Nordic Ecolabelling for

Renovation of buildings

Residential, educational, office and hotel buildings

Generation 2 • 01 March 2024 – 30 September 2027

Nordic Ecolabelling

Content

1 Summary ... 3
2 Definitions ... 4
3 Environmental impact of renovation of buildings ... 5
3.1 Alignment with the EU Taxonomy framework ... 6
4 Product group definition ... 6
5 General requirements ... 9
6 Prior to the renovation phase ... 9
7 Resource efficiency and circular economy ... 15
8 Energy ... 17
9 Climate ... 20
10 Chemical products, construction products, construction goods and materials 23
10.1 Product information and logbook ... 23
10.2 Chemical products ... 24
10.3 Construction products – restricted material ... 30
10.4 Construction products – ingoing substances and emissions ... 34
10.5 Ecolabelled products ... 36
11 Wood raw materials ... 36
12 Quality management of the demolition and construction process ... 38
13 Changes compared to previous generation ... 39

Renovation of buildings, generation 2

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:

Denmark
Ecolabelling Denmark
www.ecolabel.dk

Finland
Ecolabelling Finland
www.joutsenmerkki.fi

Sweden
Ecolabelling Sweden
www.svanen.se

Iceland
Ecolabelling Iceland
www.svanurinn.is

Norway
Ecolabelling Norway
www.svanemerket.no

This document may only be copied in its entirety and without any type of change.
It may be quoted from provided that Nordic Ecolabelling is stated as the source.

1 Summary

In 2023 the criteria for Renovation of buildings (previously Renovation) have been revised. As from this revision, renovations of hotels and associated conference facilities can also be Nordic Swan Ecolabelled. Renovation of holiday homes have been removed from the criteria.

The focus has been on implementing requirements for climate impact and circular economy where substantial changes have been made compared to criteria generation 1. There has also been a focus on creating a clearer section on the processes prior to construction (e.g., hazardous material survey and deconstruction). The criteria have been aligned with the technical screening criteria for the EU Taxonomy section 7.2.

The number of obligatory requirements is slightly lower at 43. There is no point system in this criteria document.

Overall, the criteria have been aligned with the requirements for the EU Taxonomy wherever possible, see the section "Alignment with the EU Taxonomy framework" for details.

The most important changes within this revision are presented below:

- A new section on climate, including requirements concerning materials with high climate impact such as concrete, steel and aluminium.
- A new section on the circular economy including areas such as increased focus on the handling of construction waste and its preparation for reuse, recycling, and material recovery.
- Alignment with the material requirements for Nordic Swan Ecolabelled buildings, generation 4 of Nordic Swan Ecolabelled New Buildings 089.
- Hotels and associated conference facilities are now covered by the criteria.
- Alignment with the technical screening criteria for substantial contribution to climate change mitigation in the EU Taxonomy Annex 1* for Renovation of existing buildings.

** Except for Iceland and Norway which has not yet implemented Directive 2010/31/EU and Regulation (EU) 2020/852 and protected buildings and buildings worthy of preservation covered by the exemption in O7.*

2 Definitions

Definition	Description
Chemical products	A chemical product is a substance or a mixture of two or more substances, in liquid, gaseous or solid form, which are used on a construction site or by a manufacturer of prefabricated building components. Chemical products both for indoor and outdoor use are covered by the requirements. Nordic Ecolabelling does not set chemical requirements for cement or concrete, nor for metal alloys such as steel or brass.
Construction products	Products used in the construction of buildings, for example wall elements, flooring, power cables, doors, thermal insulation etc. In EU regulation No 305/2011, a construction product is defined as “any product or kit which is produced and placed on the market for incorporation in a permanent manner in construction works or parts thereof and the performance of which has an effect on the performance of the construction works with respect to the basic requirements for construction works”.
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). A daughter EPD is based on a third-party verified EPD but can be adapted to small variations in the composition of the product.
EU Taxonomy	In these criteria, references to the "EU Taxonomy" means the Delegated Act on the objective climate change mitigation (Commission Delegated Regulation (EU) 2021/2139 of 4 June 2021). Specifically, reference is made to the activity 7.2 " Renovation of existing buildings".
Facade	The principal front of a building, that faces on to a street or open space.
Heavy current cables	Heavy current cables/Electricity cables for nominal voltage equivalent to or more than 50 V AC voltage or 120 V DC voltage. The definition does not include data, telephone, and TV cables. Cables that arrive at the construction site together with electric appliances, such as lifts, white goods, pumps, and fans are not subject to material requirements.
Impurities in chemical products	Residuals, pollutants, contaminants etc. from production, incl. production of raw materials that remain in the raw material/ingredient and/or in the chemical product in concentrations of less than 1000 ppm (0.100 w-%, 1000 mg/kg) in the chemical product. Examples of impurities are residues of the following: Residues or reagents incl. residues of monomers, catalysts, by-products, scavengers, and detergents for production equipment and carry-over from other or previous production lines.
Ingoing substances	Chemical products: All substances in the chemical 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. Construction products: All substances in the construction product that are present in concentrations higher than 100 ppm (0.010 w-%, 100 mg/kg).
Nanomaterial	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.
PED (Primary Energy Demand)	Defined according to the national implementation of the EU Directive 2010/31/EU.
Post-consumer/commercial recycled material	“Post-consumer” is defined as material generated by households or commercial, industrial, or institutional facilities in their role as end-users of a product that can no longer be used for its intended purpose. This includes materials from the distribution chain.
Pre-consumer/commercial recycled material	Material that is reclaimed from the waste stream during a manufacturing process. Production waste (scrap, rework, regrind) that can be returned directly to the same process in which it was generated is not counted as recycled pre-consumer material. Nordic Ecolabelling defines rework, regrind or scrap, that cannot be

	reused directly in the same process, but requires reprocessing (e.g., sorting, reclamation, and granulation) before it can be reused, to be pre-consumer material. This is regardless of whether it is produced in-house or externally.
Recycled material	Recycled material is defined according to ISO14021 in the categories of pre-consumer and post-consumer and includes both mechanical and chemical recycling.
Reused materials	Reuse of a material means using it again for the same purpose for which it was originally made. The original product is usually not altered in any significant way before being used again. These criteria also include use of a certain material again, but in a manner different to what it was originally intended for. The original product is left mostly intact, utilising its shape, form, and material for a different purpose.
Selective demolition	In selective demolition the building is taken down in such a way that the materials can be sorted correctly and subsequently used the “best possible” way. At the same time the materials which contain problematic amounts of environmentally harmful substances are sorted out and handled. “Best possible” means that the materials are used as close to their original function and thus as high up in the waste hierarchy as possible, taking into account an overall assessment of costs and environmental effects. Demolition, where the building is first demolished and the materials are then sorted before disposal from the demolition site, is not considered selective demolition. Further details can be found in the report by Miljøstyrelsen Denmark: Selektiv nedrivning i byggebranchen (https://www2.mst.dk/Udgiv/publikationer/2022/02/978-87-7038-359-2.pdf).
Supplementary buildings	Supplementary buildings are refusing depots, bicycle sheds, garages (both as a separate structure or connected to the building) and similar constructions.
Take back systems	An initiative organized by the manufacturer or retailer, to collect used products or materials from the construction sites and module manufacturers and reintroduce them to the original processing and manufacturing cycle. A company may implement this program in collaboration with end-of-life logistics and material processing firms.
Technical service areas	Technical service areas are fan rooms, substations, lift shafts, machine rooms, electrical rooms, and other areas to which unauthorised persons do not have access. The following are not service areas: all living areas and communal areas such as dressing rooms, shower rooms, stairways, entrance areas, storerooms, corridors in basements/galleries, pram rooms and bicycle rooms. Installation shafts.

3 Environmental impact of renovation of buildings

The criteria for Nordic Swan Ecolabelled Renovation of buildings are based on the principles of life cycle assessment and RPS (Relevance, Potential and Steerability) analysis. The following table sums up the overall output of the RPS analysis, which aims to maximise the total environmental benefit of the criteria.

RPS Analysis for Renovation of buildings

Area	RPS level (high-medium-low)	Comment
Climate impact and energy demand of the building	R= High P= High S= Medium	Buildings are associated with high energy and resource/material consumption during both construction and the use phase. The potential to improve on relevant parameters is considered high. The Nordic Swan Ecolabel contributes to reduced climate gas emissions through different pathways: reduced energy demand, specific climate requirements for materials with high climate impact (cement, steel, and aluminium), renewable raw materials and reduced construction waste.
Circular economy	R= High P= High S= Medium	The construction sector produces a large amount of construction waste and consumes substantial resources. When possible, materials should stay in closed loops and be reused or recycled into new construction products instead of ending up as waste.

		The Nordic Swan Ecolabel focuses on setting requirements so that virgin materials of today can be reused or recycled in the future. This is ensured, for instance, through strict chemicals requirements that minimise harmful substances in construction materials and waste. Existing materials in the building must by inventoried and surveyed to ensure the mitigation of any potential risks to the environment and indoor climate posed by harmful substances. Furthermore, requirements are set to improve the handling of construction waste and set up the framework for using secondary materials in the current market.
Chemical products and construction products	R= High P= High S= Medium	Chemicals that are hazardous to health and the environment are found in many construction products and chemical products. In many cases alternatives are available, where the content of hazardous substances has been limited or completely phased out. Through its requirements for chemical content in materials and products, Nordic Ecolabelling contributes to the use of chemicals that are less damaging to health and the environment, thereby ensuring that materials of today can be reused or recycled in the future.
Indoor environment	R= High P= Medium S= Medium	We spend a large part of our time in our homes and educational buildings. A Nordic Swan Ecolabelled building contributes to a good indoor environment and good health. Identified indoor environmental factors that are critical for achieving a good indoor environment are: problematic chemical substances, acoustics, moisture prevention control and radon.

3.1 Alignment with the EU Taxonomy framework

Please refer to chapter 2 in the criteria document.

4 Product group definition

Nordic Swan Ecolabelled renovation of buildings is the result of an active renovation process. It is not possible for existing buildings to be Nordic Swan Ecolabelled without an ongoing renovation process. Only changing the energy system is not considered an active renovation process.

The size and scope of the renovation:

The renovation project must fulfil at least one of the following three options:

1. The estimated total cost of the renovation relating to the building envelope* or the technical building systems is higher than 25% of the value of the building, excluding the value of the land upon which the building is situated**.

2. More than 25% of the surface of the building envelope* undergoes renovation.

3. Renovation leads to a reduction of primary energy demand (PED) of at least 30%. Documentation must be done according to the principles in O14 alternative 2.

Documentation for compliance with 1, 2 or 3 must be done in O1.

