining are however still under development and S has therefor been assessed as medium. The latest assessment of the State of Nature in the EU, published in 2020 <sup>8</sup> , shows that we are still losing nature as too many protected species continue to decline. The extraction of minerals, particularly by surface methods, inevitably results in changes to the

<sup>7</sup> <https://www.nordic-ecolabel.org/nordic-swan-ecolabel/criteria-process/> (accessed 05.07.2022)

<sup>8</sup> <https://www.eea.europa.eu/publications/state-of-nature-in-the-eu-2020>

		characteristics of the land and local biodiversity where it takes place.
<b>Production/distribution</b>		
	<b>Energy - production of wood-based panels/HPL</b> R: High P: Medium/High S: High	High/medium RPS has been identified in relation to energy impact from panel production (production and/or drying of panels). For panels, the production of adhesives and its input raw materials can also have a relatively large effect on the climate impact as it is an energy-intensive process. 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. Energy savings have an important role to play in reducing environmental impact and thus also global warming and climate change. All panel manufactures are focusing on reducing their energy consumption and therefore the potential to tighten the requirement levels is medium.
	<b>Energy - production of wood plastic composite panels</b> R: High P: Medium/High S: Medium	High/medium RPS has been identified in relation to energy impact from panel production (energy used to melt the polymer (PP, PE, or PVC), mixing materials on the production line as well as pressing/drying of the panel). The concentration of polymers differs in panel types - polymers constitute around 30% in WPC and 10% in mineral composite panels. However, the relevance for restricting the use of energy in the manufacturing process is high. The variation in design/function of the different types of panels makes it difficult to set ambitious energy requirements for the individual board type (medium P and S).
	<b>Energy - production of mineral wool façade panels</b> R: High P: Medium/High S: Medium	Mineral raw materials such as mineral wool and cement are used in several types of panels/acoustic panels. In a life cycle perspective, the production of the raw materials (especially mineral wool and cement) has a higher environmental impact compared to the actual manufacturing of the panels. However, the relevance for restricting the use of energy in the manufacturing process is high. The variation in design/function of the different types of panels makes it difficult to set ambitious energy requirements for the individual board type (medium P and S).
	<b>Energy - production of cement</b> R: High P: Medium/High S: High	Portland cement being the key ingredient in cement-based panels/acoustic panels and one of the major sources of emission of greenhouse gasses. Portland Cement accounts for 5% of global carbon dioxide emissions <sup>9</sup> , which is due to inputs of high amounts of energy to heat the kilns, with indirect emissions from the energy and direct emissions from the production. Nordic Ecolabel sets out requirements to restrict the GWP on the production of cement to limit the anthropogenic emissions of CO <sub>2</sub> .
	<b>Chemicals used in manufacturing of panels</b> R: High P: Medium/High S: High	Chemicals used in the manufacturing of panels and possible surface treatment contain many different substances and raw materials with many different harmful effects on the environment and health. The chemicals requirements apply to all chemical products used in panel production. Here it is assessed that formaldehyde, VOC and isothiazolinones in the binders have high relevance. Also securing a low content of problematic chemicals in the surface treatment, e.g., flame inhibitors, heavy metals in pigments. Also, a high RPS for requirements limiting the use of nano particles, for instance in the surface treatments.

<sup>9</sup> The Cement Sustainability Initiative: <https://docs.wbcsd.org/2016/12/GNR.pdf> (visited 2022-05-30)

<b>Use phase</b>		
	<b>Quality and properties</b> R: High P: High S: Medium	RPS is high for securing conformity between the properties and the functions for which the panels are marketed, and the performance declarations drawn up in relation to the CE marking. There is also high 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.
	<b>Durability</b> R: High P: High S: High	RPS has been found to set requirements for durability (long lifetime) for panels designed for exterior use. The longer the lifetime of a product, without the need for replacement, the lower the environmental impact of the product <sup>10</sup> . The consumption of raw materials and energy is drastically reduced.  High steerability is illustrated partly with compliance with quality standards but also with promised warranty on the products. Long lifetime of the panels is very important for the overall environmental impact of the product.
<b>End of life</b>		
	<b>End of life - take back system.</b> R: High P: High/medium <b>S: Medium/low</b>	Product take-back systems are fundamental for Circular Economy (CE) and focus on recovering value by taking back products to be recycled.  High relevance and potential have been identified regarding setting requirements at the end-of-use stage to increase recycling of panels and decrease their incineration. Steerability is however challenged by many parameters such as the choice of the material used in the panels and their recyclability, the long lifespan of panels and the lack of traceability between the installed products and the panel manufacturers. As a result, no panel manufacturers have a fully operational take-back system for worn out panels as of today (Wood-based panels are already covered by existing waste systems, which means that part of the materials is returned to the panel production again).  A requirement is set to ensure that manufactures of panels must also offer a system for taking back old used panels or alternative be in a process/test/pilot phase to establish a system for taking back products.

## 1.4 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 for exterior use products 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

<sup>10</sup> Francart et al: Influence of methodological choice on maintenance and replacement in buildings. The international Journal of Life Cycle Assessment (2021)

contribute to sustainable management and efficient use of natural resources.

- Quality requirements and consumer information requirements on maintenance and use promote a longer service life and 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, these criteria also contribute to other goals such as:

- Target 3.9 - 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 and requirements concerning COD emissions, all contribute towards this target.
- Target 15.1, 15.2 and 15.5 - Addresses conservation, restoration, and sustainable use of terrestrial and inland freshwater ecosystems in forest, promoting the implementation of sustainable management of all types of forest and action to reduce the degradation of natural habitats and loss of biodiversity. The criteria requires that virgin wood raw materials are sourced from FSC/PEFC forestry and virgin mineral raw materials are responsibly sourced from mining operations with documented.

## 1.5 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 website<sup>11</sup>. Factors relating to the circular economy are often closely linked to factors that contribute to a reduced climate impact. Both aspects are therefore described below for Nordic Ecolabelling's requirements for panels:

- The criteria promote the use of renewable, controlled and recovered raw materials, which leads to more efficient and sustainable use of resources. The use of recycled raw materials reduces the need for virgin raw materials and thus saves natural 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

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<sup>11</sup> <https://www.nordic-swan-ecolabel.org/official-nordic-ecolabel/life-cycle-perspective/> and <https://www.nordic-swan-ecolabel.org/official-nordic-ecolabel/life-cycle-perspective/> (visited March 2023)

renewable and recycled raw materials also reduces overall energy consumption indirectly, and the impact on the climate is reduced<sup>12</sup>.

- 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. Also, virgin mineral raw materials must come from mining operations (quarries) with documented biodiversity management and rehabilitation plans.
- Strict chemical requirements in both production and surface treatment lead to the substitution of hazardous substances and avoid the recycling of harmful substances.
- Quality requirements and consumer information/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.
- Requirement for durability/expected lifespan of at least 50 years reduces the need for new products.
- Requirements for take-back system as well as a general use of recycled raw materials promotes circular economy.

## 1.6 Biodiversity

Biodiversity is the variety of all living organisms on Earth and how they interact. It has a value in itself and is crucial to sustain nature's contributions to people (ecosystem services) and ability to respond to change.

In 2019 the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) published its first global report, calling for transformative change. The world must bring biodiversity back into the production landscapes in addition to creating more protected areas. In 2022 the UN Convention on Biological Diversity<sup>13</sup> adopted the Kunming-Montreal Global Biodiversity Framework agreeing to conserve and manage at least 30 percent of the world's lands, inland waters, coastal areas, and oceans.

Nordic Ecolabelling contributes to protecting biodiversity by requiring that renewable raw materials be responsibly sourced e.g., wood raw materials from forests that are managed in accordance with FSC or PEFC sustainable forestry management principles. Virgin mineral raw materials must come from mining operations (quarries) with documented biodiversity management and rehabilitation plans. The goal is to counteract loss of species and deterioration of ecosystems and that sourcing of biological raw materials is in balance with regeneration.

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<sup>12</sup> Extraction and processing raw resources to make usable materials (paper, plastic, or metal) requires a lot of energy. Recycling often saves energy because the production being recycled usually require much less processing to turn them into usable materials.

<sup>13</sup> <https://www.unep.org/un-biodiversity-conference-cop-15> (visited February 2023)

## 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”<sup>14</sup>. Other types of labels in the Nordic market, which often only cover one parameter, are FSC/PEFC (raw materials), M1 (indoor climate) and Dansk Indeklima (indoor climate). 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<sup>15</sup>.

## 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 1. 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.

### 3.1 Definition of the product group

The product group includes panels or cladding for exterior use designed to provide protection from the weather, aka outer climate shield of a building. Panels or cladding are mounted on to the outside of the building construction without any relevant loadbearing function for building structures. Panels designed for use in production of outdoor furniture, playgrounds, and exterior design is also part of the criteria.

The products must fall into one of the categories below:

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<sup>14</sup> Blue Angel: Low-Emission Floor Coverings, Panels and Doors for Interiors made of Wood and Wood-Based Materials, UZ 176, 2013

<sup>15</sup> [https://single-market-economy.ec.europa.eu/single-market/european-standards/standardisation-requests\\_en](https://single-market-economy.ec.europa.eu/single-market/european-standards/standardisation-requests_en), visited January 2023

1. Panels made from renewable raw materials according to EN 13986 suitable for service class 3 (exterior use),
2. Panels based on renewable raw materials other than wood,
3. Laminate such as HPL (High Pressure Laminate) or compact laminate according to the EN 438 series,
4. Wood plastic composite (WPC) according to EN 15534,
5. Cement-based panels according to EN 12467, category A (exterior use),
6. Mineral wool panels (where the main function is not thermal insulation),
7. Boards or planks use for cladding, either of surface treated solid wood according to EN 14915 suitable for use class 3 or consisting of the panel types indicated in any of the other points.

A maximum of 10% by weight of the panel or cladding may consist of materials that are not required by the criteria. This allows panels to contain a limited amount of materials for which there are no requirements.

If the panel is sold with a unique fixing system/installation bracket/support frame this are part of the criteria. Screws, bolts, small mounting brackets, clips and similar is not part of the criteria.

The product group does not include the following products:

- Panels and mouldings for interior use. Panel and mouldings for interior use can be labelled according to criteria for 010 Panels and mouldings for interior use\*.
- Solid wood with naturally long durability (no surface treatment), chemically or thermally modified wood may be Nordic Swan Ecolabelled according to criteria for 086 Durable wood for outdoor use\*
- Pressure-impregnated solid wood with metals such as chromium, copper or arsenic.
- Panels or cladding materials used for outdoor decking or fencing. Several types of materials for decking or fencing can be labelled according to criteria for 086 Durable wood for outdoor use\*
- Hard covering products such as tiles, block, panels, slab, clinker, paver, kerb made of natural stone, agglomerated stone, ceramic, fired clay or precast concrete/cement. Hard covering products can be labelled according to EU Ecolabel criteria for Hard Covering products\*
- Masonry units defined in the EN 771 series and clay roof tiles and fittings defined in EN 1304.
- Magnesium oxide panels.
- Fully prefabricated wall elements e.g., wall systems complete with structural framing, water/air/vapor barrier(s), insulation, and interior/exterior panels.
- Glass-, aluminium-, steel-, plastic and sandwich panels and cladding. The function of a sandwich panel is often also insulating against cold or heat.

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

If there is a desire for ecolabelling other types of panels than those covered by the product group definition, 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.

Nordic Ecolabelling determines whether a product can be Nordic Swan Ecolabelled, and under which criteria a product can apply for a licence.

### **Background to the product group definition**

It has been clarified that the definition of the product group primarily includes panels or cladding designed to provide protection against weather condition (rain, sunlight, frost, aka outer climate shield) of a building. Also, these panels are usually designed to be mounted on to the outside of the building construction and thus not part of the wall construction itself. If panels/cladding is sold together with a unique fitting system/installation bracket (often aluminium) this fitting system is covered by the criteria. Panels designed for use in production of outdoor furniture, playgrounds and exterior design is also part of the criteria.

The product group definition specifies several different types of panels made from different types of materials that can be labelled. A maximum of 10% by weight of the product may consist of materials that are not required by the criteria. This allows panels to contain a limited amount of materials for which there are no requirements.

The mechanical properties of wood-based panels vary with moisture content, which depends on the environment in which the panel is used<sup>16</sup>. Therefore, only wood-based panels suitable for service class 3 according to EN 13986 (exterior use - fully exposed) is part of the criteria.

The product group definition has been expanded with wood plastic composite panels (WPC) and surface treated solid wood. The definition of mineral wool facade panels has been made clearer. Cross laminated timber (CLT) has been removed to criteria for panels for interior use.

Wood plastic composite panels according to EN 15534 is characteristic of a high share of recycled raw materials mixed with resin or polymer binders which results in a long lifespan and minimal need for maintenance which is important in a circular perspective. Requirements for take-back system as well as a general use of recycled raw materials promotes circular economy.

Surface treatment (painting) of solid wood is often necessary to extend the surface life of the wood. Solid wood with naturally long durability (no surface treatment), chemically or thermally modified wood is already part of Nordic Swan Ecolabelling criteria for durable wood but does not include surface treated wood. The product group durable wood is intended for several function such as cladding, decking or fencing. Surface treatment of solid wood is often used for cladding and therefore introduces in these criteria. Surface treated solid wood must comply with EN 14915 suitable for use class 3. The surface treatment (primer or paint) must be carried out by the manufacture of wood cladding. The paint or primer needs to comply with the chemical requirements alternative be ecolabelled. Pressure-impregnated solid wood with metals is not part of the

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<sup>16</sup> <https://hanson-plywood.co.uk/wp-content/uploads/2017/06/Specification-and-use-of-wood-based-panels-in-exterior-situations-1.pdf>, visited September 2023

criteria. The purpose is to limit the use of chemical wood preservatives containing heavy metals.

Cement is used as a binder in both cement- and wood-based panels. Cement must comply with the definition in EN 197-1. The cellulose component varies widely in the different types of panels. Common to all types of cement-based panels are strict requirements for certified wood raw materials and energy use both for the actual production of cement and the production of the various types of panels.

Fully prefabricated wall elements e.g., wall systems complete with structural framing, water/air/vapor barrier(s), insulation, and interior/exterior panels, are not part of the criteria. This is primarily due to the difficulty in comparing wall elements with multiple functions. This also applies to sandwich panels as the function of the core often is heat/cool/thermal insulation.

Aluminium- and steel panels are not part of the criteria as the production is energy-intensive and the potential for gaining an effect by increasing the share of recycled metal is low. The development of manufacturing glass facades from recycled glass is still very low and therefore no potential to include glass panels/facades in today's criteria.

Masonry units defined in the EN 771 series and clay roof tiles and fittings defined in EN 1304 are not part of the criteria as these can be part of the wall or roof construction.

### 3.2 Terms and definitions

The first time a term is used in the document, it is written in bold font or with a reference to this definition list.

<b>Word/Term</b>	<b>Definition</b>
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%.
Agglomerated stone	An industrial product manufactured from mixture of aggregates of various sizes and natures (generally coming from natural stones), sometimes mixed with other compatible materials, additions, and resin binder.
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.
CMR substances	Substances classified as Carcinogenic, Mutagenic, or toxic for Reproduction (CMR substances).
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.
EPD	A product specific EPD according to the standard ISO 14025 and EN 15804 is a third-party verified document based on product category rules (PCR) and life cycle assessment (LCA).
Expected lifespan	The expected lifespan/technical lifespan of a product under a set of given conditions for the use of the product.
Fibre-cement flat sheets	Defined in EN 12467.
FSC	Forest Stewardship Council. Certification scheme for forestry and traceability in the supply chain.

