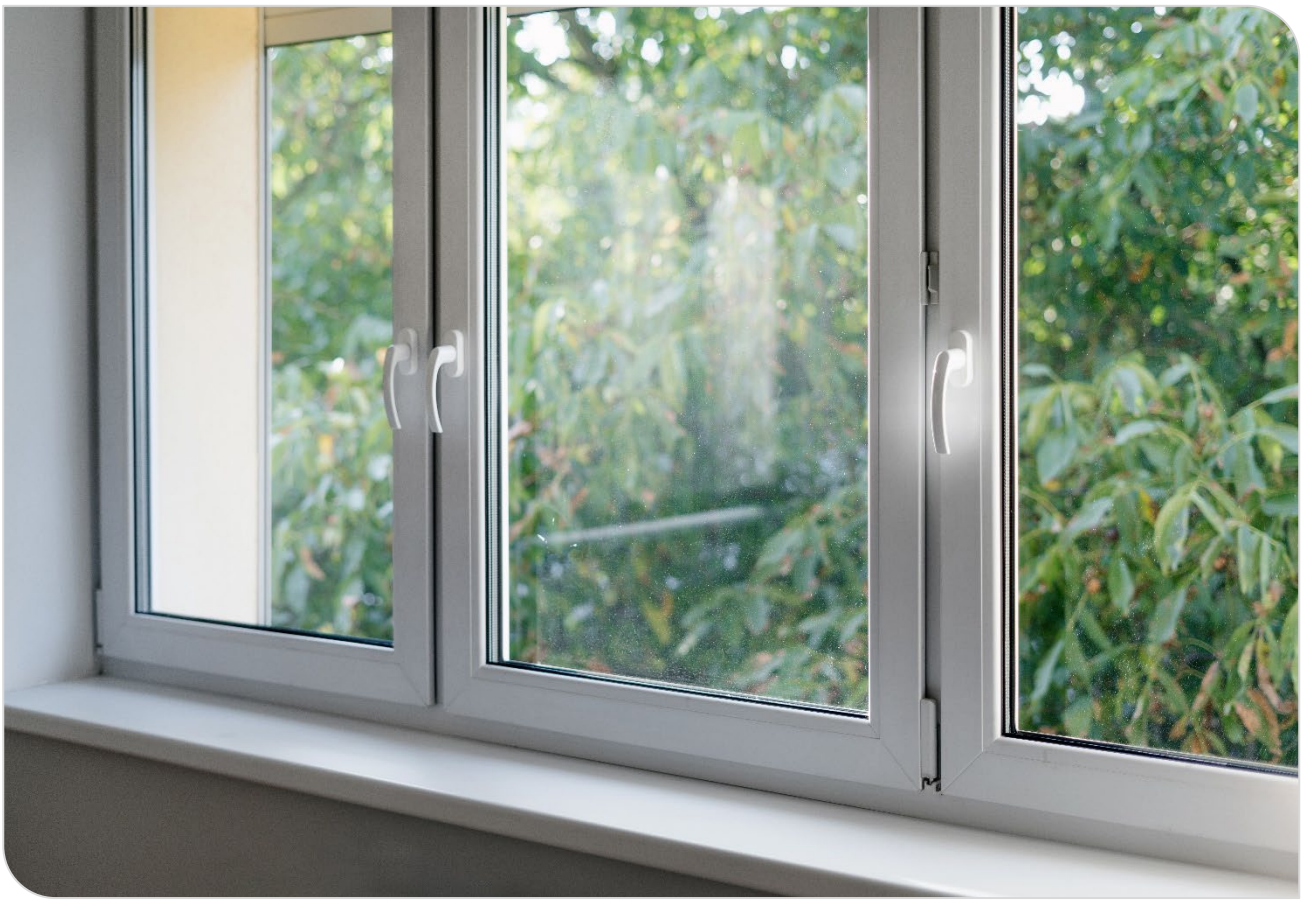
Nordic Ecolabelling for

Windows and External Doors



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Consultation

Nordic Ecolabelling

Content

062 Windows and External Doors, version 5.0, 13 June 2024

Contact information

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

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What is a Nordic Swan Ecolabelled Window and External Door?

Nordic Swan Ecolabelled windows, window doors and external doors have a reduced environmental and climate impact throughout their life cycle. Nordic Ecolabelling has assessed all the relevant environmental aspects throughout the life cycle of these products and made strict requirements concerning the topics and processes in the life cycle where ecolabelling can have the greatest effect.

Nordic Swan Ecolabelled windows, window doors and external doors:

- Have a low climate impact due to low energy losses through the windows and doors
- Meet strict requirements for materials and chemicals
- Contribute to circular economy through design for disassembly, use of systems for material recycling/take-back, recycling of float glass into new float glass and production waste management
- Must document good function and quality
- Offer a long service life
- Have a warranty for 20 years against wood rot for windows and window doors
- Have clear instructions for installation and maintenance

What can carry the Nordic Swan Ecolabel?

Nordic Swan Ecolabelled products are windows, window doors and external doors which separates the internal climate from the external climate of a construction.

Nordic Ecolabelling's Criteria for Windows and External Doors cover products pursuant to standard EN 14351-1. This means that the following products may carry the Nordic Swan Ecolabel:

- Fixed and opening facade and roof windows (manual or electrically operated).
- Window doors (e.g. balcony and terrace doors).
- External doors.

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

- Windows, window doors and external doors not covered by the standard EN 14351-1. This applies, for example, to windows and external doors that are resistant to fire under standard EN 16034.
- Hallway doors, attic doors and doors to warm and cold storage rooms as they are not subject to the same requirements for insulation capacity.
- Interior doors as they can be labelled under the Nordic Ecolabelling criteria for the product group Furniture and Fitments.

The frame, casement and door leaf in Nordic Swan Ecolabelled windows, window doors and external doors must be made from the following materials:

- wood
- metal, aluminium or steel
- a combination of these materials, e.g. wooden windows with aluminium cladding or windows with combined wooden and aluminium casement

PVC is **not** allowed as a primary material to be used in frames, casements and door leaves in Nordic Swan Ecolabelled windows, window doors and external doors.

Windows, window doors and external doors manufactured from primary materials other than those listed above must be assessed by Nordic Ecolabelling before they possibly can be considered for labelling. Nordic Ecolabelling will determine which new materials that possibly may be included in the product group.

How to apply

Application and costs

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

What is required?

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

In this criteria document each requirement is marked with the letter O (obligatory requirement) and a number. All requirements must be fulfilled to be awarded a licence.

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

✉ Enclose

All information submitted to Nordic Ecolabelling is treated confidentially. Suppliers can send documentation directly to Nordic Ecolabelling, and this will also be treated confidentially.

Licence validity

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

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

On-site inspection

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

Queries

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

1 Summary

The Nordic Ecolabelling criteria for windows, window doors and external doors have been revised to generation 5. Nordic Swan Ecolabelled windows and doors must comply with strict requirements to reduce the environmental and climate impact throughout the whole life cycle. Nordic Swan Ecolabelled windows and doors have a low climate impact due to low energy losses through the windows and doors, strict requirements for the materials and chemicals used, good function and quality, long service life and contribution to circular economy through design for disassembly, use of systems for material recycling/take-back, recycling of float glass into new float glass and use of production waste management.

Window and doors' ability to minimize heat loss is most important to reduce the products impact in a life cycle. Strict requirements concerning thermal transmittance (U-value), air permeability and climate testing have therefor been established. The daylight transmittance limit has been slightly increased to ensure sufficient amount of daylight that enters through a window/window door.

As use of raw materials and chemicals has a large environmental impact in the production phase, Nordic Swan Ecolabelled windows and doors must comply with strict requirements for the wood, metals, isolation materials and chemicals used for the production. PVC is **not** allowed as a primary material to be used in Nordic Swan Ecolabelled windows and doors. And there are no material requirements for the glass material used in window glass/insulation glass units as the market for float glass made with recirculated glass, is still very limited.

Production of windows and doors made with vacuum impregnation and/or surface treatment using organic solvents, results in emissions of volatile organic compounds (VOC) to air. Strict limit levels regarding VOC-emissions from solvent-based wood impregnation and surface treatment must be fulfilled.

The criteria have also been updated from a circular economy point of view with new requirements for recycling of float glass from the production into new float glass and requirements to improve material recycling from windows and doors by end-of-life.

Long service life will reduce the environmental impact from windows and doors significantly, and to offer a long service life, Nordic Swan Ecolabelled windows and doors must document good function and quality and have clear instructions for installation and maintenance. A requirement for a warranty of 20 years against wood rot for windows and window doors, has also been introduced.

For an overview of the changes in this revised generation 5, see the table in section 5.

2 Environmental Impact of Windows and External Doors

As a basis for the criteria development, Nordic Ecolabelling has performed a MECO-analysis and an RPS-analysis to evaluate the environmental impact from windows, window doors and external doors.

The purpose of the MECO-analysis (materials/resources (M), energy (E), chemicals (C) and other impact areas (O)) is to assess all the relevant environmental aspects throughout the life cycle of the windows, window doors and external doors, ref. MECO-analysis for Windows and Exterior Doors[1].

Nordic Ecolabelling sets requirements concerning the topics and processes in the life cycle that have a high environmental impact – also called hotspots. An RPS-analysis is used to identify where ecolabelling can have the greatest effect. R represents the environmental relevance; P is the potential to reduce the environmental impact and S is the steerability on how compliance with a requirement can be documented and followed up.

In the table below, the summary of the RPS is given. The aspects where the assessment concludes with high or medium RPS are those covered by requirements in the criteria. Background documentation for the assessments is Life Cycle Assessments[2,3,4] (LCAs), a SINTEF Byggforsk report[5], a prestudy for window renovation[6] and the background document for the previous version of the criteria[7]. The LCAs are made for windows, but it is assumed that most of the environmental impacts for windows, are applicable for external doors.

Table. Summary of the RPS-analysis

Lifecycle stages	Area and assessment of R, P, S (high, medium or low)	Comments
Raw materials		
	Consumption of material resources due to extraction and production of materials used in windows and doors. R: High P: High S: High	RPS = high The environmental impact on natural resources and energy demand from use of raw materials is high. To reduce the environmental impact, Nordic Ecolabelling wishes to drive the trend towards more material recovery and more use of renewable materials. Nordic Ecolabelling set strict requirements to non-renewable materials. We also set indirect requirements for use of more renewable materials via a differentiated U-value requirement for products made from renewable materials compared with non-renewables.