** The building envelope is the outer structure of the building, i.e. the physical barriers that separate the inside from the outside, land, or unheated space. The building envelope is usually walls, floors/foundation, roof, windows, and external doors.*

*** The value of the building should be understood as the cost that a reconstruction of the existing building would amount to.*

Building types that can be subject to Nordic Swan Ecolabelled renovation of buildings

The following building types can be certified as Nordic Swan Ecolabelled renovation according to the criteria for Renovation of buildings:

- Buildings classified as residential buildings in the national building legislation.
- Educational buildings, including preschool buildings, kindergartens and day-care centres, schools, universities, and other schools for higher education.
- Office buildings, including all associated facilities in the building.
- Buildings for residential care facilities for people in need of 24-hour health care and service, such as homes for the elderly, nursing homes (NO: sykehjem), hospices, rehabilitation centres, and homes for persons with disabilities. If buildings are nationally classified as residential buildings, they are covered by bullet one.
- Buildings for health centres and clinics that accommodate health consultations, diagnosis and treatment of injuries or ailments from qualified physicians, dentists, chiropractors, physioterapists, etc. Surgical clinics and surgical centers are not included.
- Buildings for hotels or other establishments offering temporary accommodation such as hostels, motels and similar. The following applies for the facilities below:

  a) Restaurants and conference centre buildings that are an integrated part of the hotel or other accommodation must be included in the licence and must fulfil the requirements.

  b) Restaurants and conference centres buildings built as separate buildings can be included in the licence and must fulfil the requirements.

  c) Spa facilities cannot be included in the licence and must be kept separate in the marketing of the licence.

- Buildings accommodating conference centers. The following applies for the facilities below:

  a) Restaurant buildings that are an integrated part of the conference center must be included in the licence and fulfil the requirements.

b) Restaurant buildings built as separate buildings can be included in the licence and fulfil the requirements.

- Commercial areas, such as cafés, hairdressers, clothing stores, supermarkets, etc., that are integrated in one of the building types 1-7. The commercial areas may constitute a maximum of 25 % of the total area of the building.

- Buildings that are converted into any of these types of buildings.

Building types that cannot be Nordic Swan Ecolabelled

- Holiday homes and cottages.

- Permanent supplementary buildings, such as garages, refuse depots, bicycle storage rooms, and sheds constructed as separate projects. Supplementary buildings are included in the licence when planned and constructed along with the renovation of main building.

- Separate educational buildings that primarily accommodate laboratories, workshops and similar.

- Ice skating halls, public and private swimming pools.

- Gymnastics halls and sports halls constructed as separate projects.

- Hospitals, surgical clinics and surgical centers.

- Veterinary clinics.

- Separate commercial buildings, retail stores, and shopping centres.

- Factories and other industrial buildings.

Background

Renovation projects vary greatly in size and complexity. Nordic Ecolabelling focuses on building types where the complexity of technical installations and specialised functions is not too great. Buildings with very specialised use typically have very specific requirements concerning technical installation and materials. This can make it more difficult for these building types to fulfil e.g. the material requirements. Nordic Ecolabelling continuously evaluates the possibility of extending the scope of the criteria.

In the EU Taxonomy on renovations of existing buildings, the technical screening criteria for substantial contribution to climate change mitigation are as follows: a) The building renovation complies with the applicable requirements for major renovations. b) Alternatively, it leads to a reduction of primary energy demand (PED) of at least 30%.

Directive 2010/31/EU defines major renovations as: “the renovation of a building where: (a) the total cost of the renovation relating to the building envelope or the technical building systems is higher than 25% of the value of the building, excluding the value of the land upon which the building is situated; or (b) more

than 25% of the surface of the building envelope undergoes renovation; Member States may choose to apply option (a) or (b)."

Nordic Ecolabelling has decided to limit the size of the renovations in relation to the EU Taxonomy's technical screening criteria. This is relatively similar to the approach used in generation 1 of the criteria, where reference was also made to the definition of major renovation.

5 General requirements

Background O1: Outline description of the renovation project

The purpose of the requirement is to give an overview of the building project that is to be Nordic Swan Ecolabelled and the immediate surroundings. The information is relevant to ensure efficient and correct certification in relation to the rest of the criteria document.

6 Prior to the renovation phase

Prior to the renovation phase, the project must assess the existing building. The following requirements must be documented in the early phase of the project.

Background O2: Hazardous material survey and report

Older buildings may have been constructed using materials that contain various hazardous substances. During a renovation, it is critical that the risk related to these substances is eliminated. Depending on the substances, they may pose a risk to the environment and/or human health.

The hazardous material survey must be performed before contracting the remediation contractor, since the results will affect the remediation process. Due to the rapid changes in regulations and knowledge within the field of environmental surveys, a previous survey may not be more than three years old.

The survey must include the substances that are harmful to human health and the environment, according to the requirements/recommendations of the national authorities, national guidelines, and industry standards. The national legislation must have implemented Commission Decision 2000/532/EC establishing a list of hazardous waste, Commission Regulations (EU)1357/2014 replacing Annex III to Directive 2008/98/EC and (EU)2017/997 amending Annex III to Directive 2008/98/EC.

If the environmental surveyor has reason to believe that asbestos may be present (e.g. a broken or cracked pipe elbow), these elements must be marked with asbestos tape (warning tape with the word "Asbestos" written along it) as asbestos can pose a serious risk to the human health.

The industry standard has been to recommend the removal of hazardous waste during a renovation. Everything below the limits for hazardous waste can, in principle, be retained in the building. Nordic Ecolabelling therefore requires a risk assessment when substances are above the threshold limits in the appendix *Hazardous substances in reused construction products* and/or national threshold

limits for hazardous waste, to minimise harmful indoor environments or other adverse health or environmental impacts. A new threshold limit has been introduced for PFAS in generation 4 of the criteria. The level (100 ppm) is in line with the level set for new building products in O33. Nordic Ecolabelling is aware that a proposal has been made to ECHA by the countries Denmark, Germany, the Netherlands, Norway, and Sweden for a general threshold limit of 50 ppm for all products (https://echa.europa.eu/da/-/echa-publishes-pfas-restriction-proposal). Nordic Ecolabelling will follow this proposal closely to assess the possibility for implementation in the criteria New Buildings and Renovation.

It is technically feasible and desirable to retain a building part or material with hazardous substances that exceed the threshold limits – it is possible to encapsulate/enclose or render them harmless to prevent direct exposure. The method of choice must be justified in a risk assessment.

Background O3: Follow-up of hazardous material report

Remediation is the removal of hazardous materials, and Nordic Ecolabelling seeks to ensure a common minimum standard for Nordic Swan Ecolabelled renovations.

The hazardous material survey aims to identify all hazardous waste for demolition, as well as hazardous substances retained in the building. The remediation firm is responsible for choosing the method for the removal, storage, and transport of the hazardous waste. There may be multiple removal methods available, but the choice of most appropriate method often depends on the equipment available to the remediation firm.

Nordic Ecolabelling considers it extremely important to hire professional hazardous material surveyors and remediation contractors to ensure that the processes are performed in a manner that prevents environmentally hazardous substances from going undetected.

Background O4: Moisture survey

Material that has been damaged by moisture or biological fouling can affect the indoor environment, the local environment or the strength and durability of the building. The negative effect of moisture damage can be lasting, in some cases, even if corrective actions are taken to reduce the moisture level. If mould grows on interior surfaces or in the framework of the building and spores or fungal fragments spread to the indoor environment, it can cause unpleasant odours while exposure to these spores can have an adverse effect on human health.

A material may become damaged if it is exposed to a higher than intended moisture level. The release of chemical substances may increase, leading to abnormally high levels of chemical substances in the air. Moisture can also cause components in adjacent materials to react with one another and give rise to new, possibly harmful substances.

Not all moisture, damp and water damage affect the indoor environment and human health, but the risk exists. If a building is to be renovated anyway, it is cost-effective to repair damage and take measures against the risk of damage to building components. This is why Nordic Ecolabelling requires a moisture survey to be undertaken before the renovation work begins.

The moisture survey is normally performed in two stages. Stage one involves a visual, non-destructive inspection. A more detailed inspection is performed based on the knowledge and experience of the building surveyor, the building components that are identified as being at risk and the findings of the initial inspection. The methods used in the more detailed inspection vary, but several methods for collecting data are described in the requirement. Destructive (material) sampling is required at this stage.

If mould removal is necessary, the work must be carried out by a licensed contractor and in compliance with national occupational health and safety guidelines. This includes fulfilment of that any national requirements on authorisation.

Chemical products needed for the treatment of e.g. mould must fulfil the chemical requirements in chapter 11.

Background O5: Radon

Radon can cause lung cancer. The risk of lung cancer increases with prolonged exposure and particularly in combination with smoking. Radon gas in the air inside buildings can have several causes, including air permeability in the building envelope, emissions from building materials and radon from tap water. The annual average concentration inside a building also depends on user habits, for example ventilation settings and how often rooms are aired.[1]

Renovation works on heating, water, ventilation systems, window replacements, insulation improvements or drilling of holes in the base plate, cellar walls or between apartments may increase radon exposure. The risk analysis required must therefore identify such risks and propose measures to avoid or mitigate the risk. Short term measurements (normally 2-4 weeks) are only advisory and are not accepted as verification of compliance.

The purpose of the requirement is to ensure a very low radon level in Nordic Swan Ecolabelled renovated buildings. Measurements of radon in the indoor air are the preferred basis of the risk evaluation, but have seasonal constraints tied to them. If measurements are not feasible before the start of the renovation, other information such as historic measurements, information from ground or groundwater sampling, radon level maps, the age of the building, the presence and state of air sealing materials and construction material inventory can be used.

There is no requirement for Iceland, due to low radon risk since the Icelandic bedrock does not contain much uranium[2].

Option b is not applicable for Finland as the whole country is considered to be high risk area. The option is neither available in Sweden as a relatively high share of buildings have shown radon levels in the indoor air above legislation level.

[1] Measurement of radon in housing - description of methods. Swedish Radiation Safety Authority, April 2013.
[2] http://www.gr.is/wp-content/uploads/2016/09/Indoor-and-outdoor-radon-levels-in-Iceland_NSFS_Final_FINAL_version.pdf

Background O6: Mapping of components and materials suitable for reuse

Production of new components and materials is a demanding process in terms of both resources and energy. Avoiding this is therefore a fundamental concept that supports a circular economy. Reusing products instead of manufacturing new ones, it directly reduces the need for new resources, cuts energy usage and avoids accumulation of waste.

It is generally considered that there is huge potential for increasing the reuse of building materials in construction projects from present-day levels. There may be several reasons why reuse does not take place very often in the demolition process today. It may be due to a lack of expertise when it comes to identifying valuable materials in the building, the expense of reuse compared to buying new products, or time constraints related to the demolition resulting in damaging the materials. The project therefore has to follow-up this report in O7 with a plan for reuse.

The foremost aim of the requirement has been to raise awareness and initiate systems that will ensure increased reuse.

It is not possible to set an absolute requirement for the amount of construction material that must be reused directly in a Nordic Swan Ecolabelled renovation, as the projects vary greatly. The market for reused materials is small and for this reason, a potential has been identified for each renovation project to undertake an in-depth analysis of the opportunities for reusing construction materials for a similar or new purpose.

Background O7: Plan for reuse

Establishing better ways of managing the resources in today's buildings is a key factor in achieving a more circular material flow. The first step in a circular material flow is to identify components and materials in existing buildings, but performing an inventory for reuse is by no means a guarantee of actual reuse today.