IFL	<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>
Ingoing substances and impurities	<p><b>Ingoing substances:</b></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><b>Impurities:</b></p> <p>Residues from production, incl. raw material production, which remain in the chemical product at concentrations below 1000 ppm (0.1000% by weight). Examples of impurities are residues of reagents incl. residues of monomers, catalysts, by-products, scavengers (i.e., chemicals that are used to eliminate/minimise undesirable substances), detergents for production equipment and carry-over from other or previous production lines.</p>
IUCN	<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>
Laminate	<p>Laminate means a process in which paper is used in the product, e.g. HPL or compact laminate.</p>
Lignocellulose raw materials	<p>Lignocellulose refers to plant dry matter (biomass), so called lignocellulosic biomass such as straw, hemp, linen, and bagasse.</p>
Mineral wool	<p>Insulation wool manufactured from molten rock, slag, or glass.</p>
Nanomaterial	<p>'Nanomaterial' means a natural, incidental or manufactured material consisting of solid particles that are present, either on their own or as identifiable constituent particles in aggregates or agglomerates, and where 50 % or more of these particles in the number-based size distribution fulfil at least one of the following conditions:</p> <p>(a) one or more external dimensions of the particle are in the size range 1 nm to 100 nm;</p> <p>(b) the particle has an elongated shape, such as a rod, fibre or tube, where two external dimensions are smaller than 1 nm and the other dimension is larger than 100 nm;</p> <p>(c) the particle has a plate-like shape, where one external dimension is smaller than 1 nm and the other dimensions are larger than 100 nm.</p>
PEFC	<p>Programme for the Endorsement of Forest Certification.</p> <p>Certification scheme for forestry and traceability in the supply chain.</p>
VOC	<p>Organic compounds with a steam pressure exceeding 0.01kPa, at 20°C.</p> <p>For products under EU Directive (2004/42/EC) in which steam pressure is not indicated: Organic substances with an initial boiling point that is lower than or equal to 250°C measured at a normal pressure of 101.3 kPa.</p>
Recycled materials	<p>Recycled materials are defined according to ISO 14021 in the following two categories:</p> <p>"Pre-consumer/commercial" is defined as material diverted from the waste stream during a manufacturing process.</p> <p>"Post-consumer/commercial" is defined as material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.</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>
Self-generated energy	<p>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.</p>
SVHC substances	<p>Candidate list of Substances of Very High Concern published by the European Chemicals Agency (ECHA).</p>

Wood based panels	<p>Example of wood-based panels according to EN 13986:</p> <ul style="list-style-type: none"> <li>• Particleboard.</li> <li>• MDF (Medium Density Fibreboard)</li> <li>• HDF (High Density Fibreboard)</li> <li>• Plywood</li> <li>• OSB (Oriented Stranded Board)</li> <li>• Flaxboard</li> <li>• LVL (Laminated Veneer Lumber), structural LVL is CE marked according to EN 14374</li> <li>• SWP (Solid Wood Panel),</li> <li>• Cement bonded particleboard</li> </ul>
WPC	Wood Plastic Composite. WPCs are composite materials made of wood fibre/wood flour and thermoplastics such as PE, PP, PVC, or PLA.

### 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	Number of requirements	Responsible for the documentation
Description of product and production process	General requirements	O1	Product manufacturer
<b>Quality</b>			
Product requirements	Quality and properties	O2	Product manufacturer
<b>Raw materials</b>			
Wood raw materials	Wood, cork, and bamboo	O3 O4	Product manufacturer/Subcontractor Product manufacturer
	Recycled wood raw material	O5	Product manufacturer/Subcontractor
Lignocellulose raw materials	Lignocellulose raw materials	O6	Product manufacturer/Subcontractor
Paper	Ecolabelled paper	O7	Product manager
	Raw materials, chemicals, and emissions in manufacturing of pulp and paper	O8-O11	Product manufacturer/Subcontractor
Wood Plastic Composite	Wood fiber and plastic	O12	Product manufacturer
	Chemicals and additives in plastic	O13-O14	Product manufacturer/supplier of recycled plastic
Mineral raw materials	Responsible sourcing	O15	Product manufacturer
	Heavy metals	O16	Supplier of mineral raw materials
Cement-based and mineral wool-based panels	Recycled raw materials	O17	Product manufacturer
	Chemicals in recycled mineral wool?	O18	Product manufacturer/supplier of recycled mineral wool
Metal	Aluminium	O19	Supplier of aluminium
<b>Chemicals</b>			
Chemicals in production	Classification of chemical products	O20	Manufacturer/supplier of chemical products
	Classification of ingoing substances	O21	Manufacturer/supplier of chemical products
	Prohibited substances	O22	Manufacturer/supplier of chemical products

	Nanomaterials	O23	Manufacturer/supplier of chemical products
	Preservatives	O24	Manufacturer/supplier of chemical products
	VOCs in adhesives	O25	Manufacturer/supplier of chemical products
	Free formaldehyde	O26	Manufacturer/supplier of chemical products
Chemicals - surface treatment	Plastic foiling	O27	Product manufacturer
	Ecolabelled products	O28	Product manufacturer
	Classification of chemical products	O29	Manufacturer/supplier of chemical products
	UV curing surface treatment system	O30	Manufacturer/supplier of chemical products
	Classification of ingoing substances	O31	Manufacturer/supplier of chemical products
	Prohibited substances	O32	Manufacturer/supplier of chemical products
	Nanomaterials	O33	Manufacturer/supplier of chemical products
	Preservatives	O34	Manufacturer/supplier of chemical products
	Free formaldehyde	O35	Manufacturer/supplier of chemical products
Chemicals - application method	Application method and quantity applied – surface treatment	O36	Supplier/performer of surface treatment
	Volatile organic compounds (VOC)	O37	Supplier/performer of surface treatment
<b>Emissions</b>			
Emissions from production - COD	Emissions of COD from wet processes	O38	Product manufacturer
Emissions from production – working environment	Emissions to air from production – HPL and compact laminate	O39	Product manufacturer
	Emissions of dust	O40	Product manufacturer
<b>Climate and energy</b>			
Pulp and paper	Pulp and paper production included in HPL and compact laminate	O41	Manufacturer of pulp and paper
Laminate	Laminate	O42	Laminate manufacturer
Wood-based panels	Wood-based panels	O43	Panel manufacturer and wood suppliers (drying process)
Panels made from lignocellulose raw materials	Panels - other lignocellulose raw materials	O44	Product manufacturer
Solid wood	Solid wood panels and cladding	O45	Product manufacturer
Wood Plastic Composite (WPC)	Wood plastic composite	O46	Product manufacturer
Mineral wool-based panels	Mineral wool-based panels	O47	Product manufacturer
Cement	Cement	O48	Manufacturer of cement
Cement-based panels	Cement-based panels	O49	Product manufacturer
<b>Circularity</b>			
Durability		O50	Product manufacturer

Information to costumer	Information	O51	Product manufacturer
Take back system	Take back system	O52	Product manufacturer
<b>Innovation</b>			
	Innovation requirements	O53	Product manufacturer
<b>Other requirements</b>			
	Maintenance of the Nordic Swan Ecolabel licence	O54-O55	Product manufacturer/licensee

## 3.4 Product information

This chapter contains product specification such as description of the product, material composition and production methods/process.

### O1 Description of the product

Applicants must provide the following information about the product:

- Trade name(s), brand name(s) and ID numbers.
- Description of the product(s) and materials/raw materials included. The total weight of the product and the weight of the constituent materials/raw materials must be stated.
- 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).

Description of the points above.

Product sheets or equivalent information. A flow chart is recommended to explain the production process.

### Background

The purpose of the requirement is to give information on the product, material composition, description of the production method and treatment techniques. Panels can have different functions and be produced from different types of materials, techniques, and production sites. To provide traceability for the Nordic Swan Ecolabelled panel, all activities must be described. Product data sheets or equivalent information must be included in the application.

## 3.5 Quality

### 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 by a declaration of performance (DoP) and example of CE marking.

## Products not covered by harmonised standard

Products not covered by a harmonised product standard must 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 third-party verification of the product's performance. The 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 example of CE marking and the declaration of performance (DoP).
- 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 purpose of the requirement is to ensure a correlation between the features and functions that the product is marketed, and the declaration of performance prepared in accordance with the Construction Products Regulation<sup>17</sup>. 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, based on standardised test results.

## 3.6 Raw materials

The requirements in this chapter concern requirements for raw materials used in panels.

The requirements only apply to raw materials that are included by **more than 5 wt%** of the panel.

Panels consisting of different types of raw materials need to comply with the specific raw material requirements e.g., a cement-based panel must comply with requirements for wood raw materials and cement.

### 3.6.1 Wood raw materials

#### O3 Prohibited and restricted tree species

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)

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<sup>17</sup> [https://single-market-economy.ec.europa.eu/sectors/construction/construction-products-regulation-cpr\\_en](https://single-market-economy.ec.europa.eu/sectors/construction/construction-products-regulation-cpr_en) (visited March 2023 such as specific frequency tuning or reverberation time for use in e.g., sound studios, concert halls, theatres, cinemas, conference room and classroom)

### *Exemptions*

*Eucalyptus and Acacia used in production of fibreboards and particle boards are exempted from the list (note\*\*).*

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.
- tree species grown in plantations shall in addition not originate from plantations established on areas converted from forest after 1994.

\* [https://www.nordic-swan-ecolabel.org/pulp-paper-declaration-portal/what-can-be-declared/forestry-requirements/forestry\\_requirements\\_2020/](https://www.nordic-swan-ecolabel.org/pulp-paper-declaration-portal/what-can-be-declared/forestry-requirements/forestry_requirements_2020/)

\*\* *Regarding wood chips, fibre raw materials from eucalyptus/acacia must be a minimum of 70% certified.*

- Enter the names of the tree species included in the product.
- Declaration from the applicant/manufacturer/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/manufacturer covering the specific tree species and documenting that the wood is controlled as FSC or PEFC 100% through the FSC transfer method or PEFC physical separation method.
- The applicant/manufacturer/supplier shall document full traceability back to the certified forest unit and document the following:
  - the wood does not originate from an area/region where it is on the IUCN Red List, categorised as CR, EN or VU.
  - the tree species does not originate from an Intact Forest Landscape (IFL), as defined in 2002: <http://www.intactforests.org/world.webmap.html>
  - for plantations, the applicant/manufacturer/supplier must document that the tree species does not originate from plantations established on areas converted from forest 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 and cladding 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.

Exemption for the use of eucalyptus and acacia in production of fibreboards and particleboards: Eucalyptus and Acacia are grown in plantations for the specific use in the wood fibre and pulp/paper industry. Fibre raw material from acacia/eucalyptus must, however, be a minimum of 70% FSC/PEFC certified. The remaining proportion of fibre raw material must be covered by the FSC/PEFC control schemes.

### *Exemptions:*

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

Many of the trees on the list grow in countries that still have large Intact Forest Landscapes (IFL). It is important to protect these for the sake of biodiversity and the climate. Several of these countries are at high risk of corruption, and national legislation relating to the environment, human rights and land ownership is often weak and/or not enforced by the authorities. There are different views on whether certification is good enough to meet the challenges of forest management in countries with a high risk of corruption and illegal logging. For example, relevant challenges related to this were published by Danwatch in a number of articles in 2018<sup>18</sup>,<sup>19</sup> and by redd-monitor.org in 2019<sup>20</sup>. Greenpeace International has terminated its membership of FSC because the certification body no longer fulfils its goals of protecting forests and human rights<sup>21</sup>. 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

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<sup>18</sup> <https://danwatch.dk/undersogelse/dokumentfalsk-og-millionboeder-danske-byggemarkeder-saelger-trae-forbundet-til-ulovlig-hugst-i-amazonas/>

<sup>19</sup> <https://danwatch.dk/undersogelse/baeredygtighedsmaerke-er-ingen-garanti-for-baeredygtigt-trae/>

<sup>20</sup> <https://redd-monitor.org/2019/08/29/evicted-for-carbon-credits-new-oakland-institute-report-confirms-forced-evictions-for-green-resources-plantations-in-uganda/>

<sup>21</sup> <https://www.greenpeace.org/international/press-release/15589/greenpeace-international-to-not-renew-fsc-membership/>

control system and the PEFC percentage system are not approved. Full traceability of the wood back to the forest/certified forest unit makes it possible to document that the tree species does not come from an area/region where it is on the IUCN Red List, categorised as CR, EN or VU. Full traceability also makes it possible to document that the tree species does not come from an Intact Forest Landscape (IFL), as defined by Intactforest.org in 2002<sup>22</sup>. Intact forest 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.

#### O4 Traceability and certification

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

##### **Species name**

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

##### **Chain of Custody certification**

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

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

##### **Certified wood raw material, bamboo, and cork**

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

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

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

\* *See Terms and definitions.*

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<sup>22</sup> <http://www.intactforests.org/world.webmap.html>, accessed January 2020

- ☒ 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 regarding 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, sustainable 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.

## O5 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<sup>23</sup>.

This means that the recycled materials and the panel must not include:

- Treated wood: wood that contains halogenated organic compounds, creosote, or heavy metals because of treatment with wood preservatives.
- 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

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.

- Certification or declaration of compliance with the EPF’s Standard for delivery conditions of recycled wood. Alternative, test of the final panel/cladding showing compliance with the requirement.

## 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 panels for interior use (generation 7). 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, fluorine, chlorine and PCB.

<sup>23</sup>[Regulation - European Panel Federation \(europanel.org\)](https://www.europanel.org/), visited December 2023

It has been clarified that creosote is regarded a substance used for wood preservation. 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. Alternative, test can be done on the final product/panel.

### 3.6.2 Lignocellulose raw materials (other than wood)

This requirement concerns panels made from lignocellulose raw materials such as straw, flax, or hemp.

#### O6 Lignocellulose raw materials (other than wood)

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

The lignocellulose 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 lignocellulose 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 lignocellulose raw materials must be waste or residual products from other production.

### 3.6.3 Paper and cellulose fibre

The requirements in this chapter comprise raw materials, chemical and emissions in production of pulp and paper used in panels. Pulp and paper are used in several types of panels such as kraft- and decor paper in HPL/ compact laminate.

#### O7 Ecolabelled paper

If the paper is ecolabelled with Nordic Swan Ecolabel or EU Ecolabel\*, all requirements in this chapter 3.6.3 is fulfilled.

\* *Valid licence according to Nordic Swan Ecolabel Basic module gen. 3, copy- and printing paper gen. 5 or EU Ecolabel EU11 2019/70 - or later valid generations.*

- Nordic Swan Ecolabel or EU Ecolabelled paper: Submit name of paper, manufacturer, and licence number. Appendix 3 may be used.

## Background

Nordic Swan Ecolabel and EU Ecolabel are so called type 1 ecolabels and both schemes assess the entire life cycle of the paper and target requirements at the stages in the life cycle that have relevance and potential.

### O8 Prohibited and restricted tree species (pulp and paper)

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)

#### *Exemptions*

*Eucalyptus and Acacia used in pulp and paper production are exempted from the list (note\*\*).*

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.
- tree species grown in plantations shall in addition not originate from plantations established on areas converted from forest after 1994.

\* [https://www.nordic-swan-ecolabel.org/pulp-paper-declaration-portal/what-can-be-declared/forestry-requirements/forestry\\_requirements\\_2020/](https://www.nordic-swan-ecolabel.org/pulp-paper-declaration-portal/what-can-be-declared/forestry-requirements/forestry_requirements_2020/)

\*\* *Regarding pulp, fibre raw materials from eucalyptus/acacia must be a minimum of 70% certified.*

- Enter the names of the tree species included in the product. Appendix 3 may be used.
- 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/manufacturer/supplier must document that the tree species does not originate from plantations established on areas converted from forest after 1994.

## Background

See requirement O4.

### O9 Traceability and certification of wood raw materials (pulp and paper)

#### Species name

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

#### Chain of Custody certification

All wood raw material used in the pulp or paper must be covered by a valid Chain of Custody certificate in accordance with FSC/PEFC schemes.

The manufacturer/supplier of the pulp or laminate must have valid FSC/PEFC CoC certification.

#### Certified fibre raw material

A minimum of 70% by weight/volume of the fibre raw material used in the pulp or 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\*.

- Name (species name) of the fibre raw material used. Appendix 3 may be used.
- The manufacturer/supplier of the pulp and laminate must present a valid FSC/PEFC CoC certificate, which includes all fibre raw material used in the pulp or laminate.
- The panel manufacturer must document that pulp or laminate is purchased from a CoC FSC/PEFC certified subcontractor and provide documentation that the certification requirement of at least 70% certified raw materials has been met, and the remaining proportion is covered by FSC/PEFC's control schemes (FSC controlled wood/PEFC controlled sources. This must be specified on the invoice/delivery note with certification claim.
- Valid Nordic Swan Ecolabel and or EU Ecolabel licence certificate for paper.

## 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.

#### O10 Chemicals in the manufacture of pulp and paper

Chemicals used in the manufacture of pulp and paper must meet the requirements contained in the Chemical Module for Nordic Ecolabelling of paper, Version 3, or later versions.

- Declaration from the manufacture of pulp and paper that the requirement is met. Appendix 3 may be used.

### Background

Nordic Ecolabelling has long experience of setting requirements for paper production. The requirements to be met have recently been revised and the result is the chemical module generation 3 to produce pulp and paper. The chemical module contains, among other things, requirements for the classification of chemicals, specific requirements for classified residual monomers and a ban on GMO in starch. For more background, please see the background document for the Chemicals module which can be found on the Nordic Ecolabelling website.

#### O11 COD emissions from the production of paper and pulp

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 3.

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:  $(14-1 \times 0.6) + (4-1 \times 0.4) = 7.8 + 1.2 = 9.0$  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. Appendix 3 may be used.
- 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 was also included in generation 6 of the criteria and remains unchanged. All pulp and paper production generate wastewater with organic content expressed as chemical oxygen demand (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. The Nordic Swan Ecolabel's basic module for paper also contains requirements concerning other emissions, such as emissions of nitrogen and phosphorus. However, requirements are only set for COD. COD emissions also correlate with other emissions. If the emission of COD is low, emissions of other substances to water are thus also expected to be low.