[1] MECO for Windows and Exterior Doors, Anita Øygarden Burgos, 26.09.2023
[2] LCA,"Whole Life Analysis of timber, modified timber and aluminium-clad timber windows", Dr. Gillian F. Menzies, Heriot Watt University, 2013
[3] LCA, «The influence of durability and recycling on life cycle impacts of window frame assemblies», Stephanie Carlisle and Elizabeth Friedlander, 2016
[4] «Analysing the environmental impact of windows: A review», Jean Souviron et.al. Building and Environment, 2019
[5] Project report, «Moderne trevinduer – funksjonalitet, levetid og design», Heidi Arnesen et.al. SINTEF Byggforsk, 2009
[6] "Forstudie om mulighetene for å svanemerke vindusbytte/-renovering", Nordisk Miljømerking, 25.04.2023
[7] Background Document for the 062 Criteria for Windows and Exterior Doors, Nordic Ecolabelling, 29.11.2022, version 4.15

	Energy used for material extraction and production. R: High P: Medium S: Low	RPS = low The environmental impact from energy used for material extraction and production is high, but the steerability is low. See also above.
	Transportation of raw materials to the material producer. Transportation of materials to the window and door producer. And transportation of windows and doors to sales location and finally to the consumers/installation location. R: High P: High S: Low	RPS = low Environmental impact from transportation of raw materials, materials and products is high. Unfortunately, Nordic Ecolabelling assesses the steerability of imposing requirements with regard to transportation as low.
	Loss of forest/biodiversity. R: High P: Medium S: Medium	RPS = medium It is relevant to impose criteria on wood raw material due to the environmental impact from loss of forest/biodiversity. Wood can be sustainably grown and can be sourced from areas where forestry is certified according to a certification system. Steerability is good through requirements for certification and traceability along the processing chain.
Production		
	Energy used for production of windows and external doors. R: Low P: Medium S: Medium	RPS = low As energy consumption is at its highest when the product is in use, rather than during production, Nordic Ecolabelling focuses on requirements relating to the window's or the door's thermal transmittance and air permeability. Nordic Ecolabelling believes that it is not relevant to impose direct energy requirements on the production.
	Emissions to air from solvent-based impregnation and surface treatment. R: High P: Medium S: Medium	RPS = medium Emissions to air from solvent-based impregnation and surface treatment have a clear environmental relevance and the steerability is good, which is why Nordic Ecolabelling has strengthened the requirements for VOC-emissions from the impregnation production process and keeps the requirement for emissions from the solvent-based surface treatment process.
	Emissions to working environment from chemical products like sealant, surface treatment, impregnation etc. R: Medium P: Medium S: Medium	RPS = medium Nordic Ecolabelling sets stricts requirements to all chemical products used in the production to reduce exposure to health hazards from chemicals during the production phase.
Use phase		
	Energy consumption for heating due to heat transfer/loss through windows and external doors. R: High P: High S: High	RPS = high Several LCA studies indicate that heat loss during the usage phase is the most important environmental impact of windows and external doors over the course of their life cycle. The thermal surface properties of windows and external doors are important in order to ensure energy efficient buildings.The steerability is high as it is possible to set requirements for the thermal transmittance (U-value) and the air permeability for windows and external doors.

		To reduce health impact, a minimum value is also included for the daylight transmittance to ensure a minimum amount of daylight that enters through a window/window door.
	Use of chemical products (oil, lacquer and paint) for surface treatment during production causing emissions to indoor climate and exposure to health hazards in the use phase. R: Medium P: High S: High	RPS = high Nordic Ecolabelling sets strict requirements to all chemical products used for surface treatment in the production to reduce exposure to health hazards from chemicals in the use phase.
End-of-Life		
	Service life. R: High P: High S: High	RPS = high Short service life for windows and external doors has a major environmental impact. Nordic Ecolabelling sets strict requirements for durability and functional testing.
	Landfill or incineration by end-of-life instead of material recovery/recycling R: High P: Medium S: Low	RPS = medium Large quantities of windows end up on landfill or incineration. By windows' end-of-life, sending the windows for landfill and/or incineration is today easier and cheaper than sending windows for disassembly and material recycling. Some recycling facilities and partnering projects exist with the aim to increase the material recycling of window materials and specially glass. The aim is to increase the amount of glass being used again as glass packaging and/or insulation (downcycling) but also as new float glass. Nordic Ecolabelling has requirements for design for disassembly and production waste management. In this generation a new requirement is also introduced to improve the producer's support to material recycling. Windows and doors must be sent to material recycling using national waste collection systems where such system exist. If such systems are not established, the producers must be in a process for establishing a take-back system.
	Contribution to the greenhouse effect due to leakage from windows of filler gases with GWP (Global Warming Potential). R: Low P: Low S: High	RPS = low The filler gases normally used for insulation in insulation glasses are argon, xenon and krypton. All are noble gases with GWP = 0. But as xenon and krypton require more energy for its production compared to argon, the requirement for filler gases is kept to stimulate to the use of argon rather than xenon and krypton.
	Reduced material recycling due to content of hazardous chemicals in the materials. R: Medium P: Medium S: Medium	RPS = medium Nordic Ecolabelling sets strict requirements to the chemical products and materials used to produce windows and external doors. This will increase the possibility to recycle materials.

3 Requirements and Justification of the Requirements

This chapter presents all requirements, explains the background to them, the chosen requirement levels and any changes compared with generation 4 of the criteria.

3.1 Definition of the product group

Nordic Swan Ecolabelled products are windows, window doors and external doors which separates the internal climate from the external climate of a construction.

Nordic Ecolabelling's Criteria for Windows and External Doors cover products pursuant to standard EN 14351-1. This means that the following products may carry the Nordic Swan Ecolabel:

- Fixed and opening facade and roof windows (manual or electrically operated).
- Window doors (e.g. balcony and terrace doors).
- External doors.

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

- Windows, window doors and external doors not covered by the standard EN 14351-1. This applies, for example, to windows and external doors that are resistant to fire under standard EN 16034.
- Hallway doors, attic doors and doors to warm and cold storage rooms as they are not subject to the same requirements for insulation capacity.
- Interior doors as they can be labelled under the Nordic Ecolabelling criteria for the product group Furniture and Fitments.

The frame, casement and door leaf in Nordic Swan Ecolabelled windows, window doors and external doors must be made from the following materials:

- wood
- metal, aluminium or steel
- a combination of these materials, e.g. wooden windows with aluminium cladding or windows with combined wooden and aluminium casement

PVC is **not** allowed as a primary material to be used in frames, casements and door leaves in Nordic Swan Ecolabelled windows, window doors and external doors.

Windows, window doors and external doors manufactured from primary materials other than those listed above must be assessed by Nordic Ecolabelling before they possibly can be considered for labelling. Nordic Ecolabelling will determine which new materials that possibly may be included in the product group.

3.2 Definitions

Table 1 Definitions

Term	Definition/explanation
Air permeability	Amount of air passing through all joints between casement or leaf and frame profiles of a test specimen caused by the test pressure.
Daylight transmittance	Daylight transmittance, expressed in %, is a measure of the amount of daylight that enters through the window.
DVV	Dansk Vindues Verifikation
External door	A door which separates the internal climate from the external climate of a construction. The main intended use is the passage of pedestrians.
External cladding	External cladding refers to wooden windows, where the external components of the window, i.e. the wooden frame and/or casement, are covered usually in aluminium. The purpose is to provide weatherproofing, increase durability and reduce the need for regular maintenance.
Float glass	Also called flat glass and typically used in window glass. Made by pouring molten glass on a bed of molten metal (mostly tin). Through this process the glass gets a uniform thickness and a flat surface.
GWP	GWP stands for Global Warming Potential. This is a measure used to compare the potency of various greenhouse gases in causing global warming over a specified time period, typically 100 years, relative to carbon dioxide (CO_2). Gases with higher GWP values have a greater potential to contribute to global warming than those with lower values.
Insulation glass	Consists typically of units with 2, 3 or 4 panes of glass separated by a space filled with gas (argon for example). The purpose of such insulation glass units is to reduce heat transfer through windows/window doors.
LCA	Life Cycle Assessment
MECO-analysis	MECO stands for materials/resources (M), energy (E), chemicals (C) and other impact areas (O). The purpose of the MECO-analysis is to assess all the relevant environmental aspects throughout the life cycle of a product.
Nanomaterials/-particles	Nanomaterials/-particles are defined according to the EU Commission Recommendation on the Definition of Nanomaterial (2022/C 229/01): 'Nanomaterial' means a natural, incidental or manufactured material consisting of solid particles that are present, either on their own or as identifiable constituent particles in aggregates or agglomerates, and where 50% or more of these particles in the number-based size distribution fulfil at least one of the following conditions: (a) one or more external dimensions of the particle are in the size range 1 nm to 100 nm; (b) the particle has an elongated shape, such as a rod, fibre or tube, where two external dimensions are smaller than 1 nm and the other dimension is larger than 100 nm; (c) the particle has a plate-like shape, where one external dimension is smaller than 1 nm and the other dimensions are larger than 100 nm.
NDVK	Norsk dør- og vinduskontroll
PVC	Polyvinyl chloride, a chlorinated polymer/plastic.
RPS-analysis	Nordic Ecolabelling sets requirements concerning the topics and processes in the life cycle that have a high environmental impact – also called hotspots. An RPS-analysis is used to identify where ecolabelling can have the greatest effect. R represents the environmental relevance; P is the potential to reduce the environmental impact and S is the steerability on how compliance with a requirement can be documented and followed up.
Solar energy transmittance (g-value)	Solar energy transmittance, expressed as the g-value (%), specifies how much solar radiation that enters through the window.
Thermal transmittance (U-value)	Thermal transmittance, expressed as the U-value (W/m^2K), is the rate of heat transfer, for example through a window.

VOC	Volatile Organic Compound, i.e. any organic compound having at 293,15 K a vapour pressure of 0,01 kPa or more, or having a corresponding volatility under the particular conditions of use, as defined in Directive 2010/75/EU.
Water tightness	A measure of tightness to avoid water leakages during precipitation and wind.
Window door	Constructed as a window, which extends to floor level and allows access or passage for persons. Can be partially or fully glazed like balcony and terrace doors.
Wood preservative	Wood preservative means an agent used in impregnation and surface treatment that makes the wood resistant to fungal attack/rot.

3.3 Description of the product and the production

O1 Description of the product and the production

Applicants must provide the following information about the product and the production process per model and according to the product group definition:

- Name and technical drawing/picture of the product.
- Description of all components, materials, chemical products, suppliers and producers.
- Declaration of performance (DoP) in accordance with the Construction Products Regulation (EU/305/2011)
- State the weight of each material and component for the standard/reference size
- Calculation of the percentage by weight for each material related to the total weight of the product except the weight of the insulation glass* **
- Description e.g. a flowchart, of the production process

**Chemical products must be listed, but it is not necessary to specify the percentage by weight for chemicals.*

***If external cladding is part of the product, it must be included in the calculation.*

✉ An overall product description per model. An excel template is made by Nordic Ecolabelling that can be used for this purpose. Please contact Nordic Ecolabelling to get the template.

✉ Description of the production process.

Background to requirement O1

To know which environmental requirements that are applicable to a window, window door or external door, Nordic Ecolabelling needs a description of the production process and of the components, materials, chemicals, suppliers and producers of each product including the percentage by weight of each material.

A Nordic Swan Ecolabel licence that covers several types/models of windows, window doors or external doors within the same family or series can be given. This is possible because the U-value is given for the reference size of the product, and thus apply to all sizes of the same product in the series/family with the same construction as the example used in the U-value-calculations.

The percentage by weight for each material under this requirement, must be given for the reference size of the product representing the same family or series.

3.4 Energy requirements

The energy requirements cover thermal transmittance, daylight transmittance, air permeability and climate testing.

O2 Thermal transmittance

The thermal transmittance (the U-value) of windows and window doors must not exceed the values in Table 2 for each product category and material.

The thermal transmittance of external doors, irrespective of material must not exceed 1.0 W/m^{2}K.

Table 2 Maximum U-values, W/m^{2}K

Product material	Facade window	Window door	Roof window
Wood*	0.84	0.93	1.00
Non-renewable material**	0.74	0.82	0.91

**Window or window door where the total weight of the product except the weight of the insulation glass consists of maximum 20 weight% non-renewable primary material (i.e. smaller parts made in non-renewable material like hinges, handles, fittings, kick plates, lists, gaskets etc. are excluded from this calculation)*

***Window or window door where the total weight of the product except the weight of the insulation glass consists of more than 20 weight% non-renewable primary material (i.e. smaller parts made in non-renewable material like hinges, handles, fittings, kick plates, lists, gaskets etc. are excluded from this calculation)*

The U-value shall be set for a model of windows, window doors or external doors according to the product standard EN 14351-1. Presented U-values shall be determined by or reviewed by an accredited party or by a corresponding independent body and calculated or tested according to the standards EN ISO 10077 or EN ISO 12567, see Appendix 1.