To gain the full potential related to reuse, the inventories and reports must be taken into consideration early on in the project. This reduces the time and cost required to design with reused components and materials. Reuse internally in the project requires less logistics and should always be considered. As the identified components and materials are not always suitable for reuse in the project, they may also be reused elsewhere. Either directly in another project, through a platform specialised in reuse, or similar.

As the process of reusing components and materials is still maturing in the construction industry, Nordic Ecolabelling sets no requirements regarding how much of the identified components and materials must be reused. This requirement seeks to encourage reuse and guide the projects as to when these considerations should take place.

When reused components and materials are introduced to the project, it is important to ensure that they do not contain hazardous substances that negatively affect the indoor environment. For internally reused products this is documented through O2 and the hazardous material report. Reused products from elsewhere must be documented separately in O12.

Background O8: Selective demolition

In selective demolition the building is taken down in such a way that the materials of can be sorted correctly and subsequently used the “best possible”. “Best possible” means that the materials are used as close to their original function and thus as high up in the waste hierarchy as possible taking into account an overall assessment of costs and environmental effects. Demolition, where the building is first demolished and the materials are then sorted before disposal from the demolition site, is not considered selective demolition[3].

In order to preserve the resource in the buildings the best possible, selective demolition is an essential tool. A large potential in terms of conserving the resources available by promoting these principles.

A plan must be developed to account for the use of selective demolition. Relevant standards, methods or national guidelines can be used and referred to. Nordic Ecolabelling is aware that the specific use, potential and relevance of selective demolition varies from project to project.

A report after demolition must document the actual measure taken in the project.

Silica used in the manufacturing of flat glass is a very scarce resource. Flat glass from windows can be recycled into new window glazing if contamination can be avoided. Dismounting and securing the intact windows for transport is an important step in the recycling of flat glass, to avoid contamination of the glass. The applicant must show that the waste contractor will send the windows for recycling into new glass for windows and not downcycled to for example glass insulation or glass packaging. Flat glass recycling is being developed in the Nordic region and is currently available in Sweden (November 2023). When the technology becomes available in more countries, the requirement will be updated accordingly.

Background O9: Plan for indoor air quality

Pollutants in the indoor air will often be more prevalent during renovations and remediations, compared to construction of new buildings. The pollutants originate from old materials being removed, new building materials, chemicals used, sawdust, concrete dust, and other particulate matter. Ventilation systems might spread these pollutants to other parts of the building, but ventilation also needs to be controlled for the sake of the work environment at the renovation site.

The plan for indoor air quality aims at ensuring a healthy working/living environment during the renovation phase and that the ventilation system will not spread pollutants and particulate matter, during or after renovation works.

Procedures for adequate ventilation, cleaning of the systems, and e.g. replacement of air filters before occupancy are essential to ensure satisfactory indoor air quality. In new buildings and renovated buildings, emissions and particles from different building elements, materials and various surface

[3] "Selektiv nedrivning i byggebranchen", Miljøstyrelsen: https://www2.mst.dk/Udgiv/publikationer/2022/02/978-87-7038-359-2.pdf .

treatments will be greatest at the start. It is therefore important to minimise this before the building is occupied.

Background O10: Measurement of PCB levels in indoor air

PCBs are a group of chemicals that affect the development of the brain and nervous system and are suspected carcinogens, immune system- and endocrine disruptors[4]. They were used in e.g. sealants, mastics, windows, paints, and electrical equipment until the 1970s.

Nordic Swan Ecolabelled renovated buildings must be guaranteed to have low levels of PCBs that may pose a risk to health and the environment. Nordic Ecolabelling therefore requires measurements to be carried out in the building in cases where PCBs have been identified in materials with concentration above the national threshold limit for hazardous waste. The requirement also applies if PCBs have previously been found in the building before the Nordic Swan Ecolabelled renovation. Measurements must be made after remediation to show the extent to which PCBs have been removed from the building.

Many circumstances affect the PCB-levels in the indoor air, e.g. the placement of the materials, the material structure, ventilation and migration properties of the materials. A Danish study[5] has mapped PCB in the indoor air in 67 existing buildings. The buildings in the study were selected based on the criteria that there should be either materials indoors with more than 50 mg/kg PCB (threshold limit for hazardous waste) or materials outdoors with more than 5,000 mg/kg PCB. With these selection criteria, it was expected that all buildings where PCB concentrations in the indoor air of more than 300 ng/m3 could occur would be covered by the measurement program. The summary of the study shows that ≥300 ng/m3 was found at 7% of the locations surveyed. ≥3,000 ng/m3 was found at two locations, corresponding to 0.4 % of the locations surveyed. In addition, the PCB-guiden (Social og boligstyrelsen in DK) states PCB must typically be present in concentrations of 1 % in materials to result in the indoor air reaching the reactions levels (300 ng/m3). Based on this and NSE's experience with the result of PCB measurements in buildings with PCB findings below the threshold limits for hazardous waste, it is found reasonable to limit the requirement to measurements in buildings with materials in the indoor environment above the national threshold limits for hazardous waste.

Nordic Ecolabelling's threshold limit value of 300 ng PCB/m^3 for indoor air is the same as the level set by the Danish Health Authority as guidance when no action is required. If the level of PCBs per cubic meter of indoor air is below 300 nanograms, this is considered an acceptable level where the exposure to PCBs is not expected to pose a significantly increased risk. If the level of PCBs exceeds the threshold limit value stated in the requirement, further action must be taken to trace the source of the PCB and then remove/remediate it. The indoor air must then be tested once again to analyse PCB levels.

[4] https://www.naturvardsverket.se/amnesomraden/miljofororeningar/organiska-miljogifter/pcb-i-miljon/ 2023-05-22

[5] KORTLÆGNING AF PCB I MATERIALER OG INDELUFT RAPPORT_STANDARD_GROOWI

7 Resource efficiency and circular economy

Background O11: Waste Management

EU waste directives and national plans have identified the material recovery of construction waste for recycling or reuse as a core issue in the transition to a circular economy. This obligatory requirement for all ecolabelled renovations will ensure that construction companies contribute towards this goal, by delivering demolition and construction waste that is prepared for reuse, recycling, or other material recovery to the established recovery systems in each country.

Nordic Ecolabelling has identified waste handling as an area with a great potential for improvement in the building sector. The delivery of the waste management plan before the start of demolition / construction will help identify any possible issues with sorting and handling in the building project. In addition, it will ensure that the waste management is in alignment with the situation at the construction site and the local possibilities for handling of the waste. Any issues can be addressed before start of the construction/demolition, while in later phases of the project it might be too late.

After finalized project the following must be accounted for: The total amount of construction waste produced at the construction site; the amounts of all waste fractions, the company name of the respective receiver(s)** and their intended treatment form and a calculation of material recovery degree based on the bullets above. Nordic Ecolabelling do not require documentation for traceability of the waste fractions after the receiver as we have no steerability of the handling from this point.

This requirement is in alignment with the level in the EU Taxonomy's "Do No Significant Harm" criteria that require at least 70% of non-hazardous demolition and construction waste to be prepared for reuse, recycling, and other material recovery. For details on the EU Taxonomy please refer to the section on the EU Taxonomy in this criterion.

Production of modules and prefabricated elements must account for and fulfil the requirement when the building is mainly constructed from prefabricated modules/elements with finished or nearly finished interior surfaces. Finished or early finished interior surfaces should be understood as surfaces that only require minor work on the building site to be finished, e.g. covering up joints between elements, installing thresholds between elements, minor plastering work or applying a bespoke nuance of paint. In cases where materials like insulation, vapour barrier or building panels are to be added on the building site, it is not considered as finished or nearly finished. Sweden: According to Byggföretagen and Fastighetsägarna sorted wood waste can be calculated as part of the non-hazardous construction and demolition waste even if it is incinerated after collection by the waste management company. This interpretation differs from the other Nordic countries. Nordic Ecolabelling awaits clarification from the EU Commission on this issue.

Background O12: Hazardous substances in reused construction products and materials

Reusing products instead of manufacturing new ones is a fundamental concept in a circular economy. The requirement ensures that no harmful substances are introduced in new buildings from old materials.

A risk analysis of the materials made by an expert must be performed as an assessment based on the age of the building/construction, the renovation history of the building, and the state and cleansing of the material can verify any risks in relation to the material in question. In addition, knowledge and experience with the materials used at the time the building of origin was first constructed and renovated must be included in the assessment. This includes content of problematic substances in the material itself and in surrounding materials if substances found have migratory properties. The risk analysis must always be performed, as only a handful of substances will most likely be analysed. There is always a need to address the other substances not analysed.

When an expert cannot verify the lack of harmful substances in reused products, it is necessary to perform a laboratory analysis to ensure that any contaminated products will be taken out of the circular loop.

The appendix *Hazardous substances in reused construction products* specifies relevant substances that must be investigated for. In addition, any national threshold limits must be fulfilled.

Background O13: Waste sorting inside the building

To support extensive recycling of waste, a Nordic Swan Ecolabel renovated building must be equipped with vessels for sorting at source. The number of fractions in residential units is set at four sorting fractions, which could be: residual waste, food waste, plastic, metal, glass, or paper. The last four fractions, apart from the residual and food waste, are also the minimum fractions required by the revised European Directive 2008/98/EC on waste. However, Nordic Ecolabelling will not set requirements concerning which specific fractions must be sorted, due to variations in the collection systems of the countries and municipalities. Some fractions are often collected mixed and then sorted afterwards.

In educational buildings, office buildings, health centres and clinics, hotels and conference centres, every room with kitchen facilities, where appliances are permanently installed for cooking and preparing meals, should have four fractions for sorting of waste. That includes small kitchens attached to sports facilities.

In residential care facilities every room with a kitchen, where appliances are permanently installed for cooking and preparing meals, should have four fractions for sorting of waste. Tea kitchens are exempted.

8 Energy

Background O14: The energy use of the building

Large parts of the building stock in the Nordic are due for renovation in the coming years. Energy efficiency of the building envelope and technology is important to achieve a more energy-efficient building stock with a lower climate impact. There is huge potential for energy efficiency improvements.

This requirement aims at reducing the overall energy demand for buildings. Either by attaining relatively ambitious levels for the final building (alternative 1) or by making large reductions in the energy demand (alternative 2).

Alternative 3 is introduced to make it possible to Nordic Swan Ecolabel protected buildings and buildings worthy of preservation. It is often not possible to achieve a large reduction of energy demand in these buildings, but we see considerable potential for many other environmental benefits covered by these criteria. Therefore, they only need to document compliance with the national building legislation when renovation is performed. The definition of what is covered by this exemption in alternative 3 is determined nationally.

The EU Taxonomy (on climate mitigation) for renovation of buildings has the following technical screening criterion:

a) The building renovation complies with the applicable requirements for major renovations (298).
b) Alternatively, it leads to a reduction of primary energy demand (PED) of at least 30% (299).

298) As set out in the applicable national and regional building regulations for 'major renovation' implementing Directive 2010/31/EU. The energy performance of the building or the renovated part that is upgraded meets cost-optimal minimum energy performance requirements in accordance with the respective directive.