### 3.6.4 Wood-plastic composite material (WPC)

#### O12 Wood fibre and plastic

The raw materials of plastic and wood fibre in the wood-plastic composite material must meet the following requirements:

##### Plastic:

The plastic raw material used WPC panels (final product) must consist of:

- Minimum 60% post-consumer recycled plastic\* and
- Minimum 100% total recycled plastic\*. The min. 60% post-consumer recycled plastic may be included in the 100%.

Recycled plastic must not contain:

- re-worked granulate from reprocessing processes that have obtained an EFSA\*\* or FDA\*\*\* approval.

Virgin and recycled plastic must not contain:

- PVC or PVDC.

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

- a) Global Recycled Standard certificate or Recycled Claim Standard certificate showing that the plastic is recycled, or other equivalent certification approved by Nordic Ecolabelling.
- b) By giving the name of the recycled raw material producer, by documenting that the feedstock used is recycled material and by stating the share of recycled material included in the raw material, see definition in requirement.

##### Wood fibre:

The wood fibre raw material used in WPC panels (final product) must consist of:

- 100% recycled materials and
- Wood fibre must not originate from wood impregnated with biocides or heavy metals.

\* *See Terms and definitions.*

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

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

- Declaration from the manufacturer of the recycled plastic that the plant is not EFSA or FDA approved, and free of PVC or PVDC, see requirement.
- a) Certificate from an independent certifier of the supply chain (e.g., Global Recycled Standard or Recycled Claim Standard).
- b) Documentation in the form of an invoice or delivery note from the manufacturer of the panel or cladding which shows that recycled plastic has been purchased to produce the product. Documentation in form of a statement from the recycled material producer, showing type plastic used is recycled material and showing the share of recycled raw material contained in the raw material.
- Declaration from the manufacturer/supplier of recycled wood fibre raw materials that the wood fibre is defined as recycled materials and that the wood fibre is not from wood impregnated with biocides or heavy metals.
- Documentation (calculation) from the applicant showing that the requirement for share of recycled plastic and wood fibre has been reached.

## Background

Wood-plastic composite (WPC) is a new material that has been added to these criteria, generation 2.

Wood-plastic composite (WPC) are composite materials made from wood fibre/wood flour and thermoplastics such as polythene (PE), polypropylene (PP) and polyvinyl chloride (PVC).

For the environmental impact of the composite material, the plastic component is crucial. In general, the plastic raw material can be recycled or newly produced. If the plastic raw material is recycled, energy use and climate impact are reduced. But it also has great significance if the recycled raw material is post-consumer or just pre-consumer.

There are different views on whether the WPC has a place in the circular economy or not. WPC can be considered a dead end because plastic and wood are mixed and cannot be separated in the waste phase. WPC can be recycled into a new WPC, but since WPC can be made of many different types of polymeric materials, it requires that the individual product made in WPC returns to the specific manufacturer of that type of WPC, which is not immediately logistically possible to solve. It can therefore be seen as a step in the wrong direction to include a new material such as WPC in the criteria for panels and cladding for exterior use.

On the other hand, WPC provides the opportunity to use recycled post-consumer plastic that has been collected from households and that is difficult to find outlets for today. WPC is maintenance-free and the environmental impact during the use phase is thus virtually non-existing. Furthermore, WPC, when it meets Nordic Ecolabelling's requirements, is also free of substances that are hazardous to health and the environment and has a long service life.

The requirement stipulates that feedstock used in the recycled raw material must be fully traceable. Without proper traceability, it is difficult to ascertain that the material is recycled. Documentation regarding traceability should be available, e.g., a certificate from a third party's certification of the supply chain, such as Global Recycled Standard. Alternatively, the manufacturer of the recycled plastic can document the traceability by declaring that specific amounts of recycled plastic has been used. The requirement is the same as Nordic Swan Ecolabelling criteria for outdoor furniture, gen. 4.

### O13 Chemicals in recycled plastic used in WPC

The used recycled plastic must not contain the following substances:

- halogenated flame retardants  
cadmium
- lead
- mercury
- chromium IV
- arsenic
- phthalates
- polycyclic aromatic hydrocarbons (Benzo[A]Pyrene, Benzo[E]Pyrene, Benzo[A]Anthracene, Dibenzo[A,H]Anthracene, Benzo[B]Fluoranthene, Benzo[J]Fluoranthene, Benzo[K]Fluoranthene, Chrysene)

*Impurities up to 100 ppm are permitted.*

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

### Background

This is a new requirement in generation 2.

The requirement applies to chemicals contained in the recycled plastic raw material and not chemicals that are added through regranulation. There are separate requirements for additives, see O14. The requirement must be documented with a test report using X-ray fluorescence (XRF), GC-MS or equivalent methods or traceability to the source that substantiates that the specified substances are not included. The aim of the requirement is to capture the "worst substances". The documentation requirement is identical to criteria for Nordic Swan Ecolabelling of flooring and furniture. 8 specific polycyclic aromatic hydrocarbons (PAH) are now part of the requirement. All 8 PAHs is listed in

annex XVII in REACH due to concerns risks to human health. PAHs have been found in plastic packaging made of recycled PCR plastic (PE and PP)<sup>24</sup>.

Although this will entail extra documentation work, it shows that it is possible to set such a requirement. Using recycled plastic is good as it helps reduce resource use and stimulates a circular economy. At the same time, there is no wish to recycle chemicals that are harmful to health and the environment.

#### O14 Additives - prohibited substances

Additives in the list below must not be added to plastic (both virgin and recycled plastic). The requirement applies to additives actively added to the polymer raw material in the master batch or compound in production of plastic. The requirement also covers substances that are added during re-compounding of recycled plastic raw materials.

- CMR substances - Carcinogenic, Germ cell mutagenicity, Reproductive toxicity category 1A or B or category 2
  - An exemption is made for titanium dioxide (CAS No. 13463-67-7) classified H351
  - An exemption is made for 1,1,1-Trimethylolpropane (TMP, CAS No. 77-99-6) classified H361
- Substances on the Candidate List\*
- Substances evaluated by the EU to be persistent, bioaccumulative, and toxic (PBT) or very persistent and very bioaccumulative (vPvB), in accordance with the criteria in Annex XIII of REACH\*\*.
- Endocrine disruptors:
  - Substances 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. See the following link:  
[http://ec.europa.eu/environment/chemicals/endocrine/strategy/being\\_en.htm](http://ec.europa.eu/environment/chemicals/endocrine/strategy/being_en.htm) (Annex L, page 238 onwards)
  - Substances on the EU member state initiative "Endocrine Disruptor Lists", List I and III. See the following links: <https://edlists.org/the-ed-lists/list-i-substances-identified-asendocrine-disruptors-by-the-eu> and <https://edlists.org/the-ed-lists/list-iii-substances-identified-asendocrine-disruptors-by-participating-national-authorities>
- Halogenated organic compounds with the following exceptions:
  - halogenated organic pigments that comply with the Council of Europe recommendation "Resolution AP (89) 1 on the use of colorants in plastic materials coming into contact with food", point 2.5
- Butylhydroxytoluene (BHT, CAS No. 128-37-0)
- Aziridine and polyaziridines

<sup>24</sup> <https://www2.mst.dk/Udgiv/publications/2023/04/978-87-7038-507-7.pdf>, visited September 2023

- Short-chain chlorinated paraffins (C10-C13) and medium-chain chlorinated paraffins (C14-C17).
- Perfluoroalkyl and polyfluoroalkyl substances (PFASs)
- Alkylphenols, alkylphenol ethoxylates (APEO) and other alkylphenol derivatives (APD)\*\*\*.
- Brominated flame retardants.
- Phthalates\*\*\*\*
- Pigments and additives based on lead, cadmium, arsenic, chromium (VI), mercury and their compounds.
- Bisphenols and bisphenol derivatives
  - Bisphenol A used in the production of epoxy acrylate is not covered by the requirement.
  - Assessment of regulatory needs: Bisphenols. ECHA – 16 December 2021: Section 2.1: Bisphenols for which further EU RRM is proposed – restriction <https://echa.europa.eu/documents/10162/c2a8b29d-0e2d-7df8-dac1-2433e2477b02>

\* *The Candidate List is available 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 derivative.*

\*\*\*\* *Phthalates are esters of 1,2 benzenedicarboxylic acid (orthophthalic acid)*

- Safety data sheet for additives in compliance with current European legislation (Annex II of REACH, Regulation (EC) No. 1907/2006).
- A declaration from the plastics manufacturer.

## Background

This is a new requirement in generation 7. The requirement covers ingoing substances in additives that are added to the polymer raw material in the master batch or compound. Substances that arise from the actual polymer production are thus not covered by this requirement. Recycled plastic raw materials are counted as polymer raw materials, where additives that are added to a new master batch or compound are covered by requirements.

The list is based on the general principles from Nordic Swan Ecolabelling regarding undesirable compounds in combination with corresponding requirements for other Nordic Swan Ecolabelled product. For more information see chapter 3.7 chemical.

### 3.6.5 Mineral raw materials

The requirement in this chapter covers sourcing of virgin mineral raw materials and content of heavy metals in the mineral raw materials. The requirements apply to virgin minerals such as natural stones, limestone, volcanic rocks, and silica used in panels such as cement-based -and mineral wool-based panels.

## O15 Responsible sourcing of virgin mineral raw materials

The licensee must:

- have a supply chain policy/code of conduct for responsible sourcing of mineral raw materials such as natural stones, limestone, volcanic rocks, and silica. The policy must concern biodiversity and deforestation risk - reducing impact to biodiversity along the whole supply chain. The policy must be both public and communicated to the supply chain.
  - have a process to identify all specific mining operations (quarries) where the minerals are extracted from.
  - ensure that virgin mineral raw materials used in panels come from mining operations (quarries) with documented biodiversity management and rehabilitation plans.
- The most recent version of the public policy and a description of how it is communicated to the supply chain.
- List of mining operations supplying virgin minerals to the ecolabelled panel.
- Documentation/description of the supplying mining operations biodiversity management and rehabilitation plans.

### Background

This is a new requirement in generation 2 of the criteria. The latest assessment of the State of Nature in the EU, published in 2022, shows that we are unfortunately still losing nature as too many protected species continue to decline. The new European Biodiversity Strategy provides Biodiversity provides a real opportunity to put Europe's biodiversity on a pact to recovery by 2030<sup>25</sup>.

The extraction of minerals, particularly by surface methods, inevitably results in changes to the characteristics of the land and local biodiversity where it takes place<sup>26</sup>. Many source eco-systems harbour endemic species and highly diverse communities that are crucial for ecosystem functioning and services supply, including food and clean water provision, and land stability. Mining poses serious, often irreversible, and far-reaching impacts, to those ecosystems, for example through erosion, shrinking deltas, salinization, pollution, and traffic disturbances. However, these changes are often temporary, and if carefully managed, is possible to protect species/biotope both during active operations and after end use-phase<sup>27</sup>.

The licensee must have a supply chain policy/code of conduct for responsible sourcing of mineral raw materials The policy must concern biodiversity and deforestation risk - reducing impact to biodiversity along the whole supply chain. Addressing biodiversity risk involves e.g., knowing your supply chain, engaging suppliers, implementing strong purchasing standards, and monitoring

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<sup>25</sup> EU Biodiversity Strategy for 2030; [https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030\\_en](https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_en), visited March 2023

<sup>26</sup> Torres A et al: Unearthing the global impact of mining construction minerals on biodiversity, 2022

<sup>27</sup> <https://ec.europa.eu/environment/nature/natura2000/management/docs/NEEI%20case%20studies%20-%20Final%20booklet.pdf>, visited March 2023.

mechanisms and being transparent. The policy must be both public and communicated to the supply chain.

Virgin mineral raw materials used in panels must come from mining operations (quarries) with documented biodiversity management and rehabilitation plans. This means that the licensee must have full traceability to the specific mining operations (quarries) where the minerals are extracted from. The European mineral mining industry such as Cembureau<sup>28</sup>, Eurogypsum<sup>29</sup> and UEPG<sup>30</sup> have been working with biodiversity for several years and have been developing guidelines for biodiversity management and rehabilitation plans for mining operation (quarries).

## O16 Heavy metals

Virgin mineral raw materials or mineral biproducts must not exceed the quantities of heavy metals indicated in the table below in accordance with indicated test method:

Heavy metal	Partial opening of the test sample EN 259 Maximum content mg/kg	Total opening of the test sample EN 13656 Maximum content mg/kg
Arsenic	10	30
Lead	56	56
Cadmium	1,6	10
Mercury	1,4	1,4
Chrome (total)	300	300

- The declaration from the raw materials producer/-refiner, containing measurement results, measurement methods and measurement frequency. For the description of the measurement method, see Appendix 1.

## Background

New requirement in generation 2. The requirement covers both primary mineral raw materials and mineral bi-products such as fly ash from heat and power generation at coal-fired power and district heating stations. Different raw materials may contain higher quantities of heavy metals compared to the background levels, e.g., in soil. These include natural gypsum, gypsum from cleaning of smoke gas (FDG industrial gypsum), fibreglass from collected glass and mineral wool from stone. It is important that the heavy metal content is not too high that it creates problems in the user phase or for reuse of product materials.

### 3.6.6 Cement based- and mineral wool façade panels

The requirements in this chapter comprise cement based- and mineral wool façade panels/cladding.

<sup>28</sup> The European Cement Association

<sup>29</sup> European Gypsum Industry

<sup>30</sup> The European Aggregates Association



## O17 Cement based- and mineral wool-based facade panels

Mineral wool panels:

At least 50% by weight of the raw materials in the product must consist of recycled materials\*

Cement based panels:

At least 30% by weight of the raw materials in the product must consist of renewable and/or recycled materials\*

The requirement may be documented as an annual average of the production of Nordic Swan Ecolabelled mineral wool façade panels.

\* *See terms and definitions*

- Documentation (calculation) from the applicant showing that the requirement for share of recycled materials has been reached.

### Background

The requirement has been strengthened for mineral wool-based panels compared to generation 1.

In OECD countries, the built environment is responsible for around 30% of raw materials use and up to 40% of solid waste generation<sup>31,32</sup>. In Europe, 57% of the insulation market is dominated by mineral wool<sup>33</sup> which is the general term for stone wool and glass wool. Mineral wool waste is generated both from mineral wool production and construction activities. The waste got from production stage is easier to recycle in the production company, while the latter is often not recycled due to the unknown composition and is instead landfilled or incinerated as mixed construction waste<sup>34</sup>.

Mineral wool façade panels are prefabricated compressed mineral wool products with thermosetting binders. They are traditionally made from volcanic rock (basalt) and of different types of recycled material and finished with cured coating<sup>35</sup>. The recycled materials consist of post consumed/industrial recycled mineral wool, pre-consumer recycled mineral wool (cut offs, waste from production) and by products from other industries such as slags, alumina, wool waste and cement. The requirement for minimum share of recycled materials in mineral wool-based panels have been tightened from 30% to 45% in generation 2, based on dialog with stakeholders.

Cement-based panels consist primarily of 3 ingredients; cement, silica/limestone, and wood/cellulose, of which cement constitutes the largest share followed by

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<sup>31</sup> <https://www.oecd.org/environment/waste/OECD-G20-Towards-a-more-Resource-Efficient-and-Circular-Economy.pdf>

<sup>32</sup> [https://environment.ec.europa.eu/topics/waste-and-recycling/construction-and-demolition-waste\\_en](https://environment.ec.europa.eu/topics/waste-and-recycling/construction-and-demolition-waste_en) (visited March 2023)

<sup>33</sup> Sohn, J.L., Kalbar, P.P., Banta, G.T. and Birkved, M., 2017. Life-cycle based dynamic assessment of mineral wool insulation in a Danish residential building application. *Journal of cleaner production*, 142, pp.3243-3253.

<sup>34</sup> Müller, A., Leydolph, B. and Stanelle, K., 2009. Recycling mineral wool waste: technologies for the conversion of the fiber structure, Part 1. *Interceram*, 58(6), pp.378-381.

<sup>35</sup> Juho Yliniemi et al.: Characterization of mineral wool waste chemical composition, organic resin content and fiber dimensions. Elsevier, 2021: <https://www.sciencedirect.com/science/article/pii/S0956053X21003573>, visited December 2023

silica/limestone and wood/cellulose. A high content of cement (according to EN 197-1) in the panels leads to an overall high energy impact which is handled in section 3.9 climate and energy. Parts of the cement can be replaced with other mineral raw materials, which are waste raw materials from other industries. One example of this would be fly ash.

Apart from the cement, renewable fibres such as wood fibre (lignocellulose fibre) are often also included, often in varying amounts depending on panel type (between 3 and 20%). The wood fibres may be either virgin or recycled. Finally, water and inorganic fillers such as sand, lime, silicates, kaolin and aluminium hydroxide are used. In certain panels, the wood fibre is replaced by synthetic fibres, such as PVA fibres.

A potential has been identified for ensuring a high use of recycled raw materials (recycled fibres) and waste products such as fly ash, industrial slag and cement containing recycled/waste as materials in the panel. The requirement for minimum share of recycled materials is maintained at 30% in generation 2. The requirement level is based on dialog with several stakeholders and a review of EPDs.