The U-value is to be measured for the whole window/door, including the frame, according to the sizes in the product standard EN 14351-1.

The U-value is to be given with two significant digits.

✉ The calculations or testing results of the U-value and a report on how the calculations/testing were performed.

Background to requirement O2

The requirement level has been tightened for wooden windows and window doors with water-based impregnation compared to the previous criteria generation. Also, the classification has been clarified for windows made with a combination of wood and non-renewable material like aluminium as primary materials in the frame and casement. Wooden windows with a maximum of 20 weight% non-renewable material in the frame/casement are classified as wooden windows. For windows in non-renewable materials i.e. with >20 weight% non-renewable material in the frame/casement, the requirement is unchanged.

Windows, window doors and external doors play an important role in the energy consumption of buildings during their use phase. Life cycle assessments that include the use phase of windows show that the most significant impact in a window's life cycle is linked to its ability to insulate and thus save energy in the building in which the window is installed.[8] Improvements in energy performance of windows lead to reductions in heating and cooling needs during the use phase.

The thermal transmittance, the U-value, is a measurement of how well the window, window door or external door insulates against heat losses. Heat loss through windows should be minimised by optimising:

1. Window size and orientation

2. Glass type, number of glass panes and glass film

3. Frame/casement material and composition

Note that Nordic Ecolabelling can only influence point 2 and 3.

Nordic Ecolabelling requires different U-values for windows and window doors depending on the material, i.e. wood or non-renewable material. The reason for this is that there are differences in the embodied energy from manufacturing windows from different materials. Manufacturing entirely wooden windows uses least energy, while a window made entirely in aluminium uses considerably more energy.[9] Based on a holistic view of a window's energy performance seen over its entire life cycle, the U-value-requirement is differentiated based on material.

In the previous criteria, generation 4, wooden windows with cladding in non-renewable materials (typical aluminium) were classified as wooden windows, while windows made with a combination of wood and non-renewable material like aluminium as primary materials in the frame and casement, were classified as made in 100% non-renewable materials regardless of the amount of aluminium and wood used. Information from window producers[17] has shown that the weight percentage of aluminium used in such frames/casements is approximately the same amount as used for cladding. Based on this, in this generation, windows with cladding and windows with wood/non-renewable materials in the frame/casement, will be classified equally, and a wooden window is defined as a window where the total weight of the product except the weight of the insulation glass consists of maximum 20 weight% non-renewable primary material (i.e. smaller parts made in non-renewable material like hinges, handles, fittings, kick plates, lists, gaskets etc. are excluded from this calculation)

For windows in non-renewable materials i.e. with >20 weight% non-renewable material in the frame/casement/cladding, the U-value-requirement is unchanged.

In the previous criteria, generation 4, the required U-values for wooden windows were differentiated based on the impregnation method used. Windows impregnated with the solvent-based vacuum impregnation method had to achieve a lower U-value than windows impregnated with water-based technology. However, this differentiation has been removed in this criteria generation, and the environmental impact from vacuum impregnation is instead handled by a

[8] «Analysing the environmental impact of windows: A review», Jean Souviron et.al. Building and Environment, 2019

[9] "Embodied impacts of window systems: A comparative assessment of framing and glazing alternatives" Shiiva Saadatian et. al., 2021

stricter requirement for the VOC-emissions from vacuum impregnation, see requirement O17. This approach is more logical for handling the environmental impact from vacuum impregnation.

As a result, the U-value level for wooden windows with water-based wood preservation has been tightened, as all wooden windows are now classified in the same category. The level of 0.84 for all facade wooden windows has been chosen based on a market overview and with inspiration from the classification system introduced by the Danish government.[10]

Since 2018, the Danish government has classified windows that meet a minimum U-value of 0.84 as energy-efficient and suitable for promotion in window replacements. Nordic Ecolabelling considers this level to be ambitious enough and effective in driving the market towards more energy-efficient windows, and thereby reducing energy losses from buildings.

In Denmark, there is also another energy classification system for windows, Bygningsreglementet, ranging from A to G. This has been in place since 2011 and was developed by the Danish window association and implemented in the Danish legislation. The system is based on a method for calculating energy balance, designated E_{ref}, from windows in a fictional reference building in Denmark. E_{ref} is a function of both the U-value and the g-value ($E_{ref} = 196.4 \times g_w - 90.36 \times U_w$), and the balance must be positive to achieve Class A.[11] Class A is also, since 2021, the minimum level required by the Danish law[12] when installing windows. However, Nordic Ecolabelling still thinks that requirements for the energy balance of windows cannot be implemented in the Nordic Ecolabelling criteria for windows due to several reasons. The main reason is that the energy balance model is developed for the Danish climate and may not be representative of all Nordic countries. Additionally, the system is based on a reference building that is fictional, and a real building would look different and have a different energy balance. The Nordic Ecolabelling does not have any steerability of where and in which building the windows are installed.

The required U-values of 0.84 or lower for facade windows are also reasonable in relation to the taxonomy requirements. According to the taxonomy, windows must be constructed with a U-value less than 1.0.

O3 Daylight transmittance

The requirement is applicable to windows and window doors, not external doors.

The daylight transmittance of the insulation glass must be 0.67 (67%) or higher.

The daylight transmittance of the insulation glass shall be determined and presented based on the methods stated in product standard EN 14351-1. Presented values shall be determined by or reviewed by an accredited party or by a corresponding independent body and calculations or test results according to EN 410, see Appendix 1.

[10] https://www.glasfakta.dk/viden/vinduer/doere/regler-og-vejledninger/positivlister-for-energivinduer-tilskud-fra-bygningspuljen/ visited April 2024
[11] https://energivinduer.dk/ visited April 2024
[12] https://bygningsreglementet.dk/Tekniske-bestemmelser/11/Krav visited April 2024

✉ The results from calculations or testing of the daylight transmittance of the insulation glass. Report on how the calculations/testing were performed.

Background to requirement O3

In this generation, the requirement for daylight transmittance of the insulation glass is slightly stricter than in generation 4 and the requirement for solar energy transmittance is removed.

Solar energy transmittance, g-value, is a measurement of how much solar energy in the form of heat, enters through a window. A high g-value means that the window allows a high level of heat radiation into the building.

During the last years, the legislation regarding windows has been updated and tightened, especially in Denmark. Now, the Danish energy balance, E_{ref} must be positive for windows installed in buildings in Denmark. The energy balance referred to in Danish legislation is a function of the U- and the g-value for a reference building in Denmark.[10, 11, 12.]

It has been evaluated whether the Nordic Ecolabelling could require a minimum solar energy transmittance level. That, in combination with the requirement for thermal transmittance, would guarantee that a Nordic Swan Ecolabelled window would fulfil legislation in Denmark. That would be possible, but the consequence would be that producers that supply other markets with windows, would have to develop U- and g-values according to the energy balance model that is specifically developed for Danish circumstances. Due to this, it has been decided not to sharpen the requirement for solar energy transmittance for Nordic Swan Ecolabelled windows.

How much heating contribution a window creates depends on its positioning. High g-values might result in a risk for over-heating, with increased need for cooling. Nordic Ecolabelling has therefore re-evaluated the requirement and concluded that the steerability of setting a requirement for the g-value is weak. Based on this, the requirement for g-value has been removed.

However, the daylight transmittance requirement is kept. Daylight transmittance is a very fundamental property of windows since the main function of a window is to let light into the building. Daylight transmittance is a measurement of the amount of daylight that enters a building through a window, and that sufficient light is let into buildings, has a health impact.

The requirement for daylight transmittance must be met by both windows and window doors but not by external doors that have a significantly smaller proportion of window glass (if any at all).

O4 Air permeability and climate testing

Air permeability

Windows, window doors and external doors must be tested pursuant to EN 1026 and fulfil at least Class 4 according to EN 12207 for air permeability under negative and positive pressure.

Climate testing

The external doors must undergo differential climate testing pursuant to standard EN 1121 and fulfil at least Class 2 according to EN 12219. Unless otherwise stated, a door of normal size is to be tested.

Air permeability and differential climate testing are to be measured through tests or calculations based on the methods stated in product standard EN 14351-1. Presented values shall be determined by or reviewed by an accredited party or by a corresponding independent body, see Appendix 1.

✉ Test report of the air permeability test.

✉ For external doors, test report from differential climate testing.

Background to requirement O4

The requirement is unchanged compared to generation 4 of the criteria, except from that the climate testing is updated according to latest standards.

If a window or door is not airtight, much energy can be lost. Also, wood is a flexible material that moves in different ways at different temperatures and humidity levels. Sealing must accommodate that movement and ensure that the window/door closes tightly. In order to ensure a satisfactory sealing in the Nordic Swan Ecolabelled products, windows shall meet the strictest class, Class 4 according to the classification system in EN 12207, which is the same level as in previous generation of the criteria and in line with NDVK's air permeability requirements[13].

An external door that has been tested for air permeability, i.e. that meets Class 4 pursuant to EN 12207, may lose its air permeability properties in a real operating environment. Doors can warp in different climates and the air permeability will be compromised unless the manufacturer has taken this into account. Due to this, Nordic Ecolabelling requires doors to undergo a differential climate testing to ensure that the air permeability properties are kept over time in different moisture and temperatures. The requirement for the climate testing is at the same level as in the NDVK certification[13].

3.5 Material requirements

In this section the material requirements are given for the following frame, casement and door leaf primary materials:

- Wood, aluminium and steel
- and for the insulation materials in addition to requirements for filler gases used in the insulation glass units.

Window, window doors and external door frames, casements and door leaves manufactured from primary materials other than those listed above must be assessed by Nordic Ecolabelling before they can be considered for labelling.

PVC is not allowed as a primary material to be used.

[13] "Krav til dører og vinduer", NDVK, 2023

Smaller parts like lists, gaskets etc. can be made in materials without requirements, i.e. plastic, rubber, composite etc. as long as they constitute less than 10 weight% of the product without glass for each specific material.

There are no material requirements for the window and door glass material used in window glass/insulation glass units.

Background to the material requirements

The material requirements have been updated for the following frame, casement and door leaf primary materials: wood, aluminium and steel which are materials that are widely used to produce window and external doors[14,15,16].

Composite materials are also used to make windows, window doors and external doors. But as these materials are not easy to reuse in a circular economy, and Nordic Ecolabelling has not had any interest from external stakeholders in ecolabelling such products, Nordic Ecolabelling has decided to not develop material requirements for composite materials in this criteria generation. Followingly, it is not possible according to the new criteria generation to ecolabel windows and doors made of composite materials.

For PVC, Nordic Ecolabelling has decided to no longer allow this material as primary material in windows and door frames, casements and leaves. The decision is based on the following;

- there has not been any producers of PVC windows or doors that have ecolabelled their products and fulfilled today's criteria
- the feedback from producers[17] is that today's PVC requirements are too strict, especially regarding the limit value for the permitted content of lead in PVC
- as LCAs[18,2,3,4] show that PVC compared with wood and aluminium is the material with shortest service lifetime and the largest environmental impact in most impact categories, Nordic Ecolabelling wanted to introduce even stricter PVC-requirements in this new generation

As it seems to be no interest for ecolabelling of PVC window and doors according to such new and stricter requirements, Nordic Ecolabelling has decided to not allow PVC as a primary material to be used in windows and doors.