299) The initial primary energy demand and the estimated improvement are based on a detailed building survey, an energy audit conducted by an accredited independent expert or any other transparent and proportionate method and validated through an Energy Performance Certificate. The 30% improvement results from an actual reduction of primary energy demand (where the reductions in net primary energy demand through renewable energy sources are not taken into account) and can be achieved through a succession of measures within a maximum of three years.

Nordic Ecolabelling sees this as a good baseline for a reasonable level regarding an energy requirement for renovation of buildings.

Denmark: has implemented Directive 2010/31/EU but is not directly using the definition of major renovation in the legislation. Correspondence with the Danish building legislation authorities indicates that the renovated building must fulfil renovation class 2 (BR18) in order to be aligned with a) in the EU Taxonomy.

Finland has implemented Directive 2010/31/EU and the definition of major renovation. It is interpreted that alignment with alternative a) in the EU Taxonomy is achieved by fulfilling the Ministry of the Environment's regulation (4/2013) on improving the energy efficiency of buildings in conjunction with repair and modification works, for the building category in question.

Sweden: has implemented Directive 2010/31/EU but is not directly using the definition of major renovation in the legislation. It is interpreted that the renovated building must fulfil the energy use equivalent to the maximum permitted in accordance with BBR for new buildings in order to be aligned with alternative a) in the EU Taxonomy.

NO/IS has not yet implemented Directive 2010/31/EU and are therefore not aligned with the EU Taxonomy. Instead, the level is defined relative to the energy demand for new buildings. If the Directive 2010/31/EU is implemented during the current criteria, the requirement will be updated by Nordic Ecolabelling after a national consultation. There will be a notification period before the requirement is changed. As an alternative until this is implemented in NO there is a possibility to calculate the PED reduction of 30% according to "veiledning om beregning av primærenergibehov og nesten nullutslippbygg"[6], where all the energy carriers are set to 1. Also, the energy class must be calculated according to "energimerkeforskriften for bygninger" (FOR-2009-12-18-1665[7]).

Alternative 3 regarding protected buildings and buildings worthy of preservation is not aligned with the EU Taxonomy.

The EU is working on revision of the building directive. Among other things it is suggested that all public and commercial buildings must as a minimum have energy label F I 2027 and E in 2030. For residential buildings, energy label F and E must be achieved in 2040 and 2033 respectively. Based on this, a minimum level of energy class E for SE/FI and D for DK is introduced in the requirement in alternative 2.

Background O15: Lighting management

Even with the use of energy efficient lighting products, it is important to use automated lighting management to control the use of electricity. Automatic demand control based on daylight could be a daylight sensor or an astronomical timer. Automatic demand control based on presence could be motion detectors, acoustic detection, or presence sensors.

For safety and security reasons, outdoor lighting in educational buildings may need to be on throughout the dark and gloomy part of the day. School premises are often used in the evening for various organised activities, which requires illuminated schoolyards and entrances. Nordic Ecolabelling wants to emphasise that the requirement for automatic lighting management is not in opposition to these needs. The same reasoning applies to areas around residential buildings where lighting is necessary for safety and security reasons, such as parking spaces, entrances, or walkways.

Light pollution disturbs birds, bats, and insects. All luminaires must be well shielded from the sky with <0.5% light above the horizontal line of the light fixture. This level is defined by the International Dark-sky Association as sufficient to achieve the desired effect.

[6] https://www.regjeringen.no/contentassets/60e8f8ec02e246079f4af4d9578d78c2/veiledning-om-beregning-av-primarenergibehov-og-nesten-nullenergibygg.pdf
[7] https://lovdata.no/dokument/SF/forskrift/2009-12-18-1665?q=energimerke

Background O16: Energy efficient white goods

Energy classification of household appliances and professional kitchen appliances is an important tool for reducing energy use during the use phase of the building. The requirement on energy efficiency is based on both Energy Labelling Directive 2010/30/EC and Energy Labelling Regulation 2017/1369 with later supplements. The specific requirement concerning the energy label for each product group is set in accordance with the market supply in the Nordic countries. Nordic Ecolabelling has had close correspondence with both suppliers and producers in the Nordic to get an overview of the actual market situation and thereby set an ambitious but also reasonable level.

Household appliances

Electric water heaters are introduced in the requirement since this product group can now be energy labelled. Since there is no energy labelling or eco-design requirement for dryer cabinets often used in preschools and primary schools to dry the children's outerwear, a requirement is expressed in kWh/kg instead.

Professional kitchens

Cooking equipment, freezers, refrigerators, and dishwashers use the most energy in the kitchen. Nordic Ecolabelling sets requirements for refrigerators, freezers, and boiling pans.

The Energy Labelling Regulation only covers refrigerators and freezers with built-in refrigeration units. Refrigerators and freezers with central cooling systems are not covered and are thus not subject to this requirement.

Boiling pans are large-capacity cooking vessels that stand on the floor. Nordic Ecolabelling requires a boiling pan to be at least 90% energy efficient in accordance with EFCEM's Energy Efficiency Standard for boiling pans.

Nordic Ecolabelling does not set any performance requirements for professional kitchen cookers or dishwashers, as there are no recognised standards for assessing the energy performance of these products.

9 Climate

Background O17: Cement and concrete

Cement-based materials are often used in large quantities in a building[8],[9],[10] and they are produced in energy intensive and CO_2 emitting processes. Concrete typically accounts for 34–40% of the GHG emissions of office buildings, educational buildings, apartment blocks and homes for the elderly.[11] Nordic Ecolabelling has defined an obligatory requirement in order to help lower the GHG emissions associated with these structures and processes.

The requirements are based on the national concrete classification systems in SE, NO and FI. The classification systems provide guidelines on how to calculate the emissions. This is important because inconsistencies in data for EPDs for cement, aggregates and concrete have been found in individual EPDs.[12] The industry reference, which is used to estimate savings in GHG emissions, uses national generic values. The threshold limits and concrete classes for each country are defined in dialogue with the manufactures and the national concrete association. Documentation must be done according to national EPD-tools.

In Denmark there is no classification system for concrete. Nordic Ecolabelling has assessed the possibility to define its own concrete class system for Denmark. The conclusion was however that there is not sufficient reliable data available to define a fair concrete classification system. The data available is very limited for both ready mixed concrete and especially for elements, piles etc.

In Denmark the specific concrete products/materials used must be verified by product specific EPDs for ready mixed concrete. Due to the lack of a classification system only the ready mixed concrete must be accounted for. The requirement for the GWP is set to 15% below the level in the corresponding industry EPD published by Dansk beton. This level is considered realistic based on dialogue with the market, available EPDs for ready mixed concrete and the possibilities available to lower the total GWP of the product.

Iceland has no classification system, but the producers must provide product specific EPDs. In addition, a requirement is set on the content of cement clinker for larger building parts.

Background O18: Steel production

Using recycled metal can reduce the environmental impact and provides a significant climate benefit. Among other things, this is highlighted in the

[8] Life cycle assessment of MiniCO2 houses in Nyborg, Danish Building Research Institute, 2013.
[9] A. Dodoo, Life Cycle Primary Energy Use and Carbon Emission of Residential Buildings, 2011.
[10] Solem, Bård: Bærekraftige materialvalg (2018) Preeentasjon på Samling 1 i prosjektet Fra ide til realisering - bærekraftig bygg under Innovative anskaffelser - Nasjonalt program for leverandørutvikling. Available at: https://innovativeanskaffelser.no/wp-content/uploads/2018/10/181023-baerekraftig-materialvalg-bard-solem-eggen-arktitekter.pdf
[11] Fuglseth, M., et al. (2020) Studie potensial og barrierer for bruk av klimavennlige materialer - Potensial og barrierer klimavennlige materialer. Utarbeidet for Enova. Available at https://www.enova.no/bedrift/bygg-og-eiendom/tema/klimavennlige-byggematerialer/
[12] Anderson, J. and Moncaster, A.: Embodied carbon of concrete in buildings, Part 1: analysis of published EPD (2020). Available at: https://www.researchgate.net/publication/341943113_Embodied_carbon_of_concrete_in_buildings_Part_1_analysis_of_published_EPD

taxonomy work in the EU[13]. Nordic Ecolabelling is aware that the availability of recycled metal and traceability can be a challenge. 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 environmental work, working conditions, quality etc.

Among the most common building materials, steel is the only material that can be recycled 100% without losing its quality.[14] It is also a material that is suitable for reuse, and compared to recycled steel, reused steel has 80% lower climate gas emissions. Hence, both recycling and reuse of steel should be encouraged to reduce the carbon footprint of buildings. The two steel production processes are Basic Oxygen Furnace (BOF) for which the input is iron ore, and Electric Arc Furnace (EAF) for which the input is mainly scrap steel. It is necessary to have an ambitious requirement to promote the use of recycled steel and traceability. In practice, this means that steel that should contain more than 20% recycled steel and must be produced at plants that use EAF technology. There are steel producers using the EAF process across the whole of Europe.[15] According to the World Steel Association[16] the EU produces 58% of steel using BOF and 41% using EAF technology. Globally, approx. 70% is produced using BOF and 30% using EAF technology.

Nordic Ecolabelling has introduced requirements for iron ore-based steel production. Requirements for metal can therefore be met either by including a high proportion of recycled, or by fulfilling several requirements for primary metal production. The requirement model is based on an obligatory requirement for the producer to have an energy and greenhouse gas calculation with defined reduction targets.

Certification with Responsible Steel is something that Nordic Ecolabelling sees as a positive initiative, since it focuses on economic, social, and environmental aspects. Production of steel also produces emissions to air and water, and Nordic Ecolabelling wishes to limit this by requiring that the emissions are within the BAT-AEL values specified in the BREF documents. The requirement can also be met if the steel comes from a manufacturer who has adopted new technologies that significantly reduce the climate impact from production. The technologies are like those stated in the EU's technical annex to the taxonomy report.[17]

Nordic Ecolabelling do not set requirements for steel rebars as the consultation for 089 New buildings has clearly shown that these are almost always made of high proportions of recycled steel. The work with documenting the recycled content and addressing the issues of traceability are not considered to be reasonable when the environmental benefit that can be achieved is limited. Therefore, this requirement is only activated when large amounts of steel is used for applications where more climate friendly alternatives (such as wood) are

[13] Taxonomy report, technical annex, EU technical expert group on sustainable finance, March 2020.
[14] https://www.stalforbund.no/miljo/
[15] http://www.eurofer.org/About%20us/About%20Steel/EuropeanSteelMap.fhtml
[16] https://www.worldsteel.org/en/dam/jcr:96d7a585-e6b2-4d63-b943-4cd9ab621a91/World%2520Steel%2520in%2520Figures%25202019.pdf
[17] EU technical expert group on sustainable finance, Taxonomy Report: Technical Annex, March 2020: https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy-annexes_en.pdf

available, in façade and load bearing systems. Roof panels are not covered by the requirement.

Background O19: Aluminium production

Using recycled metal can reduce the environmental impact and provides a significant climate benefit. Among other things, this is highlighted in the taxonomy work in the EU.[18] Nordic Ecolabelling is aware that the availability of recycled metal and traceability can be a challenge. 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 environmental work, working conditions, quality etc.