### O18 Chemicals in recycled mineral wool

The used recycled mineral wool must not contain the following substances:

- halogenated flame retardants
- cadmium
- lead
- mercury
- chromium IV
- arsenic
- phthalates
- asbestos
- polycyclic aromatic hydrocarbons (Benzo[A]Pyrene, Benzo[E]Pyrene, Benzo[A]Anthracene, Dibenzo[A,H]Anthracene, Benzo[B]Fluoranthene, Benzo[J]Fluoranthene, Benzo[K]Fluoranthene, Chrysene)

*Impurities up to 100 ppm are permitted.*

- A test report (XRF, X-ray fluorescence or equivalent method) from the supplier of the recycled composite material showing compliance with the requirement.
- Alternatively, the requirement can be document with EUCEB certification (European Certification Board of mineral products) or traceability to the source to substantiate that these substances are not included.

### 3.6.7 Metal - aluminium

The requirement in this chapter applies to aluminium used in fitting system/installation bracket used for fixing panels on facades. Only relevant if the panel is sold together with a unique fitting system/installation bracket in aluminium. Screws, bolts, small mounting brackets, clips and similar is not part of the criteria.

## O19 Production of aluminium

The requirement can be met by documenting either A) High proportion recycled or B) Primary aluminium production. (B consist of 4 alternatives):

### A) High proportion recycled

A minimum of 75% by weight of aluminium must be recycled.

*Recycled aluminium is defined as both pre- and post-consumed, cf. definition in ISO 14021.*

The requirement can be verified either by:

- A signed agreement between the aluminium supplier and the manufacturer of the Nordic Swan Ecolabelled product stating that the requirement is met, or
- eBVD or EPD based on product-specific data/data from the aluminium producer's own production specifically stating the content of recycled aluminium in the product, or
- Valid Hydro Circal certificate.

Or

### B) Primary aluminium production

The requirement can be met by one of the 4 alternatives (1-4) below:

The requirement can be verified using either: direct traceability through the supply chain, mass balance approach<sup>36</sup> or by all major suppliers<sup>37</sup>.

#### 1. Aluminium production – active sustainability strategy

Aluminium used in the Nordic Swan Ecolabelled product comes from a primary aluminium producer who has an active sustainability strategy focusing on reducing energy consumption and greenhouse gas emissions. The strategy for reducing energy consumption and greenhouse gas emissions shall be quantitative and time-based, and they shall be determined by the company management.

Or

#### 2. Aluminium production – low direct climate effecting emissions

Aluminium used in the Nordic Swan Ecolabelled product comes from a primary aluminium producer whose direct climate-affecting emissions from primary aluminium production does not exceed 1,5 tonnes of CO<sub>2</sub>e/ton of aluminium produced.

or

#### 3. Aluminium production – low electricity consumption for electrolysis

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<sup>36</sup> In case of several potential aluminium producers, the supplier of the metal components can verify the requirement by using a mass balance approach if there is an account documenting the annual volumes purchased from the individual aluminium producers. The volumes must correspond to volumes sold to the producer of Nordic Swan Ecolabelled product (e.g., cannot sell a larger volume than the corresponding quantity purchased from the individual aluminium producers)

<sup>37</sup> All major suppliers are compliant with one of the 3 alternatives. Major suppliers are here defined as suppliers delivering 75% of the total volume (w/w) of aluminium components in the Nordic Swan Ecolabelled product.

Aluminium used in the Nordic Swan Ecolabelled product comes from a primary aluminium producer whose electricity consumption for electrolysis does not exceed 15.3 MWh / ton produced aluminium.

or

#### **4. Aluminium production – ASI certified site**

A minimum of 50% by weight of aluminium used in the Nordic Swan Ecolabelled product comes from a production site that are certified to the ASI Performance standard<sup>38</sup>.

##### **High proportion recycled (A):**

- Alternative 1: There must be a signed agreement between the producer of aluminium/supplier of aluminium and the manufacturer of the Nordic Swan Ecolabelled product stating that the requirement is met. The declaration from the supplier of aluminium can be based on purchase records/average data from several aluminium suppliers.
- Alternative 2: eBVD or EPD can be used as documentation if these are based on product-specific data/data from the aluminium producer's own production and specifically state the content of recycled aluminium in the product.
- Alternative 3: Valid Hydro Circal certificate<sup>39</sup>.

##### **Primary aluminium production (B):**

Alternative 1:

- Enclose latest sustainability strategy report or equivalent documentation from the producer of primary aluminium showing fulfilment of the requirement. The producer of primary aluminium can also present specific targets from annual business report with reference to specific numbers and assumptions. Average numbers from the producer of primary aluminium with several steel melting plants is accepted.
- Information on type of traceability used to document the requirement.

Alternative 2:

- Declaration that the requirement is met, as well as calculation and indication of direct emissions in tonnes of CO<sub>2</sub>e/ton of aluminium produced.
- Information on type of traceability used to document the requirement.

Alternative 3:

- Declaration that the requirement is met, as well as calculation and indication of electricity consumption in MWh/ton produced aluminium.
- Information on type of traceability used to document the requirement.

Alternative 4:

- Enclose valid ASI Performance certificate from the primary aluminium producer.

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<sup>38</sup> <https://aluminium-stewardship.org/asi-standards/asi-performance-standard> (visited November 2022)

<sup>39</sup> <https://www.hydro.com/en-DK/about-hydro/publications/certificates/> (November 2022)

- ☒ Information from the supplier/manufacturer of the constituent aluminium part about which aluminium parts are from certified aluminium production (purchase records).
- ☒ Information from the supplier/manufacturer of the constituent aluminium parts on type of traceability used to document the requirement.
- ☒ Documentation from the manufacturer of the Nordic Swan Ecolabelled product that the requirement for share of purchased aluminium from certified aluminium producers is fulfilled – e.g., invoices or other documentation from suppliers.

## Background

This is a new requirement in generation 7. Metal is normally not used in panels for interior use, but aluminium can be included in frames in certain types of acoustic panels. Nordic Ecolabelling has not seen examples of the use of other metals such as steel, and the requirement therefore only covers aluminium.

Using recycled metal significantly reduces the environmental impact and provides a significant climate benefit. Among other things, this is highlighted in the taxonomy work in the EU<sup>40</sup>. Nordic Ecolabelling is aware that the availability of recycled aluminium and traceability can be a challenge. But in a world with an increasing focus on circular economy, Nordic Ecolabelling believes that there will be an increased focus on this in the future. Traceability in the production chain is also a value, and is important for several aspects, e.g., it provides opportunities to select suppliers based on e.g., environmental work, working conditions and quality. Demand for traceability will hopefully contribute to the industry also placing increased focus on this. For Aluminium, Hydro has launched its own traceability certification with a minimum of 75% recycled Al, Hydro Circal<sup>41</sup>. The industry average for EU-produced aluminium is approx. 50% recycled, while for Al outside the EU it is approx. 40%. The big environmental benefit comes from the use of post-consumer recycled aluminium.

The requirement model is based on a mandatory requirement to the aluminium producer to have an energy and greenhouse gas calculation with defined reduction targets. Certification with ASI is something that Nordic Ecolabelling see as positive initiatives for a more sustainable metal production. This is an independent certification system with a focus on both economic, social, and environmental aspects. For aluminium, the requirement can also be fulfilled by documenting direct emissions of greenhouse gases and energy efficiency in the electrolysis process, where the limits are based on values stated in the EU taxonomy report. Direct emissions are to be calculated according to the methodology used for EU-ETS benchmarks. Please note that these values may change based on the final outcome of the EU taxonomy work.

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<sup>40</sup> Taxonomy report, technical annex, EU technical expert group on sustainable finance, March 2020

<sup>41</sup> <https://www.hydro.com/en/products-and-services/low-carbon-aluminium/hydro-circal-75r/> (available 2022-10-17)

## 3.7 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, surface treatments and surface treatment system. The chapter is divided into 3 sub-sections:

- Requirements concerning chemicals in the production of the Nordic Swan Ecolabelled product, such as adhesives, resins and waxes, Section 3.7.1
- Requirements concerning chemical products used for surface treatment\*, Section 3.7.2
- Requirements concerning surface treatment systems, Section 3.7.3.

*\* Lamination (thin layer of laminate < 2 mm) 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 3.7.1.*

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

- **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.

### 3.7.1 Chemicals used in the production of panels

The requirements in this chapter concern chemicals used in the production of the Nordic Swan Ecolabelled product itself such as adhesives, resins, or additives.

#### O20 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 <sup>1</sup>	Carc. 1A or 1B	H350
	Carc. 2	H351
Germ cell mutagenic <sup>1</sup>	Mut. 1A or 1B	H340
	Mut. 2	H341
Reproductive toxicity <sup>1</sup>	Repr. 1A or 1B	H360
	Repr. 2	H361
	Lact.	H362

<sup>1</sup> 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. Appendix 4 may be used.

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 or 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.



## O21 Classification of ingoing substances

Ingoing substances in the chemical product used in production must not be classified as in the table below.

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

<sup>1</sup> 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.
  - 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.
- A declaration from the chemical manufacturer or supplier. Appendix 4 may be used.
- 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 products. 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.

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

## O22 Prohibited substances

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

- Substances on the Candidate List\*
  - Exemption applies to melamine (CAS No. 108-78-1)
- 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 requirement O24.
- Per- and polyfluoroalkyl substances (PFASs), e.g., PFOA and PFOS
- Butylhydroxytoluene (BHT, CAS No. 128-37-0)
- Aziridine and polyaziridines
- Bisphenols and bisphenol derivatives
  - Bisphenol A used in the production of epoxy acrylate is not covered by the requirement.
  - Assessment of regulatory needs: Bisphenols. ECHA – 16 December 2021: Section 2.1: Bisphenols for which further EU RRM is proposed – restriction <https://echa.europa.eu/documents/10162/c2a8b29d-0e2d-7df8-dac1-2433e2477b02>
- 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 based on 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.*

*\*\*\*\* Phthalates are esters of 1,2-benzenedicarboxylic acid (orthophthalic acid).*

- A declaration from the manufacturer/supplier of the chemical product. Appendix 4 may be used.
- 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 ecosystems<sup>42</sup>. Nordic Ecolabelling excludes identified and potential endocrine disruptors listed on the “Endocrine Disruptor Lists” at [www.edlists.org](http://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

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<sup>42</sup> 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).

disruptors. It is still unclear how these substances will be handled at [www.edlists.org](http://www.edlists.org) after the evaluation (safety assessment of the substances included in cosmetics, for example) has been completed. Nordic Ecolabelling will assess the circumstances for the substances on Sub-List II on a case-by-case basis, based on the background information provided in the sub-list. By excluding both identified and prioritised potential endocrine disruptors that are under evaluation, Nordic Ecolabelling ensures a restrictive approach towards endocrine disruptors.

#### *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.

#### *Per- and polyfluoroalkyl substances (PFAs), e.g., PFOA and PFOS*

Fluorosurfactants and other per- and polyfluoroalkyl substances (PFASs) constitute a group of substances that have harmful properties. Certain per- and polyfluorinated compounds can degrade to the very stable PFOS (perfluorooctane sulphonate) and PFOA (perfluorooctanoic acid) and similar substances. These substances are extremely persistent and are easily absorbed by the body<sup>10</sup>. The substances are found all over the globe, from the large oceans to the Arctic. PFOS have also been found in birds and fish and in their eggs. The substances in this group impact on the biological processes of the body and are suspected to be endocrine disruptors, carcinogenic and to have a negative impact on the human immune system<sup>11</sup>. PFOA, APFO (ammonium pentadecene fluoro octanoate) and certain fluoride acids are on the Candidate List due to their reprotoxicity, as well as PBT. There are new research results showing that shorter chains (2-6 carbon atoms) have been discovered in nature<sup>43</sup>.

#### *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

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<sup>43</sup> Perkola, Noora, Fate of artificial sweeteners and perfluoroalkyl acids in aquatic environment, Doctoral dissertation Department of Environmental Sciences, Faculty of Biological and Environmental Sciences, University of Helsinki, Finland 12.12.2014, <https://helda.helsinki.fi/bitstream/handle/10138/136494/fateofar.pdf?sequence=1>

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 found<sup>44</sup>. These are substances that have the same properties as Bisphenol A<sup>45</sup>. 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.

### *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,

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<sup>44</sup> Screening programme 2013: New bisphenols, organic peroxides, fluorinated siloxanes, organic UV filters and selected PBT substances, Norwegian Environment Agency, Report M-176/2014

<sup>45</sup> <https://tema.miljodirektoratet.no/no/Tema/Kjemikalier/Miljogifter/Bisfenol-A/>

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.

## O23 Nanomaterials

The chemical product must not contain nanomaterials\*.

Exemptions apply for:

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

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

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

*\*\*\* This applies to non-modified synthetic amorphous silica and surface-treated pyrogenic silica, as long as the silica particles form aggregates or agglomerates in the end product. For surface treated nanoparticles, the surface treatment must meet the chemical requirements in O31 (Classification of ingoing substances) and O32 (Prohibited substances).*

- A declaration from the chemical manufacturer that the chemical product does not contain any nanomaterial. Appendix 4 may be used.

## 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<sup>46, 47, 48, 49, 50, 51</sup>. Coatings and other modifications may also alter the properties. Nordic Ecolabelling takes the concerns about nanomaterials seriously and uses the precautionary principle to rule out nanomaterials/particles in the products. Nanomaterials/-particles are defined according to the EU Commission Recommendation on the Definition of Nanomaterial (2022/C 229/01)<sup>52</sup>.

Most nanomaterials on the market today have either been in use for decades or have recently been manipulated into nanoforms of existing materials<sup>53</sup>. For example, carbon black nanoparticles and amorphous silicon dioxide (SiO<sub>2</sub>) have been used in previous centuries. Titanium dioxide (TiO<sub>2</sub>) has long been used as a dye in bulk form but is now manufactured as a nanomaterial for other purposes<sup>54</sup>. Other types of engineered nanomaterials are expected to enter the market in the future<sup>55</sup>.

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:

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<sup>46</sup> 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](https://wedocs.unep.org/bitstream/handle/20.500.11822/22255/Frontiers_2017_EN.pdf?sequence=1&isAllowed=y)

<sup>47</sup> 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=aHR0cDovL2Fzc2VtYmx5LmNvZS5pbmQvbnVlZG1sL1hSZWYvWDJILURXLWV4dHluYXNwP2ZpbGVpZD0xOTczMCZsYW5nPUVO&xsl=aHR0cDovL3NlbWFudGljcGFjZS5uZXQvWHNsdc9QZGYvWFJlZi1XRRC1BVC1YTUwyJERGLnhzbA==&xsltparams=ZmlsZWlkPTE5NzMw>

<sup>48</sup> Larsen PB, Mørck TAA, Andersen DN, Hougaard KS (2020) A critical review of studies on the reproductive and developmental toxicity of nanomaterials. European Chemicals Agency.

<sup>48</sup> 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](https://ec.europa.eu/health/sites/health/files/scientific_committees/consumer_safety/docs/sccs_o_233.pdf)

<sup>49</sup> 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

<sup>50</sup> 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](http://www.beuc.eu/publications/beuc-x-2014-024_sma_nano_position_paper_caracal_final_clean.pdf)

<sup>51</sup> 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/rappporter/Rapport-Nano.pdf](http://www.naturskyddsforeningen.se/sites/default/files/dokument-media/rappporter/Rapport-Nano.pdf)

<sup>52</sup> [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022H0614\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022H0614(01)&from=EN)

<sup>53</sup> 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](https://euon.echa.europa.eu/documents/23168237/24095696/190919_background_note_next_gen_materials_en.pdf/b9178324-5a69-2e4b-1f2b-aac2c2845f45)

<sup>54</sup> 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

<sup>55</sup> 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](https://euon.echa.europa.eu/documents/23168237/24095696/190919_background_note_next_gen_materials_en.pdf/b9178324-5a69-2e4b-1f2b-aac2c2845f45)



### *Pigments*

Pigments are finely ground, insoluble particles that are used to give the products a certain colour. There are no substitutes that can perform the function of pigments such as paint dyes, inks, fabric dyes, masterbatch, etc. and many pigments consist entirely or partially of nanoparticles. Therefore, nanosize pigments are exempted. Although clear conclusions on the safety of nanopigments cannot be drawn<sup>56</sup>, 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<sup>57, 58</sup>. Paint pigments consist of particles of individual crystals up to aggregates of several crystals. It is generally more effective to use pigments with smaller particles than larger to get the same colour. Inorganic pigments used in the paint industry, which can occur in nanosize, include carbon black and iron oxides<sup>59</sup>. Carbon black used in paints is very finely ground and has a particle size of approximately 10–30 nm<sup>60</sup>. 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 (SiO<sub>2</sub>) that has been used in industrial, consumer and pharmaceutical products for decades<sup>61</sup>. Silica plays an important role in coating formulations; this is true for non-surface treated types as well as surface modified types.