For window glass/float glass, Nordic Ecolabelling has evaluated whether it is possible to introduce a requirement for use of window glass made with a portion of recirculated glass material. Based on feedback from window producers[17] and information from float glass producers' websites[19,20,21], the conclusion is that the

[14] https://parkwooddoors.co.nz/a-guide-to-the-most-common-exterior-door-materials/ (visited March 2024)
[15] Webpages for several Nordic and European window and external door producers
[16] https://www.understandconstruction.com/materials-for-windows.html (visited March 2024)
[17] Meetings with licence holders and other window and door producers, autumn 2023
[18] M. Asif, et al. Sustainability analysis of window frames, Building Services Engineering Research & Technology. (2005).
[19] https://www.reiling.de/en/recycling-products#progress--anchor--151, visited March 2024
[20] https://www.pilkington.com/nb-no/no/produkter/funksjonsglass/spesialglass/pilkington-mirai, visited March 2024
[21] https://www.ragnsells.com/about-us/press-media/articles/flat-glass/, "Circular solution for flat glass", news article posted on 14th of March 2024

market for float glass made with recirculated glass, is still very limited. Nordic Ecolabelling has decided to not introduce such a requirement in this generation of the criteria but will follow the situation and ongoing projects closely to prepare for such a requirement in the next generation.

3.5.1 Wood

The following requirements are applicable to all wood raw material. Wood that are certified according to Nordic Ecolabelling's criteria for Durable Wood automatically comply with the requirements in this section.

O5 Tree species with restricted use

Nordic Ecolabelling's list of restricted tree species* consist of virgin tree species listed on:

a) CITES (Appendices I, II and III)

b) IUCN red list, categorized as CR, EN and VU

c) Rainforest Foundation Norway´s tree list

d) Siberian larch (originated in forests outside the EU)

Tree species listed on a) CITES (Appendices I, II and III) are not permitted to be used.

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

- the tree species does not originate from an area/region where it is IUCN red listed, categorized as CR, EN or VU.
- the tree species does not originate from Intact Forest Landscape (IFL), defined in 2002: http://www.intactforests.org/world.map.html
- the tree species must originate from FSC or PEFC certified forest/plantation and must be covered by a valid FSC/PEFC chain of custody certificate documented/controlled as FSC or PEFC 100% through the FSC transfer method or PEFC physical separation method.
- tree species grown in plantation shall in addition originate from FSC or PEFC certified forest/plantation, established before 1994.

**The list of restricted tree species is located on the website: Forestry requirements (nordic-swan-ecolabel.org)*

✉ Declaration from the applicant/manufacturer/supplier that tree species listed on a-d) are not used.

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

✉ The applicant/manufacturer/supplier are required to present a valid FSC/PEFC Chain of Custody certificate that covers the specific tree species and demonstrate that the tree is controlled as FSC or PEFC 100% through the FSC transfer method or PEFC physical separation method.

✉ The applicant/manufacturer/supplier are required to document full traceability back to the forest/certified forest unit thereby demonstrating that;

- the tree does not originate from an area/region where it is IUCN red listed, categorized as CR, EN or VU;

- the tree species does not originate from Intact Forest Landscape (IFL), defined in 2002 http://www.intactforests.org/world.webmap.html
- for plantations, the applicant/manufacturer/supplier must document that the tree species does not originate from plantations established on areas converted from forest after 1994.

Background to requirement O5

The requirement has been updated with the latest version of Nordic Ecolabelling's list of restricted tree species.

The requirement applies only to virgin tree species and not tree species defined as recycled material according to ISO 14021.

Several tree species are restricted or not permitted for use. The list of restricted tree species is based on tree 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 scientific name/trade name is not always adequate, as there may be more than one scientific name/trade names for the listed tree species than the list indicates.

Criteria for tree species found on the list are:

a) Tree species listed on CITES Appendices I, II and III.

b) IUCN red list, categorized as critically endangered (CR), endangered (EN) and vulnerable (VU).

c) Regnskogfondet (Rainforest Foundation Norway) tree list

d) Siberian larch (originated in forests outside the EU)

Species on the CITES list are prohibited for use in Nordic Swan Ecolabelled windows and external doors. CITES[22] is an international convention for the control of trade (across borders) of wild fauna and flora. The tree species on CITES are, dependent on how threatened they are, listed in Appendix I, II or III. Species listed in Appendix I, are highly endangered and trade with these species is totally banned. For the remaining tree species, special permits for import and export are required (Appendices II and III). CITES is regulated by EU legislation (Council Regulation (EC) No 338/97) and trees with valid CITES permits are considered to be legally harvested under EUTR (EU Timber Regulation). Nordic Ecolabelling's ban on the use of tree species listed in CITES (Appendix I, II or III) goes beyond the EU legislation. CITES regulates trade in endangered species, and there are also challenges with corruption in the trade in wild animals and plants.[23] Therefore, Nordic Ecolabelling does not want to approve species on any of the appendices.

IUCN Red Lists[24] are the world's most comprehensive inventory of the global conservation status of the planet's biological species, including trees. IUCN Red

[22] https://cites.org/eng (visited January 2020)
[23] Addressing corruption in CITES documentation processes Willow Outhwaite, Research and Analysis Senior Programme Officer, TRAFFIC, 2020: https://www.traffic.org/site/assets/files/12675/topic-brief-addressing-corruption-in-cites-documentation-processes.pdf
[24] http://www.iucnredlist.org/ (visited January 2020)

List has established clear criteria to assess the risk of extinction according to the origin of the tree species. These criteria cover all countries and all species in the world. Nordic Ecolabelling is aware that the IUCN's red list system only focuses on the extinction risk of species, and therefore is not designed for an overall assessment of whether a tree species can be provided with sustainable origin. However, the list is continually being updated and thereby is an important tool to estimate a specific tree species' conservation status on a global scale. Nordic Ecolabelling wishes to prohibit tree species listed as endangered (categories CR, EN and VU).

Regnskogfondet[25] (Rainforest Foundation Norway) is an NGO in Norway that works to protect the world's remaining rainforests. Currently, Regnskogfondet does not see any credible certification schemes working in the tropics, and therefore recommends full stop of buying tropical timber. Regnskogfondet has developed a list of tropical tree species based on tree species found on the Norwegian market. This list works as a guide to comply with Norwegian guidelines regarding non-use of tropical wood in public construction. Nordic Ecolabelling consider this a pragmatic approach for handling tropical tree species on the Nordic market.

In addition, Siberian larch (originated in forests outside the EU) is on the Nordic Ecolabelling's tree list. Siberian larch is a coveted tree species in the construction industry due to its high quality. The tree species is widespread in the Eurasian northern boreal climate zone, and particularly the species Larix sibirica, Larix gmelinii, Larix cajanderi and Larix sukaczewii are widespread in the large areas of intact forest landscapes (IFL) in Russia. Siberian larch is to be seen as an indicator species for boreal IFL-areas which are important to keep intact.

Exemption from the tree list

Nordic 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 on b), c) or d) if the applicant/manufacturer/supplier can demonstrate compliance with a number of strict requirements regarding certification and traceability.

Many of the tree species on the list are grown in countries which still have large areas of IFLs. These are important to protect due to biodiversity and climate. Many of these countries also have a high risk of corruption and the national legislation related to environment, human rights and ownership to land 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 land with a high risk of corruption and illegal logging. For instance, relevant challenges related to this have been published by Danwatch in a number of articles in 2018 [26],[27] and by redd-monitor.org in 2019[28]. Greenpeace International has ended its memberships in FSC on the grounds that the certification body is

[25] https://www.regnskog.no/no/hva-du-kan-gjore/unnga-tropisk-tommer/tropiske-treslag (visited January 2020)
[26] https://danwatch.dk/undersoegelse/dokumentfalsk-og-millionboeder-danske-byggemarkeder-saelger-trae-forbundet-til-ulovlig-hugst-i-amazonas/
[27] https://danwatch.dk/undersoegelse/baeredygtighedsmaerke-er-ingen-garanti-for-baeredygtigt-trae/
[28] https://redd-monitor.org/2019/08/29/evicted-for-carbon-credits-new-oakland-institute-report-confirms-forced-evictions-for-green-resources-plantations-in-uganda/

no longer meeting its aims of protecting forests and human rights[29]. Other environmental organisations like WWF support certification as an important tool for sustainable forestry in these countries. However, due to the uncertainty whether FSC and PEFC certification systems are good enough in protecting important areas of biodiversity and ethical aspects like human rights and land ownership in areas with a high risk of corruption, Nordic Ecolabelling have a precautionary approach and wants further documentation about the tree species and its origin.

To document full traceability of the tree species, the applicant/manufacturer/ supplier must present a valid FSC/PEFC Chain of Custody certificate that covers the specific tree species and demonstrate that the tree is controlled as FSC or PEFC 100%, through the FSC transfer method or PEFC physical separation method. This means that Nordic Ecolabelling does not accept the FSC percentage or credit control system as well as PEFC percentage system. Full traceability of the tree species back to the forest/certified forest unit, enables the applicant/manufacturer/supplier to document that the tree species does not come from an area/region where it is IUCN red listed, categorized as CR, EN or VU. Full traceability also makes it possible to document that the tree species does not come from Intact Forest Landscape (IFL), defined by Intactforest.org in 2002[30]. Intactforest has been monitoring IFL-areas since 2000 and has developed an online up to date mapping tool that shows the extent of IFL back to 2002. The monitoring results shows that the world's IFL are being degraded in an alarming speed, and that is the reason for Nordic Ecolabelling referring back to 2002.

Plantation: Nordic Ecolabelling believe that responsibly run forest plantations can play a role in preserving natural IFLs by reducing the pressure to harvest the world's remaining natural forests. In order to secure that plantation has not replaced native ecosystems (forest/grasslands) within the last 25 years, tree species has to come from FSC or PEFC certified plantations that were established before 1994. 1994 is in line with FSCs international forest management standard (version 5.2), whereas PEFC is working with 2010.

O6 Traceability and certification of wood

Species name

Applicant/manufacturer/supplier must state the name (species name) of the wood raw materials that are used in the Nordic Swan Ecolabelled windows and doors.

Chain of custody certification

The applicant/manufacturer of the window/door or the applicant’s/manufacturer’s subcontractors of wood raw materials must have FSC/PEFC chain of custody (CoC) certification.

Certified wood raw materials

A minimum of 70% by weight of all wood raw materials used in the Nordic Swan Ecolabelled product must origin from forest managed according to sustainable

[29] https://www.greenpeace.org/international/press-release/15589/greenpeace-international-to-not-renew-fsc-membership/
[30] http://www.intactforests.org/world.webmap.html, visited January 2020

forestry management principles that meet the requirements set out by FSC or PEFC.

The remaining proportion of wood raw material must be covered by the FSC/PEFC control schemes regarding FSC controlled wood/PEFC controlled sources.

If the manufacturer is chain of custody certified the following applies:

The manufacturer must provide evidence with a balance sheet from the company's accounting system correctly showing account for and allocated inputs and outputs of certified wood raw material and of any material from "controlled" sources, to their manufacturing facility and resulting Nordic Swan Ecolabelled products.

If the subcontractor is chain of custody certified the following applies:

The manufacturer must submit documentation on the purchase of wood raw material from the CoC-certified subcontractor which shows that the certification requirement of at least 70% certified is fulfilled and that the remaining share is covered by the control schemes (FSC controlled wood / PEFC controlled sources). This must be specified on the invoice / delivery note with certification claim. The manufacturer must ensure that the wood raw material specified on the invoice is used in the production of the Nordic Swan Ecolabelled product.

✉ The names (species names) of the wood raw materials that are used.

✉ The applicant/manufacturer or supplier must provide valid FSC/PEFC CoC certification that includes all wood raw materials used in the Nordic Swan Ecolabelled product.