For aluminium, Hydro has launched its own traceability certification with a minimum of 75% recycled Aluminium, Hydro Circal. Currently, there is a small plant in Luxembourg that can supply this, but from 2020, the Azuqueca plant in Spain will be able to supply Hydro Circal with a production capacity of 25,000 tonnes. The industry average for EU-produced Al is approx. 50% recycled, while for Al outside the EU it is approx. 40%. The major environmental benefit comes from the use of post-consumer recycled aluminium. Nordic Ecolabelling therefore requires that a certain proportion of the recycled material must be post-consumer.

In this version of the criteria, Nordic Ecolabelling has for the first time introduced requirements concerning primary aluminium production. Requirements can therefore be met either by including a high proportion of recycled material, or by fulfilling several requirements for primary aluminium production. The requirement model is based on an obligatory requirement for the producer to have an energy and greenhouse gas calculation with defined reduction targets.

Certification by the Aluminium Stewardship Initiative (ASI) is something that Nordic Ecolabelling sees as a positive initiative, as it focuses on 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 outcome of the EU Taxonomy work.

The requirement is limited to handling the most significant parts of aluminium in buildings; façade panels, profiles for windows and doors in aluminium (external cladding of outer wood components for the sole purpose of weather proofing is exempted) and aluminium profiles in glass facade systems when the system covers more than 20% of the façade area (excluding windows/doors).

Direct reuse of aluminium is difficult due to properties of the material and is therefore not included as an option for documentation.

[18] Taxonomy report, technical annex, EU technical expert group on sustainable finance, March 2020.

In this criteria document, windows and exterior doors are defined as:

- Windows and exterior doors between the interior climate and exterior climate, according to the EN 14351-1 standard: 2006.
- Other types of exterior doors such as entry hall doors/apartment doors, exterior corridor doors, window-walls in school and office buildings, warm storage room doors, cold storage room doors etc.

The recycled share is like in the criteria Nordic Swan Ecolabelling of New buildings gen. 4.

10 Chemical products, construction products, construction goods and materials

This section defines the requirements for new materials. Other products and materials are handled by the hazardous material survey and report (O2) or the requirements for reused products (O12).

This chapter consists of three sections of requirements:

1. Product list and logbook.
2. Chemical products.
3. Construction products, goods, and materials.

Reference is made to the individual requirements, the section "Definitions" and the section “What is subject to the requirements?” for an explanation of what is included in the requirements.

Nordic Swan Ecolabel products automatically fulfil the requirements in this chapter.

10.1 Product information and logbook

Background O20: Logbook

The purpose of a logbook is to act as an inventory of materials and products used today to ensure the best possible reusability or recyclability in the future. It is an important tool for the transition to a circular economy and for the concept of buildings as material banks. The logbook can also contribute to proper maintenance of the building during its life cycle and to the identification of hazardous substances prior to renovation and demolition.

To ensure that the logbook serves all the listed purposes, it must include not only the names of products and a product description to report the content, but also where it is located in the building. The location can be stated on a uniform basis, like in other building-related documentation and drawings. This can be as detailed as possible but there is a minimum level of description based on the following definitions: ceiling, walls and floor, building’s roof, facade, cellar, stairwell, slab, building’s frame, terrace, balconies, garage, sports halls, garden,

entrance hall, technical installation rooms, waste sorting room, laundry room, lift shaft.

To ensure compliance with the materials in this criterion the logbook must be dynamic and be updated according to the building process. Problematic products and materials, especially if discovered in the late stages of the project, can lead to measures that will be costly and will take time to undertake, even leading to the denial of certification. It is also a waste of resources and an environmental burden to replace materials and products already used in the construction. For those reasons, the logbook also offers a good basis of control, preventing unwanted situations and potential negative environmental and financial effects.

10.2 Chemical products

A chemical product is a substance or a mixture of two or more substances, in liquid, gaseous or solid form, which are used on a construction site or by a manufacturer of prefabricated building components.

Chemical products for both indoor and outdoor use are covered by the requirements. The requirements in the criteria document and accompanying appendices apply to all ingoing substances in the chemical product. Impurities are not regarded as ingoing substances and are exempt from the requirements. Ingoing substances and impurities are defined in the Definitions section.

For details on what is subject to the requirements, reference is made to the section “What is subject to the requirements?”

Background O21: Classification of chemical products

Nordic Ecolabelling seeks to ensure that the health and environmental effects of chemical products are as low as possible. The requirements therefore specify that products classified as environmentally hazardous, highly toxic, toxic, carcinogenic, mutagenic or reprotoxic must not to be used to construct Nordic Swan Ecolabelled buildings.

The requirement concerns the classification of the actual chemical products and not the individual compounds in the products, which are governed by subsequent requirements.

There are a few exemptions from the prohibited classifications of chemical products where the functionality requires substances for which unclassified alternatives are not available. One example of this is melamine in intumescent steel paints, which has recently gotten a harmonised classification. The Finnish construction industry has a specific need for repairing concrete cracks using epoxy injection resins. This is an indirect consequence of Finnish building regulations and standards, where shuttering slab elements are not commonly used

The commission regulation EU 2020/1149 will be implemented during the summer 2023 according to our information. For the PU products exempted this means that no additional working environment requirements will be implemented. This should be handled satisfactory according to this new legislation of 3 August 2020.

The exemptions for Finland for spray polyurethane foam and fire-resistant urethane foam are due to Finland's fire-safety requirements and strict requirements for moisture control, which influence the national construction methods. According to the Finnish fire safety regulations sealing solutions that leave shrinkage gaps and flexible openings under thermal deformation are not accepted. Based on discussions with manufacturers and the construction industry, the requirements from municipalities are stricter in Finland than in other Nordic countries, particularly regarding the moisture prevention and sealing of building joints. That is why NSE has found it necessary with this national exemption.

Background O22: CMR substances

In addition to the requirement concerning the classification of the chemical products, it is also required that chemical products cannot contain substances that are carcinogenic, mutagenic or reprotoxic (CMR substances cat 1A and 1B). Nor may chemical products contain substances that are suspected to be carcinogenic, mutagenic or reprotoxic (category 2).

Substances that may cause cancer, change genetic material, or interfere with reproduction are prioritised substances within the EU's chemical legislation, due to their inherently dangerous properties. It is therefore of central importance to considerably reduce, and in the long term move away entirely from, the use of CMR substances.

There are a few exemptions from the prohibited classifications of chemical products where the functionality requires substances for which unclassified alternatives are not available.

The exemption for zinc pyrithione has been set to correspond with the time limitations in criteria for Nordic Swan Ecolabelled paint.

The commission regulation EU 2020/1149 will be implemented during the summer 2023 according to our information. For the PU products exempted this means that no additional working environment requirements will be implemented. This should be handled satisfactory according to this new legislation.

Exemption is given for respirable crystalline silica/quartz classified as H372/H350i with a maximum content of 1% in raw materials. This is similar to the criteria for Nordic Swan Ecolabelled paint generation 4. For further background refer to that criteria.

In August 2025, the EU Court of Justice upheld the annulment of the harmonised Carc. 2 (H351i) classification of TiO2. Since TiO2 is no longer CMR classified, the exemption from the requirement is removed, but TiO2 can still be used in chemical products.

The exemptions for Finland for spray polyurethane foam and fire-resistant urethane foam are due to Finland's fire-safety requirements and strict requirements for moisture control, which influence the national construction methods. According to the Finnish fire safety regulations sealing solutions that leave shrinkage gaps and flexible openings under thermal deformation are not

accepted. Based on discussions with manufacturers and the construction industry, the requirements from municipalities are stricter in Finland than in other Nordic countries, particularly regarding the moisture prevention and sealing of building joints. That is why NSE has found it necessary with this national exemption.

Background O23 and O24: Preservatives in indoor paint and indoor varnish

The requirement and the levels for highest permitted preservatives are harmonised with equivalent requirements in the criteria for Nordic Swan Ecolabel indoor paints and varnishes and for products for indoor use in the criteria for Nordic Swan Ecolabel chemical building products respectively. Levels for the highest permitted concentrations of the respective preservatives are the same as those that apply to Nordic Swan Ecolabel indoor paints and varnished. For all other chemical products for indoor use, the levels are the same as for Nordic Swan Ecolabel fillers, which is considered reasonable for a Nordic Swan Ecolabel building.

Updates for total preservatives and total isothiazolinone compounds in indoor paint and indoor varnish have been updated to 900 ppm and 600 ppm respectively, in accordance with corresponding updates for Nordic Swan Ecolabel indoor paints and varnishes.

3-iodo-2-propynyl butylcarbamate (IPBC): Exempted due to its essential biocidal function as a preservative and film protector. Its use is regulated through specific concentration limits, ensuring controlled application and minimised exposure. The exemption prevents burden shifts by allowing effective preservation within strict limits, reducing the risk of product degradation, microbial growth, and the need for more hazardous or less efficient alternatives.

Background O25: Prohibited substances

Several harmful substances are banned in products used for Nordic Swan Ecolabelled renovation. This is to ensure a minimum impact on both health and environment but also to ensure the best possible potential in future reuse of building products.

The Candidate List identifies substances of very high concern which fulfil the criteria in article 57 of the REACH Regulation (EC 1907/2006). The list includes carcinogenic; mutagenic; and reprotoxic substances (CMR, categories 1A and 1B in accordance with the CLP Regulation); and PBT (persistent, bioaccumulative and toxic) and vPvB (very persistent and very bioaccumulative) substances (as defined in REACH Annex XIII). In addition, two more substance groups are included if they are of equivalent level of concern (ELoC) as the ones previously mentioned. These are endocrine disruptors and substances which are environmentally hazardous without fulfilling the requirements for PBT or vPvB. Based on these adverse characteristics, Nordic Ecolabelling prohibits substances on the Candidate List. This means that we act ahead of the legislation and ban the substances before they are subject to authorisation and restriction in accordance with REACH.

PBT and vPvB are abbreviations for substances that are persistent, bioaccumulative and toxic, and very persistent and very bioaccumulative, respectively, in accordance with REACH Annex XIII. This means that they are not biodegradable and that they accumulate in living organisms. Based on these adverse characteristics they pose a threat to the environment and human health. They are prohibited in all Nordic Swan Ecolabel products.

Endocrine disruptors (EDs) are chemicals that alter the functioning of the endocrine (hormone) system and consequently cause adverse health effects. Theterm potential EDs is used for chemicals with properties that make them suspected to be EDs. The hormone system regulates many vital processes in living organisms and when normal signalling is disturbed, adverse effects may result. EDs raise high concern for their risk of causing serious negative impact on the environment as well as on human health specifically. Special concern is raised for effects on reproduction and development and about possible links to increases in public health diseases. While effects in wildlife populations have been confirmed, evidence is pointing to effects also in humans.

Per- and polyfluoroalkyl substances (PFAS) are used in many types of products due to their water and dirt repellent properties. These compounds constitute a group of substances that have highly problematic intrinsic hazardous properties. They are extremely persistent and accumulate in the body. They are spread all over the globe, from the large oceans to the Arctic, and are found in e.g. wild birds and fish and their eggs. Also, shorter chain compounds (2–6 carbon atoms) have been discovered in nature. The substances in this group are suspected to be endocrine disruptors, carcinogenic and to have a negative impact on the human immune system. PFOA, APFO (ammoniumpentadecafluorooctanoate) and certain fluoro acids are included in the Candidate List due to being reprotoxic, as well as having PBT properties.