The surface-treated and non-surface-treated forms are expected to have the same (eco)toxicological profile because the influence of surface treatment on dissolution rate and solubility which was demonstrated in various in vitro experiments has not resulted in biologically relevant differences in bioavailability and toxicokinetic nor were there significant differences in (eco)toxicological outcomes of representative materials tested in key in vivo studies. None of the recent

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<sup>56</sup> 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.

<sup>57</sup> 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>

<sup>58</sup> 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)

<sup>59</sup> *Industrial Organic Pigments*; W. Herbst, K. Hunger; Third edition 2004; pp. 120–124

<sup>60</sup> *Coatings Handbook*; Thomas Brock, Michael Groteklaes, Peter Mischke; 2000; p. 128

<sup>61</sup> [https://www.asasp.eu/images/Publications/Nano\\_-\\_SAS\\_factsheet\\_-\\_201209.pdf](https://www.asasp.eu/images/Publications/Nano_-_SAS_factsheet_-_201209.pdf)

available data for surface-treated and non-surface-treated SAS gives any evidence for a mechanism of systemic toxicity that may raise concerns with regard to human health or environmental risks.<sup>62</sup>

The synthetic amorphous silica can be manufactured in two ways. One way is the precipitation to receive a precipitated silica and the other way is the fumed synthesis to receive a pyrogenic silica. Since the definitions of “colloidal may be ambiguous and the substance used is pyrogenic silica, exemption has been edited and is granted only to surface-treated pyrogenic silica.

## O24 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).

- A declaration from the chemical manufacturer or supplier. Appendix 4 may be used.
- 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.

<sup>62</sup> <https://echa.europa.eu/de/registration-dossier/-/registered-dossier/15556>

## O25 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 (HPL and compact laminate) is exempted from the requirement.

*Volatile organic compounds (VOC), see terms and definitions.*

- Declaration from the adhesive manufacturer/supplier that the requirement is fulfilled. Appendix 4 may be used.

### 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 due to quality issues ensuring that the resin cures properly.

## O26 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.

- A declaration from the manufacturer/supplier of the chemical product that the requirement is fulfilled. For adhesive products used for load-bearing structures a declaration must also be sent in by the panel producer that describes how the workers are protected from exposure when the adhesive and hardener is mixed and applied. Appendix 4 may be used.

### Background

The limit values for free formaldehyde have been made stricter compared with the previous criteria, generation 1. 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 panels and mouldings for interior use, generation 7. 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 can 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 regarding 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.

### 3.7.2 Surface treatment

The requirements in this chapter apply to surface treatment\* products such as lacquers, oils, paints, and stains. There are also requirements for foiling with plastic. Any filler used is also covered by these requirements.

*\* Lamination (thin layer of laminate < 2 mm) 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 4.7.1.*

#### O27 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 3.7.1.

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<sup>63, 64</sup>.

## O28 Ecolabelled products

If the chemical product is ecolabelled with Nordic Swan Ecolabel or EU Ecolabel\*, all requirements in this chapter 3.7.2 is fulfilled.

Nordic Swan Ecolabel or EU Ecolabel\* paint or varnish must be used for any surface treatment of solid wood used for cladding.

\* *Valid licence according to Nordic Swan Ecolabel Paint and varnishes gen. 4 or EU Ecolabel EU44 2014/312 - or later valid generations.*

- Nordic Swan Ecolabel or EU Ecolabelled paint or varnish: Submit name of product, manufacturer, and licence number.

## Background

New requirement in generation 2. Nordic Swan ecolabel or EU Ecolabelled paint or varnish comply with strict requirements regarding environmentally hazardous chemicals and does not contain substances that can cause cancer, damage genes or reproductive capacity. Moreover, Ecolabelled paint and varnish meet strict quality requirements to promote long-lasting, durable, and efficient paints and varnishes, which therefore leads to automatically compliance (if used) with all requirements in section 3.7.2.

Nordic Swan ecolabel or EU Ecolabelled paint or varnish must be used for any surface treatment (inc. primer) of solid wood used for cladding. Ecolabelled paint and varnish for outdoor must comply with strict quality requirements (weathering- and fungal growth test) which promote durability.

## O29 Classification of chemical products

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

<sup>63</sup> Chlorine and Building Materials: A Global Inventory of Production Technologies, Markets, and Pollution, Phase 1: Africa, The Americas, and Europe, Healthy Building Network, 2018

<sup>64</sup> Chlorine and Building Materials: A Global Inventory of Production Technologies, Markets, and Pollution, Phase 2: Asia, Healthy Building Network, 2019

Respiratory sensitisation	Resp. Sens. 1, 1A or 1B	H334
Carcinogenic <sup>1</sup>	Carc. 1A or 1B Carc. 2	H350 H351
Germ cell mutagenic <sup>1</sup>	Mut. 1A or 1B Mut. 2	H340 H341
Reproductive toxicity <sup>1</sup>	Repr. 1A or 1B Repr. 2 Lact.	H360 H361 H362

<sup>1</sup> 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 O30 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). Appendix 5 may be used.

## 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.

### O30 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.

### O31 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 <sup>1</sup>	Carc. 1A or 1B Carc. 2	H350 H351
Germ cell mutagenic <sup>1</sup>	Mut. 1A or 1B Mut. 2	H340 H341
Toxic for reproduction <sup>1</sup>	Repr. 1A or 1B Repr. 2 Lact.	H360 H361 H362
Endocrine disruption for human health	ED HH 1 ED HH 2	EUH380 EUH381
Endocrine disruption for the environment	ED ENV 1 ED ENV 2	EUH431 EUH431
Persistent, Bioaccumulative, and Toxic properties	PBT	EUH440 EUH441
Very Persistent, Very Bioaccumulative properties	vPvB	
Persistent, Mobile, and Toxic properties	PMT	EUH450
Very Persistent, Very Mobile properties	vPvM	EUH451

<sup>1</sup> 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
  - Trimethylolpropane triacrylate (TMPTA) with CAS No. 15625-89-5 classified as Carc 2, H351
  - 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. Appendix 5 may be used.
- 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. Trimethylolpropane triacrylate (TMPTA) (CAS No. 15625-89-5) have been reclassified as class 2 carcinogen H351. 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.



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

### O32 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 O45.
  - 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
- Per- and polyfluoroalkyl substances (PFASs), e.g., PFOA and PFOS
- 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 and bisphenol derivatives
  - Bisphenol A used in the production of epoxy acrylate is not covered by the requirement.
  - Assessment of regulatory needs: Bisphenols. ECHA – 16 December 2021: Section 2.1: Bisphenols for which further EU RRM is proposed – restriction <https://echa.europa.eu/documents/10162/c2a8b29d-0e2d-7df8-dac1-2433e2477b02>
- 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.*

*\*\*\*\* Phthalates are esters of 1,2-benzenedicarboxylic acid (orthophthalic acid).*

- 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. Appendix 5 may be used.

## 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 ongoing 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.

### O33 Nanomaterials

The chemical product must not contain nanomaterials\*.

Exemptions apply for:

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

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

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

*\*\*\* This applies to non-modified synthetic amorphous silica and surface-treated pyrogenic silica, as long as the silica particles form aggregates or agglomerates in the end product. For surface treated nanoparticles, the surface treatment must meet the chemical requirements in O31 (Classification of ingoing substances) and O32 (Prohibited substances).*

- A declaration from the chemical manufacturer that the chemical product does not contain any nanomaterial. Appendix 5 may be used.

### 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<sup>65, 66, 67, 68, 69, 70</sup>. Coatings and other modifications may also alter the properties. Nordic Ecolabelling takes the concerns about nanomaterials seriously and uses the precautionary principle to rule out nanomaterials/particles in the products. Nanomaterials/-particles are defined according to the EU Commission Recommendation on the Definition of Nanomaterial (2022/C 229/01)<sup>71</sup>.

Most nanomaterials on the market today have either been in use for decades or have recently been manipulated into nanoforms of existing materials<sup>72</sup>. For example, carbon black nanoparticles and amorphous silicon dioxide (SiO<sub>2</sub>) have been used in previous centuries. Titanium dioxide (TiO<sub>2</sub>) has long been used as a dye in bulk form but is now manufactured as a nanomaterial for other purposes<sup>73</sup>. Other types of engineered nanomaterials are expected to enter the market in the future<sup>74</sup>.

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. Exemptions, see background under O34.

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<sup>65</sup> 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](https://wedocs.unep.org/bitstream/handle/20.500.11822/22255/Frontiers_2017_EN.pdf?sequence=1&isAllowed=y)

<sup>66</sup> 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=aHR0cDovL2Fzc2VtYmx5LmNvZS5pbmQvbnVlZG1sL1hSZWYvWDJILURXLWV4dHluYXNwP2ZpbGVpZD0xOTczMCZsYW5nPUVO&xsl=aHR0cDovL3NlbWFudGljcGFjZS5uZXQvWHNsdc9QZGYvWFJlZi1XRRC1BVC1YTUwyJERGLnhzbA==&xsltparams=ZmlsZWkPTE5NzMw>

<sup>67</sup> Larsen PB, Mørck TAA, Andersen DN, Hougaard KS (2020) A critical review of studies on the reproductive and developmental toxicity of nanomaterials. European Chemicals Agency.

<sup>67</sup> 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](https://ec.europa.eu/health/sites/health/files/scientific_committees/consumer_safety/docs/sccs_o_233.pdf)

<sup>68</sup> 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

<sup>69</sup> 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](http://www.beuc.eu/publications/beuc-x-2014-024_sma_nano_position_paper_caracal_final_clean.pdf)

<sup>70</sup> 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](http://www.naturskyddsforeningen.se/sites/default/files/dokument-media/rapporter/Rapport-Nano.pdf)

<sup>71</sup> [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022H0614\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022H0614(01)&from=EN)

<sup>72</sup> 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](https://euon.echa.europa.eu/documents/23168237/24095696/190919_background_note_next_gen_materials_en.pdf/b9178324-5a69-2e4b-1f2b-aac2c2845f45)

<sup>73</sup> 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

<sup>74</sup> 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](https://euon.echa.europa.eu/documents/23168237/24095696/190919_background_note_next_gen_materials_en.pdf/b9178324-5a69-2e4b-1f2b-aac2c2845f45)

**O34 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).

- A declaration from the chemical manufacturer or supplier. Appendix 5 may be used.
- 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.

**O35 Free formaldehyde**

The content of free formaldehyde in each individual chemical product used for surface treatment must not exceed 0.02% by weight (200 ppm).

- Declaration from the manufacture of the chemical product(s) in the surface treatment system. Appendix 5 may be used.

**Background**

For further background information about free formaldehyde, see Section 3.7.1.

### 3.7.3 Surface treatment system

#### O36 Application method and quantity applied – surface treatment

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

- a) Name of surface treatment product and manufacturer of surface treatment product
- b) Quantity applied (g/m<sup>2</sup>), 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 Interior panels. Information about applied quantities, number of coats and method of application is required to calculate applied quantities of VOCs in subsequent requirements.

#### O37 Quantity of applied volatile organic compounds (VOC)

In the surface treatment system, 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, or
- b) The total amount of VOCs applied must not exceed 10 g/m<sup>2</sup> treated surface.

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

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

For both alternatives, it is the VOC content of the chemical products in their uncured form that must meet the requirement. If the chemical 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 quantity 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.

## 3.8 Emissions

### 3.8.1 Emissions from the production – COD

#### O38 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.

## Background

The energy requirement is unchanged compared to generation 6 of the criteria.

Panel production using a wet process 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.



### 3.8.2 Emissions from the production – working environment

#### O39 Emissions to air from production of laminate in HPL, compact laminate and panels based on resin binder

Laminate or panels produced with resins containing formaldehyde and phenol must adhere to the following hygienic limit values for emissions to air in the workplace (gate to gate at the laminate production site) \*:

- The average value during an 8-hour period must not exceed:
  - 0.3 ppm (0.37 mg/m<sup>3</sup>) for formaldehyde
  - 2 ppm (8 mg/m<sup>3</sup>) for phenol
- The average value during a reference period of 15 minutes must not exceed:
  - 0.6 ppm (0.74 mg/m<sup>3</sup>) for formaldehyde
  - 4 ppm (16 mg/m<sup>3</sup>) 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.

#### O40 Emissions of dust

The following limit values for emissions to indoor air must not be exceeded during the manufacture of panels/cladding in relation to the working environment.

The requirement relates to panels/cladding in which the content of mineral raw materials or wood raw materials individually accounts for more than 5 % by weight of the panel/cladding:

- Mineral dust, inert: 10 mg/m<sup>3</sup>
- Mineral dust, inert, breathable: 5 mg/m<sup>3</sup>
- Mineral wool: 1 fibre/cm<sup>3</sup>
- Wood dust, breathable: 2 mg/m<sup>3</sup>
- Organic dust, total: 5 mg/m<sup>3</sup>

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.

Production in countries where the official mandatory emission requirements are at the same or a stricter level than this requirement is exempted from the requirement. No limit values have been defined for the indicated emission types in the EU Commission directives (Commission Directive 2000/39/EC, Commission Directive 2006/15/EC, Commission Directive 2009/161/EU) of relevance to the area. On the other hand, all working environment authorities in the Nordic countries have defined limit values for mineral dust, wood dust and organic dust generally, which are relevant for panel production systems in the product group.

## 3.9 Climate and energy

This chapter contains requirements for the energy consumption in the production of the different types of panels and specific type of raw materials used in the panels.

The energy consumption is calculated as MJ/kg product produced, and encompasses all energy used from **gate to gate** (phase A3 in EPDs) at the panel production site. Energy consumption also needs to be calculated for specific type of raw materials such as pulp/paper, resin/glue, laminate, cement, and mineral wool used in panels.

The requirements must be documented in the form of energy consumed (actual energy used in production) without the use of primary energy factors.

The requirement may be documented either just for the specific production of the ecolabelled panel or for the company's total annual production.

**System boundary for the requirement:** Energy consumption for extraction of raw materials, transports of raw materials or any surface treatment is not part of

the energy requirement. The energy requirements do not apply to raw materials that are included by less than **5 wt%** of the panel.

Further descriptions of how the energy calculation should be carried out can be found in Appendices 6.

### 3.9.1 Panels made from renewable raw materials

The requirements apply to energy consumption in the production of; kraft paper and paper pulp used in HPL, compact laminate, wood-based panels and panels made from other lignocellulose raw materials.

#### O41 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:

$$P^*_{\text{electricity(total)}} < 2.5$$

$$P^*_{\text{fuel(total)}} < 2.5$$

For paper consisting solely of TPM/GW\* produced on-site, the limit value for  $P^*_{\text{fuel(total)}}$  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  $P^*_{\text{electricity(total)}}$  and  $P^*_{\text{fuel(total)}}$ . 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.

#### O42 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	8 MJ/kg
Other types of laminate ≤ 2 mm HPL ≤ 2 mm included	11 MJ/kg

A detailed description of how to perform the calculation is given in Appendix 6.

- 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.

### O43 Energy consumption – wood-based panels

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

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

If a type of wood-based panel is laminated, the wood-based panel must fulfil the requirement limit here, while the laminate must fulfil the requirements for laminate in O41.

A detailed description of how to perform the energy calculation is given in Appendix 6.

- 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.

### O44 Energy consumption – panels made from other lignocellulose raw materials

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

A detailed description of how to perform the calculation is given in Appendix 6.

- 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.

### O45 Energy consumption - Solid wood panels and cladding

The energy consumption in production of solid wood panels/cladding must not exceed 1350 MJ/m<sup>3</sup>.

*The requirement includes energy use (electricity and heat) from gate to gate at the production site e.g., drying, sawing, shaping/profiling, planing, surface treatment and packaging. Any drying and sawing occurring with subcontractors must be included in the calculation. Energy consumption is calculated as an annual average for either just the ecolabelled production or for the whole production site that is relevant for Nordic Swan Ecolabelled panels.*

- 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 requirement has been tightened in generation 7.

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. The requirement is the same as criteria for O10 panels and mouldings for interior use, generation 7.

### **3.9.2 Panels made from mineral- and non-renewable raw materials**

The requirements apply to energy consumption in the production of; materials based on wood plastic composite (WPC), mineral wool-based panels, cement, and cement-based panels.

#### O46 Energy consumption - Wood plastic composite (WPC)

The energy consumption in production of panels made of WPC must not exceed 3 MJ/kg.

*The requirement includes energy use (electricity and heat) from gate to gate at the production site e.g., pumping, mixing, extrusion, injection-/compressing moulding, cooling, surface treatment, cutting and packaging. For more information, see Appendix 6.*

- 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.

#### O47 Energy consumption - mineral wool-based panel (incl. facing/finishing)

Production of mineral wool-based panels must comply with a) energy consumption in production of mineral wool-based panels and b) use of fossil fuels.

a) Energy consumption

- The energy consumption in production of mineral wool-based panels must not exceed 17 MJ/kg panel.