✉ **If the manufacturer is chain of custody certified:**

The applicant shall provide audited accounting documents that demonstrate that at least 70% of the materials allocated to the Nordic Swan Ecolabelled product or production line originate from forests or areas managed according to sustainable forestry management principles that meet the requirements set out by FSC or PEFC chain of custody scheme. If the product or production line includes uncertified virgin material, proof shall be provided that the content of uncertified virgin material does not exceed 30% and is covered by a verification system that ensures that it is legally sourced and meets any other requirement set out by FSC or PEFC with respect to uncertified material.

✉ **If the subcontractor is chain of custody certified:**

Documentation from the manufacturer for the purchase of wood raw material from the CoC-certified subcontractor which shows that the certification requirement of at least 70% certified is fulfilled and that the remaining share is covered by the control schemes (FSC controlled wood / PEFC controlled sources). This must be specified on the invoice / delivery note with certification claim. The manufacturer must declare that the wood raw material that fulfils the requirement is used in the Nordic Swan Ecolabelled production.

Background to requirement O6

The requirement has been updated with the latest version of Nordic Ecolabelling's forestry requirement. The forestry requirement focuses on sustainable forestry and the traceability of the wood raw materials.

The many benefits that sustainably managed forests deliver to society include wood for materials and energy, protection against global warming, homes and livelihoods for local communities and indigenous peoples, support of biodiversity and protection of water and soil from pollution and erosion. By setting a requirement that wood raw materials must originate from certified, sustainably managed forests, Nordic Ecolabelling is supporting the move towards more sustainable forestry practices.

Nordic Ecolabelling requires a declaration of the species of wood contained in the Nordic Swan Ecolabelled product. This makes it possible to check the validity of Chain of Custody certificates in the supply chain. The requirement for CoC certification improves the traceability of materials in the supply chain within the guidelines and control systems of the FSC and PEFC. The company's CoC certification proves how certified wood is kept separate from other wood during production, administration and storage and is inspected annually by independent certification bodies. Under this requirement, CoC certification must be held by either the applicant/manufacturer or the supplier of wood raw materials. Nordic Ecolabelling considers it is too strict to require the applicant/manufacturer to hold CoC certification. If the applicant/manufacturer has CoC certification and is able to label the finished product with the FSC/PEFC logo, there is a requirement that the certified wood raw material is allocated to the Nordic Swan Ecolabelled product. This ensures that FSC/PEFC credits are used for the Nordic Swan Ecolabelled production and that the credits are not sold twice. This will stimulate increased demand for certified wood raw materials because more certified wood raw materials must be purchased if the manufacturer wants to label other products, and not just the Nordic Swan Ecolabelled products, with the FSC/PEFC logo. It also means that a Nordic Swan Ecolabelled product can have both the Nordic Swan Ecolabel logo and the FSC/PEFC logo. However, there is no requirement for the applicant/manufacturer to have CoC certification. If CoC certification is held by the supplier, the applicant/manufacturer must have documentary evidence of purchase of certified raw material in the form of claims on the invoice or delivery note, showing that a minimum of 70% certified wood raw material has been purchased. Please note that Nordic Ecolabelling approves both the percentage system and the credit system for bookkeeping and sales of certified material.

The requirement has increased the minimum percentage to 70% for all wood species. Previously, this requirement only applied to pine, fir, birch and tropical wood. Tropical wood is now largely covered by the requirement concerning restricted tree species. Public sector tenders often require a certification percentage of 70%. The remaining percentage of wood raw materials must be FSC Controlled Wood or wood from PEFC Controlled Sources. The minimum requirement set by FSC and PEFC for the use of their logos on products is also 70%.

3.5.2 Metals

The following requirements are applicable for respectively steel and aluminium.

- The steel requirements apply when steel constitutes more than 30 weight% of the total weight of the product except the weight of the insulation glass.
- The aluminium requirements apply when aluminium constitutes more than 20 weight% of the total weight of the product except the weight of the insulation glass.
- Smaller parts like hinges, handles, fittings, kick plates, lists etc. are excluded from the weight%-calculation and the metal requirements are not appliable for these parts.

Separate requirements are set for the production of steel and the production of aluminium. The requirements can either be met by having a high proportion of recycled steel or aluminium, or by meeting requirements for virgin steel production and primary aluminium production.

O7 Production of steel

The requirement applies if steel constitutes more than 30 weight% of the total weight of the product except the weight of the insulation glass.

The requirement can be met by documenting either A) High proportion recycled or B) Virgin steel production (B consist of 3 alternatives):

A) High proportion recycled

A minimum of 75% by weight of the steel must be recycled.

Recycled steel is defined as both pre- and post-consumer, according to definitions in ISO 14021.

The requirement can be verified either by:

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

or

B) Virgin steel production

The requirement can be met by one of the 3 alternatives (1-3) below:

The requirement can be verified using either: direct traceability through the supply chain, mass balance approach[31] or by all major suppliers[32].

1. Steel produced from traditional methods

Steel used in the Nordic Swan Ecolabelled product comes from a steel producer who:

- has implemented at least 2 of the energy efficiency measures stated as BAT in the BREF document for iron and steel production (2013 or later version). The energy efficiency measures are listed in Table 1 in Appendix 2, and
- has an active sustainability strategy focusing on reducing energy consumption and greenhouse gas emissions. The strategy for reducing energy consumption and greenhouse gas emissions shall be quantitative and time-based, and they shall be determined by the company management.

or

2. Steel production - Responsible steel certified production site

A minimum of 50% by weight of the steel used in the Nordic Swan Ecolabelled product comes from a production site that are certified according to the standard Responsible Steel[33], version 1.0, 2019 or later versions.

or

3. Steel production based on new technologies with reduced greenhouse gas emissions

Steel used in the Nordic Swan Ecolabelled product comes from steel production sites that have implemented one of the following technologies:

- blast furnace top gas recycling with carbon capture and storage
- direct smelting reduction processes
- hydrogen steelmaking in shaft furnaces using green H_2
- direct electrolysis of iron ore

Recycled steel (A):

☒ Alternative 1: Signed agreement/declaration between the steel supplier and the manufacturer of the Nordic Swan Ecolabelled product stating that the requirement is met. The declaration from the steel supplier can be based on purchase records/average data from several steel suppliers, or

[31] In case of several potential steel producers, the supplier of the metal components can verify the requirement by using a mass balance approach if there is an account documenting the annual volumes purchased from the individuals steel producers. The volumes must correspond to volumes sold to the producer of Nordic Swan Ecolabelled product (e.g., cannot sell a larger volume than the corresponding quantity purchased from the individual steel producers)
[32] All major suppliers are compliant with one of the 3 alternatives. Major suppliers are here defined as suppliers delivering 75% of the total volume (w/w) of steel components in the Nordic Swan Ecolabelled product.
[33] Overview of certified steel producers, https://www.responsiblesteel.org/certification/issued-certificates/

✉ Alternative 2: eBVD or EPD based on product-specific data/data from the steel producer´s own production stating the content of recycled steel in the product.

Virgin steel production (B):

Alternative 1:

✉ Enclose latest sustainability strategy report or equivalent documentation from the steel producer showing fulfilment of the requirement. The steel producer can also present specific targets from annual business report with reference to specific numbers and assumptions. Average numbers from steel producers with several steel melting plants is accepted.

✉ Description of which energy efficiency measures stated as BAT have been implemented at the production site.

✉ Information on type of traceability used to document the requirement.

Alternative 2:

✉ Enclose valid Responsible Steel certificate from the steel producer.

✉ Information from the supplier/manufacturer of the constituent steel part about which metal parts are from certified metal production (purchase records).

✉ Information from the supplier/manufacturer of the constituent steel parts on type of traceability used to document the requirement.

✉ Documentation from the manufacturer of the Nordic Swan Ecolabelled product that the requirement for share of purchased steel from certified steel producers is fulfilled – e.g., invoices or other documentation from suppliers.

Alternative 3:

✉ State the name of the steel producer and production site where the steel comes from, as well as a brief description of which technology is used.

✉ Information on type of traceability used to document the requirement.

O8 Production of aluminium

The requirement applies if aluminium is included with more than 20% by weight related to the total weight of the product except the weight of the insulation glass.

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

A) High proportion recycled

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

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

The requirement can be verified either by:

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

or

B) Primary aluminium production

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

The requirement can be verified using either: direct traceability through the supply chain, mass balance approach[34] or by all major suppliers[35].

1. Aluminium production – active sustainability strategy

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

or

2. Aluminium production – low direct climate effecting emissions

Aluminium used in the Nordic Swan Ecolabelled product comes from a primary aluminium producer whose direct climate-affecting emissions from primary aluminium production does not exceed 1,5 tonnes of CO_2e/ton of aluminium produced.

or

3. Aluminium production – low electricity consumption for electrolysis

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

or

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

[35] All major suppliers are compliant with one of the 3 alternatives. Major suppliers are here defined as suppliers delivering 75% of the total volume (w/w) of steel components in the Nordic Swan Ecolabelled product.

4. Aluminium production – ASI certified site

A minimum of 50% by weight of aluminium used in the Nordic Swan Ecolabelled product comes from a production site that are certified to the ASI Performance standard[36].

Recycled aluminium (A):

Alternative 1:

☒ There must be a signed agreement between the producer of aluminium/supplier of aluminium and the manufacturer of the Nordic Swan Ecolabelled product stating that the requirement is met. The declaration from the supplier of aluminium can be based on purchase records/average data from several aluminium suppliers.

Alternative2:

☒ eBVD or EPD can be used as documentation if these are based on product-specific data/data from the aluminium producer´s own production and specifically state the content of recycled aluminium in the product.

Alternative 3:

☒ Valid Hydro Circal certificate[37].

Primary aluminium production (B):

Alternative 1:

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

☒ Information on type of traceability used to document the requirement.

Alternative 2:

☒ Declaration that the requirement is met, as well as calculation and indication of direct emissions in tonnes of CO_2e/ton of aluminium produced.

☒ Information on type of traceability used to document the requirement.

[36] https://aluminium-stewardship.org/asi-standards/asi-performance-standard (visited November 2022)
[37] https://www.hydro.com/en-DK/about-hydro/publications/certificates/ (November 2022)

Alternative 3:

☒ Declaration that the requirement is met, as well as calculation and indication of electricity consumption in MWh/ton produced aluminium.

☒ Information on type of traceability used to document the requirement.

Alternative 4:

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

☒ Information from the supplier/manufacturer of the constituent aluminium part about which aluminium parts are from certified aluminium production (purchase records).

☒ Information from the supplier/manufacturer of the constituent aluminium parts on type of traceability used to document the requirement.

☒ Documentation from the manufacturer of the Nordic Swan Ecolabelled product that the requirement for share of purchased aluminium from certified aluminium producers is fulfilled – e.g., invoices or other documentation from suppliers.

Background to requirements O7 and O8

The material requirements for metals have been updated in this generation of the criteria based on Nordic Ecolabelling's metal requirements and according to our latest knowledge on regulations, science reports, ongoing studies etc. The requirements have been changed to requiring either a high proportion of recycled material or fulfilling strict requirements for virgin steel production and/or primary aluminium production.

The more metal used, the larger environmental impact. Nordic Ecolabelling focus on setting requirements for windows and doors where metals constitute more than certain limit values based on weight%. The limits for when the requirements are to be met are 30% by weight for steel and 20% by weight for aluminium in the product. The difference in limit values is because aluminium weighs significantly less than steel. Smaller parts like hinges, handles, fittings, kick plates, lists etc that are part of the metal weight% for a window or door and must be included in the weight%-calculation, do not need to comply with the metal requirements and no documentation is required for these parts.

In this criteria generation stainless steel is permitted to be used in all parts of windows and doors also window profiles and door leaves. The background is that stainless steel will usually give products/parts with better shelf life, strength and less wear and tear than ordinary steel and will no longer necessarily require more energy than ordinary steel to be produced due to improved production processes.