The non-ionic APEO group of surfactants are produced in large volumes and their uses lead to widespread release to the aquatic environment. APEOs are highly toxic to aquatic organisms and degrade to more environmentally persistent compounds (APDs). Ethoxylated nonylphenol and several other alkylphenols are included in the Candidate List due to endocrine disrupting properties.

Flame retardants are suspected of contributing to a number of unwanted health effects. Several of the substances are suspected of causing birth defects, cancer, and endocrine disrupting effects. Many of them are on the EU candidate list under REACH.

Many brominated flame retardants are persistent and bio accumulative chemicals that can now be found dispersed in nature. The focus on phasing out brominated flame retardants has led to the use of alternatives such as phosphorus and nitrogen-based flame retardants.

A number of phthalates are identified as endocrine disruptors and some of them are classified as reprotoxic. For these reasons several phthalates are included in the Candidate list. Based on their hazardous properties' phthalates pose a threat to the environment and human health and there is a ban on this group of substances.

Bisphenol A, CAS No. 80-05-7, is used as a monomer in, inter alia, the following relevant areas and products: Various plastic and epoxy mixes, various building parts, paint, varnish, glue (binding agents, hardeners) and polyol in the production of polyurethane. Bisphenol A can be released into the environment from the production process. Bisphenol A (BPA) is on the Candidate List of substances that may have serious effects on human health and the environment, and the goal is to eliminate emissions by 2020.[19] 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 F and S can be used as substitutes for bisphenol A. A screening programme conducted to determine the occurrence of environmental toxins in surface water, sediment and biota in Norway found bisphenols A, F and S in the samples that were taken[20]. These are substances with the same properties as bisphenol A26.

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

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 DNA28. Exposure to these products should be minimised. For this reason, no more than 1% by weight is permitted in the chemical product.[21]

Organotin compounds mainly originated from antifouling paints, but more commonly used as catalysts in industrial production, stabilizers, biocides, and surface disinfectants. Organotin compounds are harmful and toxic to the aquatic organisms at low concentration and have been linked to adverse effects in humans, such as reproductive toxicity and therefore many of these compounds are listed as substances of very high concern.

The list is based on the general principles from Nordic Ecolabelling regarding undesirable compounds in combination with corresponding requirements for Nordic Swan Ecolabel indoor paints and varnishes and chemical building products. A few exemptions are made when deemed necessary for the functioning of the chemical product.

An exemption is given for the use of naphtha-based primers and adhesives classified H411 for outdoor use (containing up to 20% by weight of VAH). This is needed to ensure proper attachment. No alternatives have been found.

Dibutyltin (DBT) compounds and dioctyltin (DOT) compounds is allowed in sealing products ≤5000 ppm (0.5% by weight) in the final product as no alternatives are currently available.

[19] https://tema.miljodirektoratet.no/no/Tema/Kjemikalier/Miljogifter/Bisfenol-A/
[20] Screening programme 2013: New bisphenols, organic peroxides, fluorinated siloxanes, organic UV filters and selected PBT substances, The Norwegian Environment Agency, Report M-176/2014
[21] 8 Environ Health Perspect. 2002 June; 110 (Suppl 3): 451-488.

Exemptions are made for 2,2-dibromo-2-cyanoacetamide (DBNPA, CAS. No 10222-01-2) and Butylated hydroxytoluene (BHT, CAS. no 128-37-0) up to 100 ppm in the final product. This is similar to the criteria for Nordic Swan Ecolabelled paint generation 4. For further background refer to that criteria.

3-iodo-2-propynyl butylcarbamate (IPBC): Exempted due to its essential biocidal function as a preservative and film protector. Its use is regulated through specific concentration limits, ensuring controlled application and minimised exposure. The exemption prevents burden shifts by allowing effective preservation within strict limits, reducing the risk of product degradation, microbial growth, and the need for more hazardous or less efficient alternatives.

The exemptions for Finland for spray polyurethane foam and fire-resistant urethane foam are due to Finland's fire-safety requirements and strict requirements for moisture control, which influence the national construction methods. According to the Finnish fire safety regulations sealing solutions that leave shrinkage gaps and flexible openings under thermal deformation are not accepted. Based on discussions with manufacturers and the construction industry, the requirements from municipalities are stricter in Finland than in other Nordic countries, particularly regarding the moisture prevention and sealing of building joints. That is why NSE has found it necessary with this national exemption.

Background O26: Nanoparticles in chemical products

There is still uncertainty related to how nanoparticles affect health and the environment.[22] Nordic Ecolabelling wishes to take a restrictive approach to the use of nanoparticles and the requirement is based on the environmental consequences when nanoparticles are released to the surroundings (indoor environment or the surrounding environment, seen over the entire life cycle). The requirement concerns chemical products that are used to produce Nordic Swan Ecolabel buildings and is in line with equivalent requirements concerning Nordic Swan Ecolabel chemical building products.

The definition of nanomaterials follows the European Commission's definition of nanoparticles[23], see Definitions.

The requirement means that newer nanomaterials produced with the intention of containing nanoparticles must not be used. Examples of such nanoparticles are fullerenes, carbon nanotubes, nano silver, nano copper, and nano-titanium dioxide.

[22] European Council, Recommendation 2017 (2013), Provisional version, Nanotechnology: balancing benefits and risks to public health and the environment. Available on page: (21/5-13).
[23] COMMISSION RECOMMENDATION of 18 October 2011 on the definition of nanomaterial (2011/696/EU).

10.3 Construction products – restricted material

Background O27: Epoxy relining

Relining may be an option if the piping system is in poor condition, but the outer layer is in good condition, in spaces that are difficult to access or where a change of pipes would be too disruptive to the business, for example in a hospital.

Epoxy, which can contain and emit Bisphenol A (BPA), is or has been used for relining domestic water pipes and wastewater pipes. 3,000 apartments in Sweden whose domestic water pipes have been relined with epoxy have been inspected and the findings show that BPA is present in both drinking water and hot water. The highest levels of BPA were found in the hot water [24].

BPA has hormone disrupting properties and is on the EU candidate list. Nordic Ecolabelling prohibits the use of both one and two component epoxy as there are alternative non-epoxy methods on the market. The ban by Swedish law only applies to relining of domestic water pipes. The ban by Nordic Ecolabelling also applies to relining of wastewater pipes. Nordic Ecolabelling does not take a stance through its requirement on whether pipes for domestic water or wastewater should be replaced with new ones or if relining is an acceptable alternative. On the other hand, Nordic Ecolabelling prohibits the use of epoxy for relining as it poses a risk of increasing the spread of the endocrine-disrupting substance BPA. Subsequently, other forms of bisphenol (e.g. bisphenol S and F) are also prohibited.

Other materials used for relining domestic water pipes include silicon-based materials, which are the most common, and cement-based materials. These do not have the negative environmental and health properties that epoxy has.

Nordic Swan Ecolabelled renovated buildings protect human health and the environment by ensuring that endocrine-disrupting bisphenol from epoxy cannot migrate to drinking water or through wastewater to sewage treatment plants from relined pipes.

Background O28: Halogen free cables

Nordic Ecolabel wishes to limit the use of PVC cables to reduce the harmful environmental and health risks related to them. This requirement focuses on cables that can affect the indoor environment due to the content of plasticisers.

The market for and use of PVC-free cables have been accessed and the products are widely available in all Nordic countries. Halogen-free cables are often put as a requirement for larger private investors and in public projects.

The cables must be documented as halogen-free according to EN 60754-1, EN 60754-2 or EN 63355. Tests according to the older standard EN 50267-2-3 use the same test method and can also be accepted although the standard has expired. An obligatory requirement for sewage pipes and electrical cable conduits has not been introduced, since these products are made from hard PVC and can be handled in the existing waste system. Furthermore, electrical cable conduits,

[24] Release of bisphenol A (BPA) in the renovation of domestic water pipes. Report from a government commission. Report no. 7/13. Swedish Chemicals Agency (Kemkalieinspektionen) 2013.

which are not made of PVC, contain varying concentrations of brominated flame retardants, which are also problematic in relation to the indoor environment.

Cables in the classes, Dca, Cca and Bca according to EN 13501-6 must always be tested for halogens according to 60754-1,-2. In addition, they must be verified by a third party. Halogen-free additional parameters in 13501-6 are a1, a2 or a3. Only parameter a3 can contain halogens above the threshold limits specified by the NSE. Therefore, additional parameter a1 and a2 specified in the DoP are accepted as a proof of a halogen free cable.

In the case of the Eca class, appendix 8 and testing according to standards EN 60754-1,-2 must be applied.

Background O29: Surface layers on floors, ceilings, walls, doors, and windows.

The requirement covers interior doors and surface layers on floors, ceilings and walls including both PVC and PVDC as a material or component. The latter may involve cork flooring coated with a thin outer layer of PVC or textile flooring with a PVC backing.

PVC (polyvinyl chloride) is one of the most widely used thermoplastic materials. Nordic Ecolabelling has traditionally been taking a restrictive position in relation to PVC due to emissions of harmful organic chemicals from manufacturing and waste management, as well as emissions of potential endocrine disrupters such as phthalates in the use stage.

It is worth noticing that PVC products today can be produced in a much more circular way as additives such as phthalates and lead/cadmium-based stabilisers can be replaced by non-hazardous alternatives. Issues associated to PVC products end-of-use are being addressed, as both techniques to safely incinerate PVC waste and handle neutralisation residues in a responsible manner exist, while take-back, collection, identification, and separation processes to increase the amount of PVC which is recycled, already exist or are being developed. It will however require a relatively extensive list of requirements to regulate the PVC used in buildings according to this. Nordic Ecolabelling will follow the development closely but do not currently see the possibility to allow PVC more generally without overcomplicating the criteria for New Buildings. Exemptions are made for areas or surfaces with specific needs for high durability or slip resistance (related to working environment legislation) and for smaller details.

When Nordic Ecolabelling's criteria for floor coverings (gen. 7) are revised and published, requirements for surface layers on floors may be adjusted according to these requirements.

Background O30: Durable wood for outdoor use

The purpose of the requirement is to limit the use of chemical wood preservative containing heavy metals and biocides. Nordic Ecolabelling recognises that it can be a challenge to use untreated wood where the exposure to weather is high. Therefore the requirement allows impregnated wood in exposed uses. It is only the applications specifically listed as not allowed that are restricted from use. That means that e.g. pergolas, outdoor furniture, playground equipment is not restricted in this requirement. However, requirements O33 must still be fulfilled

for all these materials, which means that NSE steer towards the least harmful chemicals within the category of impregnated wood.

The reason that playground equipment is not restricted (apart from O33) is that the experience is that it can be very difficult in practice. This is due to the fact, that playground equipment often consists of materials in different Use Classes (often UC 3 and UC4 in mixture). Impregnated wood in UC 4 is generally accepted by NSE and it is difficult to enforce a requirement where several different types of impregnated and non-impregnated wood is used is several different places. Furthermore, this product areas has a high risk of steering towards more climate intensive materials such as steel or concrete.