*The requirement includes energy use (electricity and heat) from gate to gate at the production site e.g., cutting, facing the mineral wool, surface coating and packaging. Manufacturing of mineral wool or fleece/glass fleece and transport is not part of the requirement.*

b) Fossil fuels

- Fossil oil and coal must not be used as fuels for production of process heat in the production of mineral wool-based panels.

*Necessary use of fossil oil e.g., in planned maintenance stops, emergency maintenance stops, as a reserve and tip fuel (peak load fuel) or at start-ups for regulation of the combustion temperature in a heat and co-generation boiler is allowed. Use of natural gas and liquid petroleum gas (LPG) is allowed in the production.*

- A) 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.

- B) The manufacturer of mineral wool-based panels shall confirm that fossil oil and/or coal are not used as fuel to produce process heat in the production of panels.

#### O48 Energy consumption - Cement

Cement defined according to EN 197-1 must comply with the requirement a) global warming potential (GWP) and b) fossil fuels:

a) **The total global warming potential (GWP)**

- The total global warming potential (GWP) from cradle-to-gate shall not exceed the values given in table below.

**Table 1:** Limit values for product-specific emissions for cement. Product specific GWP<sub>tot</sub> for the cradle to gate system boundary (A1-A3)

Cement/hydraulic binder type	GWPtot
White cement clinker	0.973 tCO <sup>2</sup> e/tonne white cement clinker
<b>Grey cement clinker</b>	<b>0.722 tCO<sup>2</sup>e/tonne grey cement clinker</b>
<b>Lime</b>	<b>0.746 tCO<sup>2</sup>e/tonne lime</b>

**b) Fossil fuels**

- Fossil oil and coal must not be used as fuels\* for production of process heat in the production of cement.

*Necessary use of fossil oil e.g., in planned maintenance stops, emergency maintenance stops, as a reserve and tip fuel (peak load fuel) or at start-ups for regulation of the combustion temperature in a heat and co-generation boiler is allowed.*

*\* Use of natural gas and liquefied petroleum gas (LPG) is allowed.*

- A) Product-Specific Type III Environmental Product Declaration (EPD) in accordance with EN 15804+A2 & ISO 14025 / ISO 21930 and PCR/c-PCR showing that the GWP limit is met.
- B) The cement manufacturer shall confirm that fossil oil and/or coal are not used as fuels to produce process heat in the production of cement.
- Documentation from the licensee showing that the specific cement is used in the product.

**O49 Energy consumption - cement-based panels**

The energy consumption in production of fibre cement flat sheets must not exceed 2 MJ/kg panel.

*The requirement includes energy use (electricity and heat) from gate to gate at the production site e.g., pumping, refining, forming, pressing, drying, cutting, and packaging. Manufacturing of cement and transport is not part of the requirement.*

- 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.

**Background**

*Wood plastic composite:*

New requirement in generation 2. The process for manufacturing WPCs includes mixing of wood flour with thermosetting polymers, extrusion, injection moulding, compression moulding or thermoforming (pressing) and any surface treatment. The processes of extrusion (melting of polymers/mixing with other components) and injection-/compression moulding are energy intensive in relation to use of electricity. Enhancing energy efficient is important when it comes to reducing the overall energy consumption.

The energy consumption in production of wood plastic composite panels must not exceed 3 MJ/kg panel. The energy limit based on dialog with stakeholders and a review of EPDs.

*Mineral wool-based panels:*

The requirement has been changed compared to generation 1 where it includes both the production of mineral wool as well as the final panel. The share of virgin mineral rock/basalt is 15-20% in the final panel and the requirement for production of virgin mineral wool has therefore been removed in generation 2. The requirement now covers all the energy used (electricity + heat) at the production site (gate to gate, or phase A3 in EPDs). The production process includes heating and melting (1500 °C) a mix of virgin basalt (15-20%) and different types of recycled material, spinning on mineral strings/fibres, pressing, cutting, facing of panels, coating, and packaging<sup>75</sup>. The proposed energy limit is based on dialog with stakeholders and a review of EPDs.

Nordic Ecolabelling wishes to encourage fossil-free manufacturing, and therefore a ban on the use of fossil oil and coal as main fuels for production of process heat in mineral wool factories is introduced. However, necessary use of fossil oil e.g., in planned maintenance stops, emergency maintenance stops and as a reserve or tip fuel (peak load fuel) is allowed. Use of coal is, however, completely prohibited.

Tip fuel is peak load fuel that is only used for short periods, e.g., when it is cold. What is meant with reserve fuel can sometimes be a bit unclear. Reserve fuel can e.g., be defined in mineral wool factories environmental permits issued by the authorities. Therefore, it has not been defined in more detail in the criteria itself, but the use of reserve fuel should be calculated in days.

At this point, it is not possible to exclude all fossil fuels in mineral wool manufacturing and therefore, use of natural gas and liquefied petroleum gas (LPG) is still allowed.

*Cement:*

This is a new requirement in generation 7 of the criteria. Portland cement is a key ingredient in different types of cement-based panels but also one of the major sources of greenhouse gases globally. The cement industry accounts for 5% of the global carbon dioxide emissions<sup>76</sup>. According to estimates, 900 grams of CO<sub>2</sub> emerge from the manufacturing of 1000 grams of cement, resulting in 3.24 billion tons of CO<sub>2</sub> being generated annually<sup>77</sup>. Therefore, requirements are set out to reduce the energy demand, to limit the anthropogenic emissions of CO<sub>2</sub><sup>78</sup>.

The specific limits for the different types of cement and hydraulic binders are derived from the average value of the top 10% of installations based on the data collected in the context of establishing the EU Emissions Trading System (EU ETS) industrial benchmarks for the period of 2021-2026 and calculated in accordance with the methodology for setting the benchmarks set out in Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003

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<sup>75</sup> <https://www.rockpanel.dk/produktfordele/baeredygtighed/produktionsprocessen-for-rockpanel-facadebeklaedning/> (visited September 2023)

<sup>76</sup> The Cement Sustainability Initiative: <https://docs.wbcsd.org/2016/12/GNR.pdf> (visited 2022-05-30)

<sup>77</sup> Hendriks, C. A., Worrell, E., De Jager, D., Blok, K., & Riemer, P. (1998, August). Emission reduction of greenhouse gases from the cement industry. In Proceedings of the fourth international conference on greenhouse gas control technologies (pp. 939-944). IEA GHG R&D Programme Interlaken, Austria.

<sup>78</sup> Antunes, M., Santos, R. L., Pereira, J., Rocha, P., Horta, R. B., & Colaço, R. (2021). Alternative Clinker Technologies for Reducing Carbon Emissions in Cement Industry: A Critical Review. *Materials*, 15(1), 209.



establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC<sup>79</sup>.

Use of fossil fuels, see mineral wool above.

#### *Cement-based panels:*

The requirement has been changed compared to generation 1 where the energy requirement covered all materials used in the cement-based panel. The main material in cement-based panels is cement. The content of cement in fibre cement flat sheets is around 65-80%<sup>80, 81, 82</sup>. To simplify the requirement, the energy requirement now covers the manufacturing of cement and the production of the panels. As the manufacturing of cement contributes the highest energy impact in the panels' life cycle it has an impact on the energy consumption in production of panels due to variation in share of cement. The energy consumption in production of mineral wool-based panels must not exceed 2 MJ/kg. The energy limit is based on dialog with stakeholders and a review of EPDs.

### 3.10 Circularity

The requirements in this chapter concern resource efficiency that have the function to increase the circularity of panels and cladding. These requirements deal with durability/expected lifespan, instructions, maintenance, and take-back systems.

#### O50 Durability - expected lifespan

The durability or expected lifespan of the panel must be at least 50 years.

Surface treated solid wood: The expected lifespan of the product shall relate to its declared technical performance and to any maintenance to provide the declared performance during the expected lifespan.

*By durability/expected lifespan is meant the stated service life (reference service life, RSL) in technical documents such as EPDs, ETAs or other third-party verified declarations.*

- ☒ A declaration of durability/expected lifespan of the panel must be submitted in accordance with an EPD, ETA or other third-party verification of the product's performance.

### Background

This is a new requirement in generation 2 of the criteria.

Several life cycle assessments<sup>83</sup> for façade panels show that durability and expected lifespan are most important for how much the product affects the environment. Longer lifetime often means that less new items are being produced and less raw material is extracted. At the same time, there will be less waste.

<sup>79</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R0447&rid=1>

<sup>80</sup> <https://www.cedral.world/en/> (visited September 2023)

<sup>81</sup> [https://www.swisspearl.com/dk?qclid=EAlalQobChMIgufh3vLhgwMVD4poCR2g8ASuEAAAYASAAEgLS\\_T\\_D\\_BwE](https://www.swisspearl.com/dk?qclid=EAlalQobChMIgufh3vLhgwMVD4poCR2g8ASuEAAAYASAAEgLS_T_D_BwE) (visited September 2023)

<sup>82</sup> <https://www.jameshardie.co.uk/en/cladding/hardieplank> (visited September 2023)

<sup>83</sup> Nicolas F. et al: Influence of methodological choice on maintenance and replacement in building LCA, The international Journal of Life Cycle Assessment (2021).

This means that less resources, energy, and chemicals are needed, and emissions to air, soil and water are reduced.

The requirement for durability or expected lifespan /service life is used to determine the expected lifespan or technical lifespan of the panel. Expected lifespan is subjected to certain uncertainties such as appropriate use and maintenance service but so is an alternative requirement for warranty. The existence of a product warranty does not mean the product will necessarily be durable or last for a certain number of years. Rather, a warranty only helps to repair or replace the product when there are problems, or to compensate for any damage.

The proposed requirement for an expected lifespan at least 50 years is based on data in EPDs and ETAs (reference service life, RSL). The requirement must be documented with a declaration of durability/expected lifespan of the panel in accordance with an EPD, ETA or other third-party verification of the product's performance. Product specific EPDs, ETAs or similar third-party verification can also be used as documentation. For surface treated solid wood the expected lifespan of the product shall relate to its declared technical performance and to any maintenance to provide the declared performance during the expected lifespan. This means that any required maintenance necessary to fulfil expected lifespan must be described/appear from the EPD.

## O51 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:

- Product information such as materials used in the panel, colour, and surface structure.
- Specify the standards by which the product is tested.
- How the product is to be stored and handled before installation, e.g., at the construction site.
- Instructions for assembly (installation manual) and instructions for any surface treatment after installation.
- Information for care and maintenance.
- In case of pre-surface treated solid wood cladding - recommendation to use relevant ecolabelled paint to obtain proper maintenance to ensure durability.
- Information related to reparability. Information related to end-of-life of the products.

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 storage and assembly are accompanied the product and/or is available for download on the manufacturer's

website to ensure that the panel is handled and used correctly. Information on which materials is made of is relevant when the product is to be discarded/recycled to make it easier to sort material in to correct fractions. Most types of panels in these criteria are covered by harmonised standards which ensure that the panels live up to industry-approved qualities. This information gives the customer assurance of the product's quality.

## O52 Take back system

The manufactures of panels or cladding must:

- offer a system for taking back products, e.g., old used panels, incorrect deliveries, faulted product, panels not used in the construction process and so on,  
or
- be in a process/test/pilot face to establish a system for taking back products, e.g., old used panels, incorrect deliveries, faulted product, panels not used in the construction process and so on.

Description of the offered take back system or planed/tested take back system.

### Background

The requirement is new in generation 2. Product take-back systems are fundamental for Circular Economy (CE) and focus on recovering value by taking back products to be recycled, re-manufactured or refurbished. In theory, the expected value from CE is undeniable. However, in practice product take-back systems are often in small scale but the interest in CE is increasing in the entire panel industry due to several benefits such as stronger customer relationship, lower cost of goods sold due to secondary material supply, alternative supply of critical raw materials and reduces environmental impacts.

Due to the different types of panels covered by this criteria and difference in how well these are intergraded in existing waste systems, the manufacture of panels must offer a take back system for taking back products or be in a process/test/pilot face to establish a system for taking back products. There is no requirement for how the manufacture uses the collected products e.g., remanufactured into new equivalent products. Companies that have an established take-back system where the collected products are remanufactured into new equivalent products have the opportunity to meet the requirement for innovation.

### 3.11 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 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.

## O53 Innovation in production

The applicant/producer must fulfil at least one of the following 12 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.
	None of the ingoing substances that are contained in the chemical products used in the production of the Nordic Swan Ecolabel product are classified as SVHC or CMR.
Raw materials and biodiversity	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 55% by weight of the plastic used in the Nordic Swan Ecolabelled WPC panel (production line) is post-consumer* recycled raw material.
	A minimum 25% by weight of the raw materials used in the Nordic Swan Ecolabelled mineral wool-based façade panels (production line) is post-consumer* recycled raw materials.
	A minimum 15% by weight of the raw materials used in the Nordic Swan Ecolabelled cement-based panels (production line) is post-consumer* recycled raw materials.
Climate	The production (production line) of the Nordic Swan Ecolabelled product, 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 product is at least 10% lower than the limit values specified in section 3.9.
	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 or cladding. This does not apply to heat pumps.
End of life - circular economy	The manufacturer of panels has a fully operational take-back system where: - new panels contain min. 5% post-consumer recycled material from reprocessed own products collected via the system
	The manufacturer of panels provides a service of selling reused panels directly or has undergone a new surface treatment.

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

### Background

This is a new requirement in generation 2. Nordic Ecolabelling sees this requirement as a possibility 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.

## 4 Licence maintenance

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

## O54 Customer complaints

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

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

- 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.

## O55 Traceability

The licensee must be able to trace the Nordic Swan Ecolabel 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 generation

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

**Figure 1 Overview of changes to criteria for exterior panels and cladding generation 2 compared with previous generation 1.**

Proposed requirement generation 2	Requirement generation 1	Same req.	Change	New req.	Comment
What can carry the Nordic Swan Ecolabel?			x		WPC panels have been added the criteria
O1 Description of the product	O1	x			The requirement is unchanged
O2 Quality and properties	O29				The requirement is unchanged
<b>Raw materials</b>					
<b>Wood raw materials</b>					
O3 Tree species – restrictions			*	*	The requirement has been updated with Nordic Ecolabelling's requirements concerning tree species that are prohibited or restricted.
O4 Traceability and certification	O5-O6		*	*	The manufacturer of the product is required to be CoC certified. Min. 70% certified and 30% controlled
O5 Chemicals – recycled wood raw material				*	New requirement for testing of chemicals in recycled wood raw material.
O6 lignocellulose raw materials				*	Requirement introduced for other renewable raw materials such as straw or hemp.
<b>Paper and cellulose fibre</b>					
O7 Ecolabelled paper				*	New requirement for Nordic Swan- and EU ecolabelled paper
O8 Tree species - restrictions				*	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.
O9 Traceability and certification	O4		*		The requirement has been tightened in that the laminate manufacturer must be CoC certified and the limit for certified raw material is now 70%
O10 Chemicals used in manufacturing of pulp and paper			*	*	Updated according to generation 3, basic module for pulp and paper
O11 Emissions of COD from the production of pulp and paper – HPL and compact laminate	O8		*		Updated according to generation 3, basic module for pulp and paper.
<b>Wood Plastic Composite materials (WPC)</b>					

O12 Wood fibre and plastic				*	Min. 95% recycled plastic - 50% by weight must be post- consumer recycled. 95% recycled wood fiber raw materials
O13 Chemicals in recycled plastic				*	New requirement for flame retardants and heavy metals
O14 Additives - prohibited substances in plastic				*	Prohibited substances in plastic in production of WPC
<b>Mineral raw materials</b>					
O15 Responsible sourcing of virgin raw materials				*	Supply chain policy and code of conduct for responsible sourcing of virgin mineral raw materials.
O16 Heavy metals	O2			*	Mineral raw materials must be tested for heavy metals - adjustment of some of the limits
O17 Cement- and mineral wool-based façade panels	O9	*	*		From 30% to 45% recycled materials in mineral wool-based panels. Unchanged, 30% recycled materials in cement-based panels
O18 Chemicals in recycled mineral wool				*	Requirement added on undesirable chemicals in recycled mineral wool
<b>Metal</b>					
O19 Production of aluminium				*	High proportion of recycled aluminium or from responsible aluminium production
<b>Chemicals in production</b>					
O20 Classification of chemical products	O16			*	Prohibition of chemicals classified as toxic to the environment has been added.
O21 Classification of ingoing substances	O17			*	Prohibition against CMR category 2, endocrine disruptors and PMT/vPvM has been added
O22 Prohibited substances	O18			*	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
O23 Nanomaterials	O20	*			
O24 Preservatives	O19			*	Requirement limit for MIT has been tightened
O25 Volatile organic compounds in adhesives	O23	*			
O26 Free formaldehyde	O25			*	The requirement limit for formaldehyde content has been tightened.