Using recycled metal significantly reduces the environmental impact and provides a significant climate benefit. Among other things, this is highlighted in the taxonomy work in the EU[38]. Nordic Ecolabelling is aware that the availability

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

of recycled metal and traceability can be a challenge. But in a world with an increasing focus on circular economy, Nordic Ecolabelling believes that there will be an increased focus on this in the future. Traceability in the production chain is also a value in itself, and is important for several aspects, e.g. it provides opportunities to select suppliers based on e.g. environmental work, working conditions and quality. Demand for traceability will hopefully contribute to the industry also placing increased focus on this. For Al, Hydro has launched its own traceability certification with a minimum of 75% recycled Al, Hydro Circal.[39] Currently, there is a smaller 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[40]. The industry average for EU-produced Al is approx. 50% recycled, while for Al outside the EU it is approx. 40%. The big environmental benefit comes from the use of post-consumer recycled aluminium.

The 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. The current requirement of 20% recycled metal has no significant impact since all steelworks, including the BOF plants, meet this today. It is therefore necessary to raise the requirement to promote the use of recycled steel and traceability. In practice, this means that steel that should contain more than 20% recycled steel must be produced at plants that use EAF technology. There are steel producers using the EAF process across the whole of Europe[41]. According to the World Steel Association[42] 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.

In this version of the criteria, Nordic Ecolabelling has introduced requirements for virgin steel production and primary aluminium production. Requirements for metal can therefore be met either by including a high proportion of recycled, or that several requirements for primary metal production are met. The requirement model is based on a mandatory requirement to the steel / aluminium producer to have an energy and greenhouse gas calculation with defined reduction targets. Certification with Responsible Steel or ASI is something that Nordic Ecolabelling see as positive initiatives for a more sustainable metal production. These are independent certification systems with a focus on both economic, social and environmental aspects. For aluminium, the requirement can also be fulfilled by documenting direct emissions of greenhouse gases and energy efficiency in the electrolysis process, where the limits are based on values stated in the EU taxonomy report. Direct emissions are to be calculated according to the methodology used for EU-ETS benchmarks. Please note that these values may change based on the final outcome of the EU taxonomy work. For steel, 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

[39] https://www.hydro.com/en/products-and-services/low-carbon-aluminium/hydro-circal-75r/ (available 2019-10-17)
[40] https://www.hydro.com/en/media/news/2018/hydro-to-increase-production-of-post-consumer-recycled-aluminium/
[41] http://www.eurofer.org/About%20us/About%20Steel/EuropeanSteelMap.fhtml
[42] https://www.worldsteel.org/en/dam/jcr:96d7a585-e6b2-4d63-b943-4cd9ab621a91/World%2520Steel%2520in%2520Figures%25202019.pdf

production. The technologies are similar to those stated in the EU's technical annex to the taxonomy report.

3.5.3 Insulation materials

The following requirements are applicable for all insulation materials used in windows and doors.

O9 Excluded substances in insulation materials

The following substances must not be an ingoing substance in the insulation materials:

Ingoing substance means all substances in the insulation material that are present in concentrations higher than 100 ppm (0.010 w%, 100 mg/kg).

- Substances on the EU REACH Candidate list of SVHC
- Substances evaluated by the EU to be persistent, bioaccumulative, and toxic (PBT) or very persistent and very bioaccumulative (vPvB), in accordance with the criteria in Annex XIII of REACH.
- Substances classified as carcinogenic, mutagenic, or toxic for reproduction (CMR) Category 1A or 1B.
- Endocrine disruptors: Substances on the EU member state initiative "Endocrine Disruptor Lists", List I, II and III, see the following links.
    - https://edlists.org/the-ed-lists/list-i-substances-identified-as-endocrine-disruptors-by-the-eu
    - https://edlists.org/the-ed-lists/list-ii-substances-under-eu-investigation-endocrine-disruption
    - https://edlists.org/the-ed-lists/list-iii-substances-identified-as-endocrine-disruptors-by-participating-national-authorities

A substance that is transferred to one of the corresponding sublists called "Substances no longer on list" and no longer appears on any of Lists I–III, is no longer excluded. The exception is those substances on sublist II that were evaluated under a regulation or directive that does not have provisions for identifying EDs (e.g., the Cosmetics Regulation, etc.). For those substances, ED properties may still have been confirmed or suspected. Nordic Ecolabelling will evaluate the circumstances case-by-case, based on the background information indicated in sublist III. In addition, the following individual substances and substance groups are prohibited or restricted. There may be an overlap between the substances listed below and substances categorised above.

- Short-chain chlorinated paraffins (C10-C13) and medium-chain chlorinated paraffins (C14-C17).
- Perfluoroalkyl and polyfluoroalkyl substances (PFASs)
- Alkylphenols, alkylphenol ethoxylates (APEO) and other alkylphenol derivates (APD).
- Brominated flame retardants.
- Phthalates (Esters of phthalic acid (orthophthalic acid / phthalic acid /1,2- benzene dicarboxylic acid).

- The heavy metals lead, cadmium, arsenic, chromium (VI), mercury and their compounds.
- Bisphenol A (CAS No. 80-05-7), bisphenol S (CAS No. 80-09-1) and bisphenol F (CAS No. 620-92-8).
- Boric acid, sodium perborate, perboric acid, sodium borate (borax) and any other boron compounds classed as carcinogenic, mutagenic or reprotoxic in category 1A/1B/2/Lact.
- Organotin compounds.

✉ Declaration from the manufacturer of the insulation material in accordance with Appendix 3.

Background to requirement O9

The requirement is tightened with a longer list of the substances/groups of substances that must not be used in insulation materials for windows and doors in quantities of 100 ppm or more.

The list is based on the general principles from Nordic Ecolabelling regarding undesirable compounds and also based on corresponding requirements for other Nordic Swan Ecolabelled construction products[43].

3.5.4 Filler gas

The following requirements are applicable for filler gas.

O10 Requirements for filler gas

The following requirements are applicable for filler gas:

- Filler gas used for insulation in insulation glasses must not contribute to the greenhouse effect i.e. the GWP (Global Warming Potential) must be zero over a period of 100 years. Noble gases have GWP=0.
- Krypton and xenon must not be used as filler gases due to the high energy consumption at production.

✉ Details of which filler gases are used for insulation and confirmation for gases other than noble gases that they do not contribute to the greenhouse effect.

Background to requirement O10

The requirement for filler gases is identical to the requirement in the previous generation. The filler gases normally used for insulation in insulation glasses are argon, krypton and xenon[44]. Krypton and xenon require more energy for its production compared to argon[7,45]. Based on this, Nordic Ecolabelling does not permit the use of krypton or xenon as a filler gas in Nordic Swan Ecolabelled windows or external doors.

[43] Background Document for the 089 Criteria for New buildings, Nordic Ecolabelling, 15.05.2023, version 4.4
[44] https://www.hamiltonwindows.co.uk/double-glazing-gases/, 14.03.2024
[45] «Energy and environmental impact analysis of double-glazed windows», Energy Conversion and Management, G.Weir and T.Muneer, February-March 1998

Argon is a noble gas and does not contribute to the greenhouse effect as the GWP = 0 for all noble gases. If gases other than noble gases are used as filler gas, the gas must not contribute to the greenhouse effect. Documentation on this is required.

3.6 Chemical requirements

Introduction to chemical requirements

The chemical requirements apply to all chemical products, for example impregnation, paints, lacquers, glues, putty, fillers and sealants used by the manufacturer of the Nordic Swan Ecolabelled products and their suppliers of parts for Nordic Swan Ecolabelled products.

The requirement for nanomaterials applies to both chemical products and the glass in windows and doors.

The requirements do not apply to touch-up paint or other patching products used by the manufacturer or their supplier if a small amount of damage occurs to the surface layer during manufacture, storage, transportation or installation.

Filler gas and insulation materials are not covered by the requirements in this section. Filler gas and insulation materials are instead covered by the requirements in respectively section 3.5.4 Filler gas and in 3.5.3 Insulation materials.

Definitions

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

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

O11 Classification of chemical products

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

Table 3 Prohibited classifications of chemical products

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

** Including all combinations of stated exposure route and stated specific effect. For example, H350 also covers the classification H350i. Note that responsibility for correct classification lies with the manufacturer.*

Exemptions apply for:

- Classification H411 for all impregnation and surface treatment.
- Classification H351 for adhesive products containing methylene diphenyl diisocyanate (MDI).
- Classifications H350, H341, H301, H311 and H331 for adhesive products and resins containing formaldehyde (CAS No. 50-00-0). For these products, up to 0.2% by weight (2000 ppm) of free formaldehyde is permitted. The requirement applies to the pure adhesive before mixing with any hardener.
- Classification H360 for propiconazole (CAS No. 60207-90-1) used as wood preservative.

✉ A declaration from the chemical manufacturer or supplier, in accordance with Appendix 4.

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

Background to requirement O11

Nordic Ecolabelling is generally committed to restricting the use of chemicals that are harmful to health and the environment, and the classification requirement prohibits the products of highest concern. The chemical requirements have been updated according to our latest knowledge on chemical regulations, science reports, ongoing studies etc.

Exemptions:

As in previous generation an exemption is given for impregnation and surface treatment classified with H411. Wood preservatives like propiconazole (CAS No. 60207-90-1) is widely used and few substitute products are available in the market. Use of propiconazole and other wood preservatives in impregnation and surface treatment, might give an H411 classification on the chemical product.

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

The exemption for adhesives containing formaldehyde is included for chemical products due to the new classifications for formaldehyde and that few substitutes for formaldehyde are available for use in adhesives. The exemption is only granted if the requirement concerning the content of free formaldehyde is fulfilled.

The exemption from the H360 classification requirement for propiconazole used in impregnation and surface treatment chemical products, is included since few substitutes for propiconazole are available per today in the market. The exemption is only granted as long as propiconazole is approved for use as wood preservative according to the Biocides Regulation EU 528/2012.

O12 Classification of ingoing substances

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

Table 4 Prohibited classifications of ingoing substances

CLP Regulation 1272/2008		
Hazard statement	**Hazard class and category**	**Hazard code**
Carcinogenic*	Carc. 1A or 1B Carc. 2	H350 H351
Germ cell mutagenic*	Mut. 1A or 1B Mut. 2	H340 H341
Reproductive toxicity*	Repr. 1A or 1B Repr. 2 Lact.	H360 H361 H362
Endocrine disruption for human health**	ED HH 1 ED HH 2	EUH380 EUH381
Endocrine disruption for the environment**	ED ENV 1 ED ENV 2	EUH430 EUH431
Persistent, Bioaccumulative and Toxic properties** Very Persistent, Very Bioaccumulative properties**	PBT vPvB	EUH440 EUH441
Persistent, Mobile and Toxic properties Very Persistent, Very Mobile properties	PMT vPvM	EUH450 EUH451

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

*** See also requirement O14 for additional requirements on potential or identified endocrine disruptors and PBT/vPvB substances.*

Exemptions apply for:

- Classification H351 for methylene diphenyl diisocyanate (MDI).
- Adhesive and resin containing formaldehyde (CAS No. 50-00-0) classified as H350 and H341. For these products, up to 0.2% by weight (2000 ppm) of free formaldehyde is permitted. The requirement applies to the pure adhesive before mixing with any hardener.
- Titanium dioxide (CAS No. 13463-67-7) classified as H351.
- 1,1,1-Trimethylolpropane (TMP, CAS No. 77-99-6) classified as H361.
- Classification H360 for propiconazole (CAS No. 60207-90-1) in wood preservatives.
- For two-component products it is the added ingredients in the separate components that shall comply with the requirement. An exemption is made if it can be documented that protective equipment was worn when the hardener was mixed with the paint/varnish and that the finished two-component product was applied in a closed system.