Nordic Swan Ecolabelled chemically chemically or thermally modified wood automatically fulfils the chemical requirements in O33.

Background O31: Copper

The largest sources of copper spreading into the environment are via tap water and road traffic. Sheet metal on the outside of buildings (roofs and facades) and contact cables for the railway are also relatively large sources. The primary recipients of the copper differ. For water mains, it is the sewage treatment plant, while the distribution of copper in road traffic primarily ends up in stormwater and soil. A predominant percentage (60–80%) of the copper entering the treatment plants originates from tap water pipes in properties.

A large part of the copper that reaches the treatment plants via wastewater ends up in the sludge. Unfortunately, the general positive trend for reduced levels of metals in the sludge does not apply to copper and zinc. One reason is that copper is largely built into the infrastructure and it is therefore not as easy to reduce the supply of copper as it is for other metals that should be reduced in the cycle. The Swedish Environmental Protection Agency states that the copper levels found in arable land do not show negative microbiological effects, but that the margin is small. Both the background content of copper and local factors varies across the country. To provide general protection against the effects of copper, it is therefore justified to have stricter requirements regarding copper for the return of sludge. The Swedish Environmental Protection Agency further states that the supply of copper must specifically be reduced for sludge to be recycled in a manner that is sustainable in the long term. This is important as increased recycling of phosphorus from sludge is desirable from a resource efficiency and recycling point of view. This is the primary reason why Nordic Ecolabelling wants to limit copper as a material in tap water pipes and as a roof and facade material.

A study carried out by SYKES[25] on behalf of the Finnish Ministry of Employment and Economic Affairs concludes that the negative effects of the supply of copper to the environment through sludge returned to agricultural land are not a general Nordic problem. This is correct. However, the problem is not limited to the Stockholm area, which is incorrectly pointed out in the investigation. On the contrary, copper is a limiting factor for returning sludge to arable land in large parts of Sweden. Nordic Ecolabelling has concluded that it is not relevant to

[25] Jyrki Laitinen and Riikka Malila, Finish Environment Institute, Sustainable Water Management, Assessment of pipe material used in buildings, Carbon footprint and health and toxicity effects, November 2020.

write geographically adapted requirements. Therefore, a general Nordic restriction requirement remains in the criteria.

Background O32: Plastic and rubber surfaces on playgrounds and outdoor areas

Nordic Ecolabelling wishes to minimise the use of plastic and rubber ground cover materials but recognises the need for impact attenuating surfaces accessible to people with disabilities and therefore work with restrictions rather than prohibitions.

Artificial turfs with loose infill of granules and mulches have been identified as major sources of microplastic pollution.[26],[27]. Granules and mulches are often made from recycled tyres (SBR) and can contain several potentially hazardous substances, including polycyclic aromatic hydrocarbons (PAHs), metals and phthalates.[28] REACH sets limit values for eight PAHs which cannot be exceeded by granules and mulches put on the market[29]. These eight are however only a small part of the over 300 identified substances found in SBR rubber granules. ECHA recommends further investigation into the effects on health and environment for some of these substances[27]. Nordic Ecolabelling has prohibited the use of rubber from recycled tyres (SBR) to reduce undesired substances.

Plastic- and rubber-based ground cover also comes in the form of granules held together by polymer-based binders. These materials are cast on the site using isocyanate binding agents or delivered as prefabricated mats or tiles that are screwed or glued to the underlay and sometimes covered by a layer of artificial turf glued on top. Although the granules are bound together, there will be spread of microplastics due to wear on the surfaces[30]. Alternative products containing cork or other natural materials instead of synthetic rubber granules are potentially less severe sources of microplastic, since only the binding agent is plastic. The materials also reduce the spread of undesired substances that can still be present in plastic and rubber materials even if they are free from recycled SBR. Wood chips or bark covered with rubber or plastic materials may not be used since they contain synthetic components but are not suitable for accessibility reasons.

Nordic Ecolabelling wishes to minimise the use of isocyanates on the construction site. The isocyanate binding agents and glues used for installation of the impact attenuating surfaces typically do not comply with the chemical requirements O17 and O18 and they are only accepted in this application, with restrictions, since there is a lack of alternatives for accessible surfaces. The commission regulation EU 2020/1149 will be implemented during the summer 2023 according to our information. For the PU products exempted this means that no additional working environment requirements will be implemented. This should be handled satisfactory according to this new legislation.

[26] https://www.ivl.se/download/18.34244ba71728fcb3f3f9f0/1591705616592/C183.pdf
[27] https://www.miljodirektoratet.no/globalassets/publikasjoner/m954/m954.pdf
[28] Granules and mulches on sports pitches and playgrounds – ECHA (europa.eu)
[29] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021R1199&from=EN
[30] https://www.ivl.se/download/18.57581b9b167ee95ab9919a1/1552466299144/C359.pdf

10.4 Construction products – ingoing substances and emissions

Background O33: Excluded substances in construction products, construction goods and materials

The requirement comprises two parts. First comes a description of which construction products are included, i.e., those for which the chemical content must be verified. The purpose is to focus on the most important construction supplies and thereby the material within the vapour barrier (moisture barrier), supplemented with known problematic material outside the vapour barrier. The second part of the requirement concerns a list of the substances/groups of substances that may not be contained in these construction supplies in quantities of 100 ppm or more.

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 construction products. Please see background for O25 for details on the substances banned in this requirement. A few exemptions are made when deemed necessary for the quality and technical performance of the product.

Textile coverings for floors, ceilings and walls are added as a new product type since they are highly relevant in offices. Textile flooring may contain chemical substances from production that can affect the indoor environment – this is especially relevant due to the large surface areas of textile flooring and because the products are not washed before usage. Textile flooring is often produced outside the EU and there is no regulation specifically for these products, meaning that the general rules in REACH apply. Relevant substances are phthalates, PFAS, aldehydes and a range of other VOC[31]. Nordic Ecolabelling focuses on setting strict chemical requirements for the known problematic substances in the textile flooring, thereby limiting exposure to these substances for the end-user. Emission testing is not a requirement as the main environmental and health effects in relation to the relevant chemicals are considered to be handled in the general chemical requirements. All products used on floors, ceilings or walls are covered by the requirement.

Drainage pipes are no longer covered by the requirement as the materials used (PP, PE and (hard) PVC) are found to have little relevance regarding the chemical substances regulated in the requirement. Plastic pipes for drinking water are not regulated by Nordic Ecolabelling, as national legislation and certification systems already set requirements for these products (e.g., GDV in DK and Rise/Kiwa in SE).

The time-limited exemption for TCPP and TEP in PIR insulation was introduced since the substances were placed on the EU member state initiative Endocrine Disruptor Lists (I, II, III) during the validity period of the criteria. TCPP and TEP are used as flame retardants and the PIR industry needs time to develop alternative flame-retardant substances. The construction industry cannot replace PIR immediately since it would affect building design and building permits.

[31] Kortlægning og risikovurdering af kemiske stoffer i gulvtæpper til børn, Kortlægning af kemiske stoffer i forbrugerprodukter nr. 147, 2016.

Background O34: Antimicrobial surface treatments

Antimicrobial (e.g., antibacterial, or antiviral) treated products are often marketed as preventing bacteria or viral formation, growth, and odours. Yet antimicrobial treatment is often not needed, and many of its methods must be used with caution, since they can be hazardous to human health and the environment. Antimicrobial substances are biocides. Increased use of biocides can lead to bacteria becoming resistant to agents that are necessary for hygiene and health in other contexts.

The general requirement in generation three of the criteria regulating nanotreatment of construction products has been removed. By assessing the licensing data and the general state of the market, it has been concluded that the primary effect of the nano requirement was to regulate antimicrobial treatments. This is handled in this new requirement. Furthermore, the work from the Swedish National Platform for Nanosafety concludes in their report "Nanomaterial i byggbranschen" that nanomaterials have a limited use within the building sector today. Nordic Ecolabelling will consider regulating this area again if the situation changes over time.

The applicant must gather the necessary information from suppliers of the relevant construction products to ensure that the requirement is met, e.g. by requiring in contracts with suppliers that the requirement is met.

Background O35: Formaldehyde emissions

In August 2026 NSE decided to remove the requirement for formaldehyde emissions in the criteria for New Buildings and Renovation.

Formaldehyde is restricted on the market in articles after 6 August 2026, under the test conditions specified in Appendix 14 (REACH), if the concentration of formaldehyde released from those articles exceeds (REACH, annex XVII): 0,062 mg/m3 for furniture and wood-based articles. The legislation limit will from august 2026 therefore be stricter than the level set in generation 4 of the criteria for New Buildings. The new legislation level is also close to the level defined for formaldehyde in activity 7.1/7.2 in the EU Taxonomy (0,06 mg/m2). NSE finds this level to be sufficiently strict and do not see a potential for a stricter requirement for the time being. Furthermore, it is in general not the role of NSE to control compliance with legislation. Therefore the requirement is removed in 089 New Buildings and 102 Renovation of buildings.

10.5 Ecolabelled products

Background O36: Ecolabelled products

In their life cycles, construction materials have been shown to contribute to environmental impacts such as energy and resource consumption, undesirable chemical risks, and negative effects on biodiversity. The criteria for ecolabelled construction materials set requirements for environmental parameters throughout the product's life cycle, having a relevant environmental impact that can be reduced and documented in relation to ecolabelling. To be able to make a difference, it is important that a Nordic Swan Ecolabelled building uses a certain amount of the building products with a reduced environmental impact that are available in the market. Construction materials, in a variety of product categories with the Nordic Swan Ecolabel and the EU Ecolabel are available in all Nordic markets, which makes it easier to promote their use in Nordic Swan Ecolabelled buildings. The building materials represent an increasingly larger share of the environmental burden, and the product decisions in a project give a significant environmental effect. This is the main reason for our decision to change the requirement (from version 1 to 2 of the criteria document), to an obligatory one, thereby encouraging projects to buy more ecolabelled products in Nordic Swan Ecolabelled renovation projects.

11 Wood raw materials

Background O37: Prohibited and restricted tree species

A number of tree species are restricted or not permitted for use in Nordic Swan Ecolabelled buildings. The requirement applies only to virgin forest tree species and not tree species defined as recycled material according to ISO 14021. The list of restricted tree species is based on the wood species that are relevant to Nordic Ecolabelling's criteria, i.e., tree species that have the potential to be included in Nordic Swan Ecolabelled products. Listed tree species are indicated by the scientific name and the most common trade names.