<b>Chemicals - surface treatment</b>					
O27 Plastic foiling				*	No use of PVC
O28 Ecolabelled products				*	Use of ecolabelled paint or varnish in surface treatment
O29 Classification of chemical products	O16		*		Prohibition of chemicals classified as toxic to the environment has been added.
O30 UV curing surface treatment system				*	
O31 Classification of ingoing substances	O17 and O22		*		Prohibition against CMR category 2, endocrine disruptors and PMT/vPvM has been added
O32 Prohibited substances	O18		*		See O22. Some other exemptions are granted.
O33 Nanomaterials	O20	*			
O34 Preservatives	O19		*		Requirement limit for MIT has been tightened
O35 Free formaldehyde	O25	*			
<b>Chemicals - application method</b>					
O36 Application method and amount				*	
O37 Amount of volatile organic compounds (VOC) applied	O24		*		The requirement limit has not been changed, but the calculation now takes the application method into account.
<b>Emissions</b>					
O38 Emissions of COD from wet processes	O26		*		Updated according to pulp and paper basic module gen. 3
O39 Emissions to air from production of HPL, compact laminate and panels based on resin binder	O27	*			
O40 Emissions of dust	O28	*			
<b>Climate and energy</b>					
O41 Kraft paper and pulp included in HPL and compact laminate	O10		*		Updated according to pulp and paper basic module gen. 3
O42 Laminate	O11		*		Requirement limits have been tightened.
O43 Wood based panels	O12		*		Requirement limits have been tightened.
O44 Panels from lignocellulose raw materials				*	New energy requirement
O45 Solid wood				*	New energy requirement
O46 Wood plastic composite				*	New energy requirement
O47 Mineral wool-based panels	O13		*		Requirement limits have been tightened.
O48 Production of cement				*	New energy requirement



O49 Cement-based panels	O14		*		Requirement limits have been tightened
<b>Circularity</b>					
O50 Durability - expected lifespan				*	New requirement for min. 50 years expected lifespan
O51 Information for consumers	O30	*			
O52 Take back system				*	New requirement
<b>Innovation in production</b>					
O53 Innovation in production				*	New requirement
O54-O55 Other requirements	O31-O32	*			The requirements have been updated in accordance with Nordic Ecolabelling's current standard formulation.
<b>Removed requirements in gen. 2</b>					
Dust emissions from production and refining of mineral raw materials	O3				
Use of biocides in tree felling	O7				Handled by FSC or PEFC
Environmental harmful substances in the panel	O21				Part of requirements for chemicals

## Regulations for the Nordic Ecolabelling of products

When the Nordic Swan Ecolabel is used on products the licence number shall be included.

More information on graphical guidelines, regulations and fees can be found at [www.nordic-swan-ecolabel.org/regulations](http://www.nordic-swan-ecolabel.org/regulations)

## Follow-up inspections

Nordic Ecolabelling may decide to check whether exterior panels and cladding fulfils Nordic Ecolabelling requirements during the licence period. This may involve a site visit, random sampling, or similar test.

The licence may be revoked if it is evident that exterior panels and cladding does not meet the requirements.

Random samples may also be taken in-store and analysed by an independent laboratory. If the requirements are not met, Nordic Ecolabelling may charge the analysis costs to the licensee.

## Criteria version history

*Nordic Ecolabelling adopted version 2.0 of the criteria for exterior panels and cladding on DAY MONTH YEAR. The criteria are valid until DAY MONTH YEAR.*

## New criteria

As part of any future evaluation of the criteria, it will be relevant to consider the following:

- Product definition - new types of panels and cladding for exterior use.
- Resources/use of raw materials.
- Energy consumption in both production of relevant raw materials and production of panels.
- End of life

## 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 (wet process) O38**

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 un-sedimented 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 is used:

$$P_{\text{pulp\_electricity}} = \sum_{i=1}^n P_{\text{pulp\_electricity}_i} \cdot \text{pulp}_i$$

$$P_{\text{pulp\_fuel}} = \sum_{i=1}^n P_{\text{pulp\_fuel}_i} \cdot \text{pulp}_i$$

$\text{Pulp}_i$  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 Declaration by the manufacturer of pulp and paper

To be used in conjunction with an application for a licence for the Nordic Swan Ecolabel of Panels and cladding for exterior use.

*Pulp and paper are used in several types of panels such as kraft- and décor paper used in HPL/compact laminate.*

Product name (pulp):
Product name (paper):
Manufacturer (pulp and/or paper):

<b>O7 Ecolabelled paper</b>	<b>Yes</b>	<b>No</b>
Is the paper ecolabelled with Nordic Swan Ecolabel or EU Ecolabel? <b>If yes</b> , please state valid licence number:		
<b>O8 Tree species - restrictions</b>	<b>Yes</b>	<b>No</b>
Are any of the prohibited and restricted wood species (listed in the list of prohibited and restricted tree species) used in the pulp and paper? Eucalyptus and Acacia used for pulp and paper production is exempted from the list. The list of prohibited and restricted tree species is located on the website: <a href="https://www.nordic-swan-ecolabel.org/forestry-requirements-2020">Forestry requirements 2020 (nordic-swan-ecolabel.org)</a> <b>If yes</b> , please state tree species/trade name/scientific name:		
<b>O9 Traceability and certification of wood raw materials</b>	<b>Yes</b>	<b>No</b>
Please state the name (species name/scientific name) of the fibre raw materials used in the production of pulp/paper:		
	<b>Yes</b>	<b>No</b>
The pulp and paper manufacturer must be Chain of Custody certified according to FSC or PEFC. All fibres used in the pulp and paper shall be covered by valid Chain of Custody certificate issued by FSC or PEFC. Are the pulp and paper covered by valid Chain of Custody certificate issued by FSC or PEFC? <b>Please present</b> valid FSC/PEFC Chain of Custody certificate covering alle fibre raw materials used in the pulp/paper (e.g., via link to website).		
Minimum 70% of the fibre raw material that is used in the paper shall originate from forestry certified under the FSC or PEFC schemes or be labelled FSC or PEFC recycled. The remaining proportion of fibre raw material must be covered by the FSC/PEFC control schemes (FSC controlled wood/PEFC controlled sources). Please enclose documentation that the paper is labelled with FSC/PEFC or e.g., third party-controlled balance sheet from CoC credit account system or a rolling average of the certification percentage on a product line showing that the quantity of certified fibre raw material in the paper is met. <b>Comments:</b>		
<b>O10 Chemical used in the manufacture of pulp and paper</b>	<b>Yes</b>	<b>No</b>
Chemicals use in the manufacture of pulp and paper must meet the requirements contained in the Chemical Module for Nordic Ecolabelling of paper, Version 3 or later. The criteria is located on the website: <a href="https://www.nordic-swan-ecolabel.org/criteria/copy-and-printing-paper-044/">https://www.nordic-swan-ecolabel.org/criteria/copy-and-printing-paper-044/</a>		

Overview of chemical requirements for pulp and paper:		
Chemicals	Requirements, Chemical Module, generation 3	
All production chemicals - Classification (O1) - Prohibited substances (O2)	O1 and O2	
Cleaning agents and dispersants	O3	
Deinking chemicals	O4	
Biocidal products and slimicides	O5	
Retention agents and flocculants	O6	
Wet strength agents	O7	
Foam inhibitors and defoamers	O8	
Paper colourants - Metals (O9) - Amines and phthalates (O10)	O9 and O10	
Adhesives	O11	
Starch - GMO	O12	
Does the pulp and paper comply with the chemical requirements? <b>Comments:</b>		
<b>O11 COD emissions from the production of pulp and paper</b>		<b>Yes</b>
		<b>No</b>
<p>COD (Chemical Oxygen Demand) emissions to water must be less than the stated COD value in the table below. The COD is calculated by adding up COD emissions from both pulp and paper:                      COD mass (kg/ADt) + COD emissions paper machine (kg/ADt).</p> <p>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.</p> <p>For example, for 60% unbleached chemical mass and 40% recycled pulp, the calculation is: <math>(14-1 \times 0.6) + (4-1 \times 0.4) = 7.8 + 1.2 = 9.0</math> kg/ADT</p>		
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	
Does the pulp and paper comply with the COD requirement? <b>Please enclose</b> documentation/calculation showing that the total emissions of COD are below the relevant limit values indicated in the table a bow. <b>Comments:</b>		
<b>Test method for COD emissions</b>		
<p>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).</p>		

**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 unfiltered samples in accordance with standard ISO 6060.

We declare that the requirements have been met and that the information provided is correct. In the event of any change to the composition of the product, that impacts the product's fulfilment of the requirements, a new declaration of fulfilment of the requirements is to be submitted to Nordic Ecolabelling.

**Signature of pulp/paper manufacturer**

Place and date:	Company name/stamp:
Person responsible:	Signature of responsible person:
Phone:	E-mail:

## Appendix 4      Chemicals used in production of panels and cladding

To be used in conjunction with an application for a licence for the Nordic Swan Ecolabel of Panels and Cladding for exterior use.

Declaration is made by the chemical manufacturer or supplier based to the best of their knowledge at the given time and available knowledge on the chemical product with reservations for new advances/knowledge. Should such new knowledge arise, the undersigned is obliged to submit an updated declaration to Nordic Ecolabelling.

This declaration shall be filled for chemical products used in the production of the Nordic Swan Ecolabelled panels and cladding for exterior use, such as adhesives, resins, and waxes, surface treatments and surface treatment system.

*Chemical products used in the manufacture of paper, and to print patterns on the decor paper, need not be declared. Neither need auxiliary substances such as lubricants and detergents be declared.*

Name of chemical product:

Function of the chemical product:

Ingoing substances in the raw material/ingredient (chemical name, CAS-number, amount in weight-%):

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

**Ingoing substances:** *all substances in the chemical product regardless of amount, including additives (e.g., preservatives and stabilisers) from the raw materials. Substances known to be released from ingoing substances (e.g., formaldehyde, arylamine, in situ-generated preservatives) are also regarded as ingoing substances.*

**Impurities:** *Residues from production, incl. raw material production, which remain in the chemical product at concentrations below 1000 ppm (0.1000% by weight).*

*Examples of impurities are residues of reagents incl. residues of monomers, catalysts, by-products, scavengers (i.e. chemicals that are used to eliminate/minimise undesirable substances), detergents for production equipment and carry-over from other or previous production lines.*

O20 Classification of chemical products used in the production	YES	NO
Does the chemical product contain substances classified with any of the hazard phrases below? Including all combinations of stated exposure routes and stated specific effect. For example, H350 also covers classification H350i.		
H400 – Toxic to the environment Aquatic Acute 1		
H410 – Toxic to the environment Aquatic Chronic 1		
H411 – Toxic to the environment Aquatic Chronic 2		
H420 – Toxic to the environment Ozone		
H300 – Acute toxicity; Acute Tox 1 or 2		
H310 – Acute toxicity; Acute Tox 1 or 2		
H330 – Acute toxicity; Acute Tox 1 or 2		
H301 – Acute toxicity; Acute Tox 3		
H311 – Acute toxicity; Acute Tox 3		
H331 – Acute toxicity; Acute Tox 3		
H370 – Specific organic toxicity, STOT SE 1		
H372 – Specific organic toxicity, STOT RE 1		
H350 – Carcinogenic, Carc. 1A or 1B		
H351 – Carcinogenic, Carc. 2		
H340 – Germ cell mutagenic, Mut. 1A and 1B		
H341 – Germ cell mutagenic, Mut. 2		
H360 – Reproductive toxicity, Repr. 1A or 1B		
H361 – Reproductive toxicity, Repr 2		
H362 – Reproductive toxicity, Lact.		
<p><b>The following are exempted from the requirement:</b></p> <ul style="list-style-type: none"> <li>- Classification H351 for adhesive products containing methylene diphenyl diisocyanate (MDI).</li> <li>- 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.</li> <li>- Classifications H341, H301 and H331 for resins containing a maximum of 10% by weight of phenol (CAS No. 108-95-2).</li> </ul>		

- 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.

**If yes**, please state the CAS No., chemical name, and level (in ppm, % by weight or mg/kg). Also state whether the substance is contained in the form of an impurity or an added substance or if the above-mentioned exceptions apply.

O21 Classification of ingoing substances	YES	NO
Does the chemical product contain substances classified with any of the hazard phrases below? Including all combinations of stated exposure routes and stated specific effect. <i>For example, H350 also covers classification H350i.</i>		
H350 – Carcinogenic, Car 1A and 1B		
H351 – Carcinogenic, Carc. 2		
H340 – Germ cell mutagenic, Mut. 1A or 1B		
H341 – Germ cell mutagenic, Mut. 2		
H360 – Reproductive toxicity, Repr. 1A and 1B		
H361 – Reproductive toxicity, Repr. 2		
H362 – Reproductive toxicity, Lact.		
EUH380 - Endocrine disruption for human health, ED HH1		
EUH381 - Endocrine disruption for human health, ED HH2		
EUH431 - Endocrine disruption for the environment, ED ENV 1		
EUH431 - Endocrine disruption for the environment, ED ENV 2		
EUH440 - Persistent, Bioaccumulative and Toxic properties, PTB		
EUH411 - Very Persistent, Very Bioaccumulative properties, vPvB		
EUH450 - Persistent, Mobile and Toxic properties, PMT		
EUH451 - Very Persistent, Very Mobile properties, vPvM		
<b>The following are exempted from the requirement:</b> <ul style="list-style-type: none"> <li>- Adhesive containing methylene diphenyl diisocyanate (MDI) classified as H351.</li> <li>- Adhesive and resin containing formaldehyde (CAS No. 50-00-0) classified as H350 and H341. Formaldehyde emissions are regulated in a separate requirement.</li> <li>- Resin containing maximum 10% by weight of phenol (CAS No. 108-95-2) classified as H341.</li> </ul>		

- 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.

**If yes**, please state the CAS No., chemical name, and level (in ppm, % by weight or mg/kg). Also state whether the substance is contained in the form of an impurity or an added substance or if the above-mentioned exceptions apply.

O22 Prohibited substances	YES	NO
Does the chemical product contain any of the following substance groups?		
Substances on the Candidate List The Candidate List can be found on the ECHA website: <a href="http://echa.europa.eu/candidate-list-table">http://echa.europa.eu/candidate-list-table</a> - Exemption applies to melamine (CAS No. 108-78-1)		
Substances that have been judged in the EU to be PBT (Persistent, Bioaccumulative and Toxic) or vPvB (very Persistent and very Bioaccumulative) PBT and vPvB in accordance with the criteria in Annex XIII of REACH		
Halogenated organic compounds - Exemptions apply for bronopol, IPBC, MIT and CMIT/MIT (3:1). These are addressed in a separate requirement, see requirement O24).		
Per- and polyfluoroalkyl substances (PFASs), e.g., PFOA and PFOS		
Butylhydroxytoluene (BHT, CAS No. 128-37-0)		
Aziridine and polyaziridines		
Bisphenols and bisphenol derivatives - Bisphenol A used in the production of epoxy acrylate is not covered by the requirement. - Assessment of regulatory needs: Bisphenols. ECHA- 16 December 2021: Section 2.1: Bisphenols for which further EU RRM is proposed – restriction <a href="https://echa.europa.eu/documents/10162/c2a8b29d-0e2d-7df8-dac1-2433e2477b02">https://echa.europa.eu/documents/10162/c2a8b29d-0e2d-7df8-dac1-2433e2477b02</a>		
APEO (alkylphenol ethoxylates) and APD (alkylphenol derivatives/alkylphenols) Alkylphenol derivatives are defined as substances that release alkylphenols when they break down.		
Phthalates - Phthalates are esters of 1,2-benzenedicarboxylic acid (orthophthalic acid).		
Pigments and dditives 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: <a href="https://edlists.org/the-ed-lists/list-i-substances-identified-as-endocrine-disruptors-by-the-eu">https://edlists.org/the-ed-lists/list-i-substances-identified-as-endocrine-disruptors-by-the-eu</a> List II: <a href="https://edlists.org/the-ed-lists/list-ii-substances-under-eu-investigation-endocrine-disruption">https://edlists.org/the-ed-lists/list-ii-substances-under-eu-investigation-endocrine-disruption</a> List III: <a href="https://edlists.org/the-ed-lists/list-iii-substances-identified-as-endocrine-disruptors-by-participating-national-authorities">https://edlists.org/the-ed-lists/list-iii-substances-identified-as-endocrine-disruptors-by-participating-national-authorities</a> 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.		



If **yes**, please state the CAS No., chemical name, and level (in ppm, % by weight or mg/kg). Also state whether the substance is contained in the form of an impurity or an added substance or if the above-mentioned exceptions apply.