✉ A declaration from the chemical manufacturer or supplier, in accordance with Appendix 4.

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

✉ Exemption for two-component products: description of the application system and how employees are protected from exposure.

Background to requirement O12

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

Exemptions are also needed in this requirement for methylene diphenyl diisocyanate (MDI) and formaldehyde. See more background information about this in requirement O11 Classification of chemical products.

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

The exemption from the H360 classification requirement for propiconazole used as wood preservative in impregnation and surface treatment, is included due to the fact that few substitutes for propiconazole are available per today in the

market. The exemption is only granted as long as propiconazole is approved for use in the Biocides Regulation EU 528/2012.

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

O13 Preservatives

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

Table 5 Preservatives in chemical products

Preservative*	Limit value
Bronopol (CAS No. 52-51-7)	≤ 500 ppm (0.05% by weight)
IPBC (iodopropynyl butylcarbamate, CAS No. 55406-53-6)	≤ 4500 ppm (0.45% by weight)
Mixture (3:1) of CMIT/MIT (5-chloro-2-methyl-4-isothiazolin-3-one / 2-methyl-2H-isothiazolin-3-one, CAS No. 55965-84-9)	≤ 15 ppm (0.0015% by weight)
MIT (2-methyl-2H-isothiazol-3-one, CAS No. 2682-20-4)	≤ 100 ppm (0.01% by weight)
Total amount of isothiazolinones	≤ 1500 ppm (0.15% by weight).

**Wood preservatives used as impregnation agents are exempted from this requirement. Wood preservatives used in surface treatment like paint and oil, are not exempted from this requirement.*

☒ A declaration from the chemical manufacturer or supplier, in accordance with Appendix 4.

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

Background to requirement O13

This requirement is new in this generation of the criteria and is based on the updated Nordic Ecolabelling chemical requirements.

The content of the preservatives bronopol, IPBC, CMIT/MIT and MIT is restricted via specific limit values. The content of the total amount of isothiazolinones is also limited.

Water-based paints and adhesives may contain the preservative bronopol and it is difficult to find substitutes. A limited amount of bronopol is therefore permitted although it is classified as a substance of concern and hazardous to the environment.

IPBC is a fungicide that has become more commonly used. The limit value and the exemption for wood preservatives used in impregnation, is the same as in Nordic Ecolabelling's Criteria for Outdoor furniture. The exemption from the limit value for wood preservatives used in impregnation, is included due to the fact that few substitutes are available per today in the market.

Isothiazolinones are used as a preservative in many water-based products, where they act as fungicides, biocides and algal growth inhibitors. They are toxic to aquatic organisms and can cause varying degrees of allergic reactions. It has proved difficult to avoid the use of these preservatives in water-based products, which is what Nordic Ecolabelling's criteria for chemicals indirectly promote. Preservatives also play an important role in ensuring the shelf-life of the products before they are used. Alternative preservatives to isothiazolinones include formaldehyde and/or formaldehyde-releasing substances, which are carcinogenic. In this respect, isothiazolinone and CMIT/MIT are better, even though they also exhibit hazardous properties. To limit the use of these substances as much as possible, the amount of the substances is restricted.

O14 Prohibited substances

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

- Substances on the Candidate List

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

  o D4 (CAS No. 556-67-2), D5 (CAS No. 541-02-6) or D6 (CAS No. 540-97-6) must only be included in the form of residues from raw material production and are allowed in concentrations up to 1000 ppm each in the silicone raw material.

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

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

- Endocrine disruptors: Substances on the EU member state initiative "Endocrine Disruptor Lists", List I, List II and List III, see following links:

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

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

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

Substances that are transferred to one of the corresponding sub-lists "Substances no longer on list" and that no longer feature on Lists I–III are not prohibited. However, this does not apply to the substances listed in Sub-List II that were evaluated on the basis of regulations or directives that do not have provisions for identifying endocrine disruptors (e.g., the Cosmetics Regulation). These substances may have endocrine disrupting properties. Nordic Ecolabelling will

assess these substances on a case-by-case basis, based on the background information provided in Sub-List II.

- Halogenated organic compounds, such as short-chain chlorinated paraffins (C10-C13), medium-chain chlorinated paraffins (C14-C17)

  o Halogenated organic pigments that comply with the Council of Europe recommendation "Resolution AP (89) 1 on the use of colorants in plastic materials coming into contact with food", point 2.5.

  o Exemptions applies to preservatives in O13
- Per- and polyfluoroalkyl substances (PFASs), e.g., PFOA and PFOS
- Butylhydroxytoluene (BHT, CAS No. 128-37-0)
- Aziridine and polyazidirines

  o An exemption is made for aziridines/polyaziridines, if the substance is not classified as carcinogenic, mutagenic or reprotoxic from any manufacturer or in ECHA.
- Bisphenols and bisphenol derivatives

  o 34 bisphenols* that have been identified by ECHA for further EU regulatory risk management that are known or potential endocrine disruptors for the environment or for human health, or that can be identified as toxic for reproduction

  *Assessment of regulatory needs: Bisphenols. ECHA – 16 December 2021: Section 2.1: Bisphenols for which further EU RRM is proposed – restriction https://echa.europa.eu/documents/10162/c2a8b29d-0e2d-7df8-dac1-2433e2477b02
- Organotin compounds
- APEO (alkylphenol ethoxylates) and APD (alkylphenol derivatives/alkylphenols)

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

  o An exemption is made for sterically hindered phenolic antioxidants with molecular weight (MW) > 600 g/mole.
- Phthalates

  o Phthalates are esters of 1,2-benzenedicarboxylic acid (orthophthalic acid).
- Pigments, dyes and additives based on lead, tin, cadmium, chromium VI and mercury, and their compounds.

✉ A declaration from the chemical manufacturer or supplier, in accordance with Appendix 4.

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

Background to requirement O14

The list for prohibited substances includes substances that are standard to include in all product groups if Nordic Ecolabelling do not get information that they are irrelevant, as we apply the precautionary principle. In this way Nordic

Ecolabelling include unknown or new problematic ingoing substances or impurities that might be present in windows, window doors and external doors.

Candidate List Substances and PBT, vPvB

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

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

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

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

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

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

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

Endocrine disruptors:

Potential endocrine disruptors are substances that can negatively affect the hormonal balance in humans and animals. Hormones control a number of vital processes in the body and are particularly important for development and growth in humans, animals and plants.

Changes in the hormone balance can have adverse effects, with a particular focus on hormones that affect sexual development and reproduction. Several studies have shown effects on animals that are probably due to changes in the hormone balance. Effluent discharges are one of the major sources of the presence and

distribution of endocrine disruptors in aquatic ecosystems. Nordic Ecolabelling excludes identified and potential endocrine disruptors listed on the "Endocrine Disruptor Lists" at www.edlists.org, which is based on the EU member state initiative. Substances listed in Lists I, II and/or III are excluded.

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

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

Halogenated organic compounds

Halogenated organic compounds that contain halogens such as chlorine, bromine, fluorine or iodine must not be present in the chemical products used. This includes halogenated flame retardants, chloroparaffins, perfluoroalkyl compounds and certain organic bleaching chemicals. Halogenated organic compounds have various properties that are not desirable in Nordic Swan Ecolabelled products. They are harmful to human health and the environment, highly toxic to aquatic organisms, carcinogenic or harmful to health in other ways. The halogenated organic compounds do not break down readily in the environment, which increases the risk of harmful effects from the substances. A side reaction can occur during the manufacture of epoxy acrylate which results in a small amount of chlorine remaining inside the molecule. The chlorine that is bound in the molecule is relatively stable and will not react further while polymerisation continues. The ban on ingoing substances in the form of halogenated organic compounds applies to the chlorine because it becomes part of the molecule.

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

Fluorosurfactants and other per- and polyfluoroalkyl substances (PFASs) constitute a group of substances that have harmful properties. Certain per- and polyfluorinated compounds can degrade to the very stable PFOS (perfluorooctane sulphonate) and PFOA (perfluorooctanoic acid) and similar substances. These

substances are extremely persistent and are easily absorbed by the body[46]. The substances are found all over the globe, from the large oceans to the Arctic. PFOS have also been found in birds and fish and in their eggs. The substances in this group impact on the biological processes of the body and are suspected to be endocrine disruptors, carcinogenic and to have a negative impact on the human immune system[47]. PFOA, APFO (ammonium pentadecene fluoro octanoate) and certain fluoride acids are on the Candidate List due to their repro-toxicity, as well as PBT. There are new research results showing that shorter chains (2-6 carbon atoms) have been discovered in nature[48].

BHT

Butylhydroxytoluene (BHT, CAS No. 128-37-0) is new to the list of prohibited substances. BHT does not have an official harmonized classification. BHT is included in the EU member state initiative "Endocrine Disruptor Lists", List II Substances under evaluation for endocrine disruption under EU legislation.

Aziridines and polyazidirines

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

Bisphenols and bisphenols derivatives

Several bisphenols with the general bisphenol structure and 'bisphenol derivatives' which have constituents with structural properties common to bisphenols are now prohibited. Based on the potential for widespread use and available information on potential endocrine disruptors, reproductive toxicity and PBT/vPvB properties, 34 substances[49] were identified in need for further regulatory risk management in EU[50].

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

[47] 6 E.g., Heilmann, C. et al, Persistente fluorbindelser reducerer immunfunktionen, Ugeskr Læger 177/7, 30.3.2015 OSPAR 2005: Hazardous Substances Series, Perfluorooctane Sulphonate (PFOS), OSPAR Commission, 2005 (2006 Update), MST, 2005b: Miljøprojekt nr. 1013, 2005, More Environmentally Friendly Alternatives to PFOS-compounds and PFOA, Danish Environmental Protection Agency, 2005

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

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

[50] 2] Annex XV restriction report https://echa.europa.eu/documents/10162/450ca46b-493f-fd0c-afec-c3aea39de487

Organotin compounds

Organotin compounds are used in biocides and as fungicides in a wide range of consumer products. In the textile industry, they can be found in products such as socks, shoes, and sportswear to prevent odours caused by the breakdown of perspiration. One of the most common organotin compounds is tributyltin (TBT). Several of the tin-organic compounds are banned for selected areas of use through Reach Annex XVII entry 20 and the following three; TBTO, DBTC and DOTE are on the EU Candidate List[51].

Alkylphenols, alkylphenol ethoxylates and/or alkylphenol derivates

Alkylphenol ethoxylates (APEO) and/or alkylphenol derivatives (APD) are a group of non-readily degradable surfactants that are proven endocrine disruptors. APEOs may be present in binders, dispersing and thickening agents, siccatives, foam inhibitors, pigment pastes, wax, etc. Alternatives to APEOs are available based on alkyl sulphates, alkyl ether sulphates and alcohol ethoxylates. These are readily biodegradable but also have harmful properties, being toxic to aquatic organisms and some may be bioaccumulative. However, there is an environmental gain to be made by substitution since they break down rapidly and the degradation product nonylphenol, with its endocrine-disrupting effects, is avoided.

Phthlalates

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

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

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

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

O15 Nanomaterials

Nanomaterials/-particles* must not be added or be present in the glass in windows and doors or in the chemical products used to manufacture windows and doors. The following substances are exempted from the requirement:

- Pigments. This exemption does not apply to pigments added for other purposes than imparting colour.
- Naturally occurring inorganic fillers. This exemption applies to fillers subject to Annex V, paragraph 7 of REACH.
- Synthetic amorphous silica (SAS). This exemption applies to non-modified synthetic amorphous silica. Chemically modified colloidal silica can be included in the products as long as the silica particles form aggregates in the final product. Any surface treatment must meet the chemical requirements in O11,O12 and O13.
- Unmodified calcium carbonate ($CaCO_3$). This exemption applies to unmodified ground calcium carbonate (GCC) and unmodified precipitated calcium carbonate (PCC).
- Polymer dispersions.
- Aluminium oxide.