The criteria for tree species found in the list relate to wood originating from:

- Tree species listed on CITES[32] Appendices I, II and III.
- IUCN red list[33], categorised as critically endangered (CR), endangered (EN) and vulnerable (VU).
- Regnskogsfondet[34] (Rainforest Foundation Norway) tree list
- Siberian larch (originating in forests outside the EU)

Many of the tree species on the list are grown in countries which still have large areas of Intact Forest Landscapes (IFLs). Protecting these is important for biodiversity and climate. Many of these countries also have a high risk of corruption and the national legislation related to the environment, human rights

[32] https://www.cites.org/ (visited January 2020)
[33] http://www.iucnredlist.org/ (visited January 2020)
[34] https://www.regnskog.no/no/hva-du-kan-gjore/unnga-tropisk-tommer/tropiske-treslag (visited January 2020)

and land ownership are weak and/or not controlled 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. Due to the uncertainty about whether FSC and PEFC certification systems are good enough in protecting 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 wants further documentation about the tree species and its origin.

Nordic Swan Ecolabelling is aware that tree species originating from b, c or d can originate from legal and sustainable forestry. Therefore, it is possible to use tree species listed in b, c or d if the applicant/manufacturer/supplier can demonstrate compliance with a number of strict requirements regarding certification and traceability.

Background O38: Wood and bamboo, traceability and certification

The intention is to include wood products used in the largest volumes in the construction of the building. Nordic Ecolabelling requires that wooden construction elements must come from sustainable forestry through requirements to traceability and certification. The requirement for Chain of Custody certification contributes to traceability in the supply chain within FSC and PEFC's control systems for traceability. Both the FSC and PEFC schemes allow several methods to verify the traceability: physical separation method, percentage-based method, and volume credit method. Nordic Ecolabelling accepts all FSC and PEFC's methods to verify traceability and the share of certified and controlled wood/sources. Suppliers of recycled material are exempted from the requirement regarding Chain of Custody certification.

It is possible to use a supplier that is not CoC-certified as not all small/local suppliers are certified. In such cases, it should be documented that wood raw materials are purchased from certified areas.

Applicants must document that at least 70% by weight or volume of all wood raw materials and bamboo used in the Nordic Swan Ecolabelled building comes from forestry certified under the FSC or PEFC schemes or is recycled material. The remaining proportion of wood must meet the requirements of FSC controlled wood or PEFC controlled sources or be recycled. The requirement limit, a minimum of 70% of all wood raw material (virgin or recycled), correspond to the FSC and PEFC's requirement limits for use of the respective labels on products, such as "FSC Mix" and "PEFC certified".

The applicant must demonstrate that the quantity of certified wood raw material or recycled material is met. The certification shall be documented through invoices/delivery notes from suppliers or an aggregated signed list from suppliers. The invoices/aggregated signed list must contain information on: CoC codes, name of tree species, type of product items, FSC/PEFC claims such as FSC MIX 70% or FSC 100% for each product item and quantities of wood raw materials. In the case of an aggregated signed list, Nordic Ecolabelling may ask for copies of invoices to confirm the proportion of certified timber purchased.

12 Quality management of the demolition and construction process

Background O39: Moisture prevention

Moisture problems in buildings have environmental, health and financial effects. A building's lifetime might decrease due to moisture problems, with an increased need for renovations. Moisture in buildings increases the risk of respiratory infections and illness such as asthma and respiratory irritation.

Exposure of construction materials to moisture can lead to mould and increased emissions of volatile chemical substances. Timber structures and concrete slabs must be sufficiently dry before further installation of the surface layer. Materials and construction elements must be sufficiently weather protected during transport to the construction site and storing at the construction site. The building and its water- and sewage installations must be designed to minimise the risk of water damage from drip leakage.

Moisture measurements are needed to ensure compliance with the target values required by the manufacturer of the surface material. Surface moisture measurements are not sufficient to determine whether the concrete slab is dry enough, hence borehole/specimen measurements are required.

Background O40: Compliance with material and chemical requirements

The requirement is intended to ensure fulfilment of the chemical and materials requirements at various stages of the process, and between the different parties involved. Many questions may arise during the process. How should communication take place? Who requests attestation of products and chemicals, and how early? Who must be informed when products do not fulfil the requirements and approve any cost increases or delays? How should reconciliations be made? This requirement ensures that these questions are assessed early in the process by defining a set of routines that will contribute to improving control over the chemicals, materials and construction products used in the project.

Background O41: Information for those involved in the construction process

The requirement covers the need for the licence applicant to define the training programme, showing the content and scope of the training/information. The aim is to provide information on the Nordic Ecolabelling requirements and how the requirements can affect standard processes and routines. All employees, supervisors, site managers, subcontractors and sub suppliers involved in the construction of a Nordic Swan Ecolabelled renovated building must have the relevant knowledge to be able to ensure fulfilment of the requirements in conjunction with the project.

Background O42: The contractor's self-monitoring system (construction phase)

The requirement aims to ensure a solid quality self-monitoring system for the construction of the Nordic Swan Ecolabelled building. The focus is on documentation, communication, and inspection through the construction period. The requirement is designed to include the most critical elements in a typical best-practice self-inspection system in the Nordics.

Background O43: Planned changes and non-conformities

Planned changes and unforeseen non-conformities affecting Nordic Ecolabelling's requirements must be reported to Nordic Ecolabelling immediately. This must be done in accordance with the licensee's commitment.

13 Changes compared to previous generation

Table 1 Overview of requirement changes in generation 2 compared with generation 1.

Generation 2		Generation 1		
No	**Name**	**No**	**Name**	**Change**
O1	Outline description of the renovation project	O1	Outline description of the renovation project	Updated and adjusted requirement.
O2	Hazardous material survey and report	O4	Environmental analysis/survey and remediation plan	Threshold limits are updated. Stating how the hazardous waste is now the remediation contractor responsibility.
O3	Follow-up of hazardous material report	O7	Follow-up of remediation plan	Clarified and updated. Remediation contractor must specify how the hazardous waste is removed.
O4	Moisture survey	O5	Moisture survey	Updated and adjusted, previous appendix removed. Possible to survey parts of the building when relevant.
O5	Radon	O9	Radon	Introduced more ways to document radon levels. Stricter limits for Finland.
O6	Mapping of components and materials suitable for reuse	O3	Building condition assessment and plan for resource use	The building condition assessment part is removed. Specified what should be included in the report from the mapping.
O7	Plan for reuse			New requirement.
O8	Selective demolition			New requirement.
O9	Plan for the indoor air quality	O8	Indoor air quality	Clarified and updated. Previous appendix removed.
O10	Measurement of PCB levels in indoor air	O12	Measurements of PCB levels in indoor air	Basically unchanged.
O11	Waste management	O6	Waste plan and waste management	The requirement has been harmonised with Nordic Swan Ecolabelled New buildings. A new mandatory level for the handling has been introduced. Selective demolition implemented according to EU Taxonomy.
O12	Hazardous substances in reused construction products and materials	O30	Requirements for reused construction products	The requirement has been harmonised with Nordic Swan Ecolabelled New buildings.
O13	Waste sorting inside the building			New requirement (similar to Nordic Swan Ecolabelled New buildings).

O14	The energy use of the building	O14	The energy requirements of the building after renovation	Introduces more ways to document energy use, the alternatives are adjusted to EU Taxonomy and protected buildings and buildings worthy of preservation.
O15	Lighting management	O15	Lighting	Requirement is only obligatory when activated. Harmonised with Nordic Swan Ecolabelled New buildings. Hotels and conference facilities are included.
O16	Energy efficient white goods	O16	Energy-efficient white goods	Requirement is only obligatory when activated. Harmonised with Nordic Swan Ecolabelled New buildings.
O17	Cement and concrete			New requirement (relatively similar to Nordic Swan Ecolabelled New buildings).
O18	Steel production			New requirement (relatively similar to Nordic Swan Ecolabelled New buildings).
O19	Aluminium production			New requirement (relatively similar to Nordic Swan Ecolabelled New buildings).
O20	Logbook	O17	Product list and logbook of the building	Harmonised with Nordic Swan Ecolabelled New buildings.
O21	Classification of chemical products	O18	Classification of chemical products	Harmonised with Nordic Swan Ecolabelled New buildings.
O22	CMR substances	O19	CMR substances	Harmonised with Nordic Swan Ecolabelled New buildings.
O23	Preservatives in indoor paint and indoor varnish	O20	Preservatives in indoor paints and varnishes	Harmonised with Nordic Swan Ecolabelled New buildings.
O24	Preservatives in other chemical products intended for indoor use	O21	Preservatives in other chemical products for indoor use	Harmonised with Nordic Swan Ecolabelled New buildings.
O25	Prohibited substances	O22	Other substances excluded from use	Harmonised with Nordic Swan Ecolabelled New buildings.
O26	Nanoparticles in chemical products	O23	Nanoparticles in chemical products	Harmonised with Nordic Swan Ecolabelled New buildings.
O27	Epoxy relining	O28	Epoxy relining	Unchanged.
O28	Halogen free cables			New requirement. Harmonised with Nordic Swan Ecolabelled New buildings.
O29	Surface layers on floors, ceilings, walls, doors, and windows	O27	Construction products made of polyvinyl chloride (PVC)	Harmonised with Nordic Swan Ecolabelled New buildings.
O30	Durable wood for outdoor use	O34	Durable/resistant wood for outdoor use	Harmonised with Nordic Swan Ecolabelled New buildings.
O31	Copper	O29	Copper in domestic water pipes and as façade and roofing material	Harmonised with Nordic Swan Ecolabelled New buildings.
O32	Plastic and rubber surfaces on playgrounds and outdoor areas			New requirement. Harmonised with Nordic Swan Ecolabelled New buildings.
O33	Excluded substances in construction products, construction goods and materials	O24	Excluded substances in construction products, construction goods and materials	Harmonised with Nordic Swan Ecolabelled New buildings.
O34	Antimicrobial surface treatments	O25	Nanoparticles and antibacterial additives in construction products and construction goods	Harmonised with Nordic Swan Ecolabelled New buildings.
O35	Formaldehyde emissions	O26	Formaldehyde emissions	Harmonised with Nordic Swan Ecolabelled New buildings.
O36	Ecolabelled products			New requirement.

O37	Prohibited and restricted tree species	O32	Tree species that may not be used in Nordic Swan Ecolabelled renovations	Harmonised with Nordic Swan Ecolabelled New buildings.
O38	Wood and bamboo, traceability, and certification	O33	Wood raw materials	Harmonised with Nordic Swan Ecolabelled buildings.
O39	Moisture prevention	O10	Moisture prevention	Harmonised with Nordic Swan Ecolabelled New buildings.
O40	Compliance with material and chemical requirements	O37	Management of requirements for products and materials	Harmonised with Nordic Swan Ecolabelled New buildings.
O41	Information for those involved in the construction process	O38	Information to those involved in the renovation process	Harmonised with Nordic Swan Ecolabelled New buildings.
O42	The contractor's self-monitoring system (construction phase)	O39	The contractor's self-monitoring	Harmonised with Nordic Swan Ecolabelled New buildings.
O43	Planned changes and nonconformities	O43	Planned changes	Similar approach

New criteria

The following are themes that will be considered in further detail in generation 3 of the criteria:

- Improving the alignment with the EU Taxonomy.
- Review of the metal requirements.
- Evaluate the possibility to strengthen the design for disassembly requirements.
- Evaluate the potential for further implementation of reused materials and products.
- Inclusion of other building types
- Review of the threshold limit for construction waste management, and review of the alignment with the waste hierarchy.