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<b>O23 Nanomaterials</b>	<b>YES</b>	<b>NO</b>
<p>Does the chemical product contain nanomaterials/-particles? Nanomaterials/-particles are defined according to the EU Commission Recommendation on the Definition of Nanomaterial (2022/C 229/01): 'Nanomaterial' means a natural, incidental, or manufactured material consisting of solid particles that are present, either on their own or as identifiable constituent particles in aggregates or agglomerates, and where 50 % or more of these particles in the number-based size distribution fulfil at least one of the following conditions: (a) one or more external dimensions of the particle are in the size range 1 nm to 100 nm; (b) the particle has an elongated shape, such as a rod, fibre or tube, where two external dimensions are smaller than 1 nm and the other dimension is larger than 100 nm; (c) the particle has a plate-like shape, where one external dimension is smaller than 1 nm and the other dimensions are larger than 100 nm.</p>		
<p>The following are exempted from the requirement: - Pigments. This exemption does not include pigments added for purposes other than colouring. - Naturally occurring inorganic fillers in accordance with annex V point 7 in REACH. - Synthetic amorphous silica (SAS). This applies to non-modified synthetic amorphous silica and surface-treated pyrogenic silica, as long as the silica particles form aggregates or agglomerates in the end product. For surface treated nanoparticles, the surface treatment must meet the chemical requirements in O31 (Classification of ingoing substances) and O32 (Prohibited substances). - Polymer dispersions</p>		

If **yes**, please state the CAS No., chemical name, and level (in ppm, % by weight or mg/kg). Also state whether the substance is contained in the form of an impurity or an added substance or if the above-mentioned exceptions apply.

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<b>O24 Preservatives</b>	<b>YES</b>	<b>NO</b>
Please state if content of preservatives exceeds the limit values below		
<b>Preservative:</b>	<b>Limit value:</b>	
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).	

If **yes**, state the CAS No. (where possible), chemical name and level (in ppm, % by weight or mg / kg) for each preservative.

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<b>O25 Volatile organic compounds in additives</b>	<b>YES</b>	<b>NO</b>
<p>Does the additive contain any VOC (volatile organic compound) and/or VAH (volatile aromatic compound)?</p> <p>Volatile organic compounds (VOC), including volatile aromatic compounds (VAH), may be present in the adhesive to a maximum of 3% by weight.</p> <p>VAHs may be present in the adhesive to a maximum of 0.1% by weight.</p> <p>Does the additive comply with the requirement?</p> <p>VOC are defined as organic compounds with a steam pressure exceeding 0.01kPa, at 20°C. For products under EU Directive (2004/42/EC) in which steam pressure is not indicated: Organic substances with an initial boiling point that is lower than or equal to 250°C measured at a normal pressure of 101.3 kPa</p>		
<p>The following are exempted from the requirement:</p> <p>Resin used in the production of laminate is exempted from the requirement.</p>		

If **yes**, please state the CAS No., chemical name, and level (in ppm, % by weight or mg/kg). Also state whether the substance is contained in the form of an impurity or an added substance or if the above-mentioned exceptions apply.

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<b>O26 Free formaldehyde</b>	<b>YES</b>	<b>NO</b>
<p>Does the content of free formaldehyde (from formaldehyde not deliberately added or from formaldehyde-releasing substances) exceed 0.02% by weight (200 ppm) in the chemical product?</p> <p>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.</p>		

If **yes**, please specify source of formaldehyde, i.e., actively added or because of release or decomposition from another substance and theoretical amount of formaldehyde in the product. Please state also if the above-mentioned exceptions apply.

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**Signature of chemical product manufacturer**

Date	Company
Signature by contact person	
Name of contact person	Phone

## Appendix 5      Chemicals used in surface treatment

To be used in conjunction with an application for a licence for the Nordic Swan Ecolabel of Panels and Cladding for exterior use.

Declaration is made by the chemical manufacturer or supplier based to the best of their knowledge at the given time and available knowledge on the chemical product with reservations for new advances/knowledge. Should such new knowledge arise, the undersigned is obliged to submit an updated declaration to Nordic Ecolabelling.

This declaration shall be filled for surface treatment products used in the production of the Nordic Swan Ecolabelled panels and cladding for exterior use such as lacquers, oils, paints, stains and foiling with plastic. Any filler used shall also be declared.

*Lamination (thin layer of laminate < 2 mm, including melamine) on another panel is not considered to be surface treatment.*

Name of chemical product:

Function of the chemical product:

Ingoing substances in the raw material/ingredient (chemical name, CAS-number, amount in weight-%):

The requirements in the criteria document and accompanying appendices apply to all ingoing substances in the Nordic Swan Ecolabelled product. Impurities are not regarded as ingoing substances and are exempt from the requirements.

Ingoing substances and impurities are defined below, unless stated otherwise in the requirements.

***Ingoing substances:*** all substances in the chemical product regardless of amount, including additives (e.g., preservatives and stabilisers) from the raw materials. Substances known to be released from ingoing substances (e.g., formaldehyde, arylamine, in situ-generated preservatives) are also regarded as ingoing substances.

***Impurities:*** Residues from production, incl. raw material production, which remain in the chemical product at concentrations below 1000 ppm (0.1000% by weight).

*Examples of impurities are residues of reagents incl. residues of monomers, catalysts, by-products, scavengers (i.e. chemicals that are used to eliminate/minimise undesirable substances), detergents for production equipment and carry-over from other or previous production lines.*

<b>O29 Classification of chemical products used in the production</b>	<b>YES</b>	<b>NO</b>
Does the chemical product contain substances classified with any of the hazard phrases below? Including all combinations of stated exposure routes and stated specific effect. <i>For example, H350 also covers classification H350i.</i>		
H400 – Toxic to the environment Aquatic Acute 1		
H410 – Toxic to the environment Aquatic Chronic 1		
H411 – Toxic to the environment Aquatic Chronic 2		
H420 – Toxic to the environment Ozone		
H300 – Acute toxicity; Acute Tox 1 or 2		
H310 – Acute toxicity; Acute Tox 1 or 2		
H330 – Acute toxicity; Acute Tox 1 or 2		
H301 – Acute toxicity; Acute Tox 3		
H311 – Acute toxicity; Acute Tox 3		
H331 – Acute toxicity; Acute Tox 3		
H370 – Specific organic toxicity, STOT SE 1		
H372 – Specific organic toxicity, STOT RE 1		
H350 – Carcinogenic, Carc. 1A or 1B		
H351 – Carcinogenic, Carc. 2		
H340 – Germ cell mutagenic, Mut. 1A and 1B		
H341 – Germ cell mutagenic, Mut. 2		
H360 – Reproductive toxicity, Repr. 1A or 1B		
H361 – Reproductive toxicity, Repr 2		
H362 – Reproductive toxicity, Lact.		
<p><b>The following are exempted from the requirement:</b></p> <p>- UV curing products are exempted from classification as environmentally hazardous 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.</p>		

If **yes**, please state the CAS No., chemical name, and level (in ppm, % by weight or mg/kg). Also state whether the substance is contained in the form of an impurity or an added substance or if the above-mentioned exceptions apply.

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<b>O31 Classification of ingoing substances</b>	<b>YES</b>	<b>NO</b>
Does the chemical product contain substances classified with any of the hazard phrases below? Including all combinations of stated exposure routes and stated specific effect. <i>For example, H350 also covers classification H350i.</i>		
H350 – Carcinogenic, Carc. 1A and 1B		
H351 – Carcinogenic, Carc. 2		
H340 – Germ cell mutagenic, Mut. 1A or 1B		
H341 – Germ cell mutagenic, Mut. 2		
H360 – Reproductive toxicity, Repr. 1A and 1B		
H361 – Reproductive toxicity, Repr. 2		
H362 – Reproductive toxicity, Lact.		
EUH380 - Endocrine disruption for human health, ED HH1		
EUH381 - Endocrine disruption for human health, ED HH2		
EUH431 - Endocrine disruption for the environment, ED ENV 1		
EUH431 - Endocrine disruption for the environment, ED ENV 2		
EUH440 - Persistent, Bioaccumulative and Toxic properties, PTB		
EUH411 - Very Persistent, Very Bioaccumulative properties, vPvB		
EUH450 - Persistent, Mobile, and Toxic properties, PMT		
EUH451 - Very Persistent, Very Mobile properties, vPvM		
<p><b>The following are exempted from the requirement:</b></p> <ul style="list-style-type: none"> <li>- Photo initiators classified H351, H341 or H361</li> <li>- Titanium dioxide (CAS No. 13463-67-7) classified as H351.</li> <li>- 1,1,1-Trimethylolpropane (TMP, CAS No. 77-99-6) classified as H361.</li> <li>· Trimethylolpropane triacrylate (TMPTA) with CAS No. 15625-89-5 classified as Carc 2, H351</li> <li>- Mequinol (CAS No. 150-76-5) classified as H361</li> <li>- The hardener in two-component UV products can be exempted from the requirement if the following is met: it must be documented by the panel manufacturer 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.</li> </ul>		

If yes, please state the CAS No., chemical name, and level (in ppm, % by weight or mg/kg). Also state whether the substance is contained in the form of an impurity or an added substance or if the above-mentioned exceptions apply.

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O32 Prohibited substances	YES	NO
Does the chemical product contain any of the following substance groups?		
Substances on the Candidate List The Candidate List can be found on the ECHA website: <a href="http://echa.europa.eu/candidate-list-table">http://echa.europa.eu/candidate-list-table</a>		
Substances that have been judged in the EU to be PBT (Persistent, Bioaccumulative and Toxic) or vPvB (very Persistent and very Bioaccumulative) PBT and vPvB in accordance with the criteria in Annex XIII of REACH		
Halogenated organic compounds. Exemptions apply for: - Bronopol, IPBC, MIT and CMIT/MIT (3:1). These are addressed in a separate requirement, see requirement O45). - 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		
Per- and polyfluoroalkyl substances (PFASs), e.g., PFOA and PFOS		
Butylhydroxytoluene (BHT, CAS No. 128-37-0)		
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 and bisphenol derivatives - Bisphenol A used in the production of epoxy acrylate is not covered by the requirement. - Assessment of regulatory needs: Bisphenols. ECHA- 16 December 2021: Section 2.1: Bisphenols for which further EU RRM is proposed – restriction <a href="https://echa.europa.eu/documents/10162/c2a8b29d-0e2d-7df8-dac1-2433e2477b02">https://echa.europa.eu/documents/10162/c2a8b29d-0e2d-7df8-dac1-2433e2477b02</a>		
APEO (alkylphenol ethoxylates) and APD (alkylphenol derivatives/alkylphenols) Alkylphenol derivatives are defined as substances that release alkylphenols when they break down.		
Phthalates - Phthalates are esters of 1,2-benzenedicarboxylic acid (orthophthalic acid).		
Pigments and dditives 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: <a href="https://edlists.org/the-ed-lists/list-i-substances-identified-as-endocrine-disruptors-by-the-eu">https://edlists.org/the-ed-lists/list-i-substances-identified-as-endocrine-disruptors-by-the-eu</a> List II: <a href="https://edlists.org/the-ed-lists/list-ii-substances-under-eu-investigation-endocrine-disruption">https://edlists.org/the-ed-lists/list-ii-substances-under-eu-investigation-endocrine-disruption</a> List III: <a href="https://edlists.org/the-ed-lists/list-iii-substances-identified-as-endocrine-disruptors-by-participating-national-authorities">https://edlists.org/the-ed-lists/list-iii-substances-identified-as-endocrine-disruptors-by-participating-national-authorities</a> 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. - 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.		

If **yes**, please state the CAS No., chemical name, and level (in ppm, % by weight or mg/kg). Also state whether the substance is contained in the form of an impurity or an added substance or if the above-mentioned exceptions apply.

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<b>O33 Nanomaterials</b>	<b>YES</b>	<b>NO</b>
<p>Does the chemical product contain nanomaterials/-particles? Nanomaterials/-particles are defined according to the EU Commission Recommendation on the Definition of Nanomaterial (2022/C 229/01): 'Nanomaterial' means a natural, incidental, or manufactured material consisting of solid particles that are present, either on their own or as identifiable constituent particles in aggregates or agglomerates, and where 50 % or more of these particles in the number-based size distribution fulfil at least one of the following conditions: (a) one or more external dimensions of the particle are in the size range 1 nm to 100 nm; (b) the particle has an elongated shape, such as a rod, fibre or tube, where two external dimensions are smaller than 1 nm and the other dimension is larger than 100 nm; (c) the particle has a plate-like shape, where one external dimension is smaller than 1 nm and the other dimensions are larger than 100 nm.</p>		
<p>The following are exempted from the requirement: - Pigments. This exemption does not include pigments added for purposes other than colouring. - Naturally occurring inorganic fillers in accordance with annex V point 7 in REACH. - Synthetic amorphous silica (SAS). This applies to non-modified synthetic amorphous silica and surface-treated pyrogenic silica, as long as the silica particles form aggregates or agglomerates in the end product. - Polymer dispersions</p>		

If **yes**, please state the CAS No., chemical name, and level (in ppm, % by weight or mg/kg). Also state whether the substance is contained in the form of an impurity or an added substance or if the above-mentioned exceptions apply.

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<b>O34 Preservatives</b>	<b>YES</b>	<b>NO</b>
Please state if content of preservatives exceeds the limit values below		
<b>Preservative:</b>	<b>Limit value:</b>	
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).	

If **yes**, state the CAS No. (where possible), chemical name and level (in ppm, % by weight or mg / kg) for each preservative.

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<b>O35 Free formaldehyde</b>	<b>YES</b>	<b>NO</b>
Does the content of free formaldehyde (from formaldehyde not deliberately added or from formaldehyde-releasing substances) 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.		

**If yes**, please specify source of formaldehyde, i.e., actively added or because of release or decomposition from another substance and theoretical amount of formaldehyde in the product. Please state also if the above-mentioned exceptions apply.

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**Signature of chemical product manufacturer**

Date	Company
Signature by contact person	
Name of contact person	Phone



## Appendix 6 Energy calculations

### **Energy calculation for production of panels made from renewable raw materials; wood- and lignocellulose based panels and laminate.**

The following applies to the energy calculation in the production of wood- and lignocellulose panels and cladding and laminate:

1. Energy consumption is calculated as an annual average for either just the ecolabelled production or for the whole enterprise that is relevant for Nordic Swan Ecolabelled panels and laminate.
2. Energy consumption calculated as MJ/kg per panel/product must include the primary panel 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 5% by weight of the finished panel/product (e.g., wood fibre and adhesive).
3. Processes included in the calculation:  
Chipping, refining, drying, blending (production of any adhesive; see 4), forming, pressing, any lamination of the panel, cooling, trimming, sanding, and packaging. If any drying process of the wood raw materials takes place at subcontractors (sawmills) this should be part of the calculations.
4. In the case of the production of chemical products, for example adhesive, the energy accounts must be based on data for production. The energy content of the raw material must not be included in the calculation. In exceptional cases a standard value of 15 MJ/kg (solution for use) for adhesive may be used, broken down as 12 MJ/kg for fuel and 3 MJ/kg for electricity purchased from an outside supplier (4:1).

*Example of a calculation using the standard value for adhesives:*

*A panel contains 12% adhesive (solution for use). This represents 0.12 kg of adhesive solution for use per kilogram of panel. Applying the standard value in the calculation of energy points for adhesive results in 0.12 kg adhesive/ kg panel x 15 MJ/ kg adhesive = 1.8 MJ/ kg panel.*

5. Energy consumption in the production of laminate (compact laminate and HPL) includes the production of resin/glue, the process of handling paper (dipping in resin/drying process), stacking of paper/laminate, pressing, heating, cooling, trimming, sanding and packaging. Production of paper has its own requirement.
6. The calculation includes the actual energy consumed (electricity and heat) in production without the use of primary energy factors. Self-produced energy and excess energy that is sold off should be stated but does not count as consumed energy in the calculation.

**System boundary for the requirement:** Energy consumption for obtaining raw material, transport of raw materials to sawmill/panel and any surface treatment (paint) is not included in the calculation.

## **Energy calculation for production of panels made from mineral- and non renewable raw materials; panels made from wood plastic composite, cement-based panels and mineral wool panels.**

The following applies to the energy calculation in the production of panels made from wood plastic composite (WPC), mineral wool-based panels and cement base panels and production of the raw material cement.

1. Energy consumption is calculated as an annual average for either just the ecolabelled production or for the whole production site that is relevant for Nordic Swan Ecolabelled panels.
2. The energy consumption is calculated as MJ/kg product produces, and encompasses all energy used from **gate to gate** (phase A3 in EPDs) at the panel production site. Separate energy consumption also needs to be calculated for production of the following raw materials: cement, mineral wool, paper, and laminate (if they comprise more than 5 wt% of the plate).
3. Processes included in the calculation:  
Raw material preparation (crushing/grinding/chipping), refining, blending, forming, heating, pressing, gluing/laminating different types of material layers together, facing the panels (paint), cooling, trimming, and packaging.
4. The calculation includes the actual energy consumed (electricity and heat) in production without the use of primary energy factors. Self-produced energy and excess energy that is sold off should be stated but does not count as consumed energy in the calculation.
5. **System boundary for the requirement:** Energy consumption for extraction of raw materials and transports of raw materials is not part of the energy requirement. The energy requirement for production of raw materials do not apply to raw materials that are included by less than **5 wt%** of the panel.