** Nanomaterials/-particles are defined according to the EU Commission Recommendation on the Definition of Nanomaterial (2022/C 229/01), see Table 1 for full definition.*

✉ The manufacturer must declare any nanomaterial/-particle that occur in the chemical products used, see Appendix 4.

✉ The manufacturer must declare any nanomaterial/-particle that occur in the glass used in windows and doors, see Appendix 5.

Background to requirement O15

Nanomaterials are a diverse group of materials under the size of 100 nm. Due to their small size and large surface area nanoparticles are often more reactive and may have other properties compared to larger particles of the same material. Further, different sizes, shapes, surface modifications and coatings can also change their physical and chemical properties. Nanoparticles can cross biological membranes and thus be taken up by cells and organs. One of the main concerns are linked to free nanoparticles, as some of these – when inhaled – can reach deep into the lungs, where the uptake into the blood is more likely.

There is concern among public authorities, scientists, environmental organisations, and others about the insufficient knowledge regarding the potential detrimental effects on health and the environment[52],[53],[54]. Nordic

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

[53] Parliamentary Assembly of the Council of Europe (2017 (2013)) Nanotechnology: balancing benefits and risks to public health and the environment.http://assembly.coe.int/CommitteeDocs/2013/Asocdocinf03_2013.pdf

[54] SweNanoSafe. Nationell plattform för nanosäkerhet.https://swenanosafe.se/ (2020-05-06)

Ecolabelling takes these concerns seriously and applies the precautionary principle to exclude potentially hazardous nanomaterials from products.

Pigments:

Pigments are finely ground, insoluble particles that are used to give products a specific colour. There are no substitutes that can fulfil pigments' function as colourants in paints, coatings etc., and many pigments consist partly or entirely of nanoparticles. Thus, nano-sized pigments are exempted. Clear evidence-based conclusions of the safety of nano-pigments cannot be drawn, but "exposures to nano-sized pigments that are integrated into polymer, paint or coating matrices are not thought to be significant, and the risks to consumers from such uses are low", according to a literature study commissioned by ECHA[55].

Nordic Ecolabelling does not consider titanium dioxide nanoparticles as pigments, and nano-TiO_2 is therefore not exempted.

Fillers:

Naturally occurring fillers from for example chalk, marble, dolomite and lime are exempted from registration according to appendix V, point 7 in REACH as long as these fillers only are physically processed (milled, sieved and so on) and not chemically modified.

Synthetic amorphous silica (SAS):

Synthetic amorphous silica (SAS) is an intentionally manufactured silicon dioxide (SiO_2) form that has been used in industrial, consumer and pharmaceutical products for decades. SAS is a nanomaterial, under the European Commission definition and is exempted from the requirement due to a lack of alternative substances.

Calcium carbonate ($CaCO_3$):

Calcium carbonate is found, for example, in sealants used in window manufacture.

Ground Calcium Carbonate (GCC) is formed directly from the grinding of limestone to a powder. GCC can be produced using two different processing methods that are dry or wet. Each method produces different finishing products that suit different applications. Precipitated Calcium Carbonate (PCC) is produced chemically and precipitated as a powder and is produced through a carbonation process between fast lime and carbon dioxide. It is a synthetic mineral that allows more flexibility in adapting its size, shape, particle size distribution compared to GCC. The chemical composition between GCC and PCC is the same though. GCC can be seen as naturally occurring. Although PCC is chemically manufactured, there is no indication that unmodified PCC would have a higher toxicity than GCC[56].

[55] Hynes J, Novotný T, Nic M, Kocurkova L, Prichystalová R, Brzicová T, Bernatikova S (2018) Literature study on the uses and risks of nanomaterials as pigments in the European Union. European Chemicals Agency.
[56] https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2022.7135

Polymer dispersions:

Polymer dispersions can technically fulfil the nanomaterial definition. The EU Commission has recommended that solid nanomaterials dispersed in a liquid phase (colloidal) should be considered as nanomaterials[57] [58] [59]. Non-solid (i.e. liquid and gaseous) particles are excluded from the definition.

Nano emulsions are not covered by the definition because they consist of liquid nano-objects suspended in a liquid phase and the term "particle" is intended to cover only solid nano-objects. Polymers exist in different phases and distinguishing between liquid, semi-solid and solid polymers can be very difficult. To treat all dispersed and suspended polymers alike and avoid confusion, we explicitly state that polymer dispersions are exempted from the requirement. However, some polymer dispersions will still be excluded from Nordic Swan Ecolabelled products because they are covered by a restriction on microplastics or by other chemical requirements.

Aluminium oxide:

Aluminium oxide is added to the powder coating as an "anti-lump" agent and as a fluidizing agent to improve the function of the electrostatic powder coating and thereby facilitate application. The aluminium oxide can be nanostructured as it is required for the function that the alumina has a small particle size.

3.7 Emissions to air

In this section requirements regarding VOC emissions from solvent-based wood impregnation and solvent-based surface treatment are given.

O16 Emissions to air from wood impregnation

Total emissions of volatile organic compounds (VOC) from vacuum impregnation (solvent-based impregnation) must not exceed 6 kg VOC per m^3 treated wood.

Total emissions are the sum of fugitive emissions and emissions in waste gases, according to EU Directive 2010/75/EU Article 57.

The requirement must be met regardless of whether the impregnation is performed by the manufacturer or by a supplier.

✉ Calculation and measurements according to methods described in EU Directive 2010/75/EU Appendix VII Part 7.

Background to requirement O16

The requirement has been tightened compared to generation 4 of the criteria.

Wood can be damaged by bacteria, fungi, insects or other bugs. These organisms can cause rot, discoloration or mechanical damage. There are several methods for

[57] European commission, COMMISSION STAFF WORKING PAPER, Types and uses of nanomaterials, including safety aspects, SWD(2012) 288 final. https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SWD:2012:0288:FIN:EN:PDF

[58] Communication from the commission to the European parliament, the Council and the European Economic and Social Committee, Second Regulatory Review on Nanomaterials, COM(2012) 572 final. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012DC0572

[59] EU Commission recommendation on the definition of nanomaterial (2022/C 229/01) https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022H0614(01)&from=EN

wood preservation of wooden windows and doors that are used at the Nordic market. The methods are:

- vacuum impregnation with organic solvents,
- water-based impregnation, applied by dipping, flow-coat or similar.
- use of heartwood,
- use of the 2ØKO-system (90% heartwood in combination with water-based treatment)
- use of heat-treated wood.

Pressure impregnation with copper-based wood preservatives are normally not used for carpentry above ground, like windows and doors. As in previous generations of these criteria such impregnation methods are not allowed in Nordic Swan Ecolabelled windows and doors.

Regardless of wood preservation technology, surface treatment with one or several layers of surface treatment/paint are used. The surface treatment may also contain biocides.

There are considerable variations in the views on wood preservation techniques between different producers in the Nordic countries. Several window producers have, through the years, switched from solvent-based vacuum impregnation to other technologies, to decrease the environmental impact and reduce the production time.

Vacuum impregnation is normally performed using organic solvents. The product used most often consists of 90% organic solvent, usually turpentine, and 10% active substance/biocide. Vacuum impregnation using organic solvents results in emissions of volatile organic compounds (VOC) to air. These VOCs are primarily a mixture of aliphatic hydrocarbons and contribute to the formation of low-level ozone, a substance that is harmful to health and the environment. The use of VOCs also involves working environment risks. Thus, it is important to minimize the emissions of VOC from vacuum impregnation facilities.

The Nordic Ecolabelling does not exclude any specific wood preservation technology but set strict requirements for vacuum impregnation. The reasons are:

- VOC emissions are only one environmental impact among many from window and door production, see section 2. Several LCA studies indicate that heat loss during the usage phase is the most important environmental impact over the course of the life cycle[4].
- The Nordic Ecolabelling's screening of the market has shown that windows where the vacuum impregnation technology is used, generally has a long warranty time, which is an indication of a long durability of the products.
- Vacuum impregnation is an effective and proven technology for sapwood.
- Heartwood is a good option, but during Nordic Ecolabelling's dialogue with manufacturers it has been clear that there are challenges with the availability of heartwood. Therefore, well protected sapwood is needed on the market to meet the demand of wood windows.

The Industrial Emission Directive[60] sets up limit values for solvent-based wood protection. The limit values apply for facilities using more than 25 tonnes of solvents per year. The limit values are implemented in different national legislation in slightly different ways in different countries.

Table: Emission limit values according to DIRECTIVE 2010/75/EU. According to the directive emission of volatile organic compounds from installations shall not exceed the emission limit values in waste gases and the fugitive emission limit values, or the total emission limit values.

Activity (solvent consumption threshold in tonnes/year)	Emission limit values in waste gases (mg C/Nm3)	Fugitive emission limit values (percentage of solvent input)	Total emission limit values (kg/m^3)
Wood impregnation (>25)	100	45	11

The Nordic Swan Ecolabel requirements for windows and doors, set stricter requirements for VOC-emissions than the legislation by two means:

- A broader area of application: The requirement must be fulfilled by all facilities using solvent-based technology and not just the larger plants under the scope of the EU Directive.
- Stricter limit value than the regulation: Total emissions of maximum 6 kg /m^3 treated wood compared to 11 kg/m^3 treated wood according to legislation.

The limit value is set as total emissions per m^3 treated wood. Total emissions are the sum of emissions in the waste gases and fugitive emissions. To reach the limit set in Nordic Swan Ecolabel criteria, 6 kg per m^3 treated wood, and still have sufficient wood protection according to the NTR B-class, technology for cleaning of waste gases must be installed.

O17 Emissions to air from surface treatment

VOC emissions from solvent-based surface treatment must not exceed 60 mg C/Nm^3.

The requirement applies to solvent-based surface treatment. Surface treatment systems where all layers are water-based (base- and topcoat) are not covered by this requirement.

✉ Calculation of the emissions or measurement of the emissions. Methods described in EU Directive 2010/75/EU, Appendix VII Part 7 or corresponding methods must be used.

✉ Declaration from the manufacturer clarifying if the products for surface treatment are solvent-based or water-based, in accordance with Appendix 4.

Background to requirement O17

The requirement is the same as in generation 4 of the criteria, but it is clarified that it is only applicable for solvent-based surface treatment. There can be some

[60] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

emissions of VOC also from water-based surface treatment. However, since VOC emissions from water-based solutions are much lower, Nordic Ecolabelling has decided that the requirement does not need to be documented for those cases. In this way, Nordic Ecolabelling promotes water-based solutions, by simplifying the certification process.

The requirement is stricter that the legislation since:

- The area of validity is broader. The requirement must be fulfilled by all facilities using solvent-based surface treatment and not just the larger plants that fall under the scope of the EU Directive 2010/75/EU.
- The limit value is stricter than the regulation; 60 mg C/m^3 waste gases compared to 100 mg C/mg waste gases in the EU Directive.

3.8 Circular economy requirements

This section describes requirements with the intention of increasing the circularity of windows and doors by increasing the recycling of materials by the end-of-life of these products. This includes a requirement for recycling of float glass into new float glass.

O18 Design for disassembly

It must be possible to separate the main material types including insulating glass from each other at the end of the window or door's service life.

✉ Description of how the materials including the glass can be separated from each other for ease of material recycling and/or replacement/repair/refurbishment.

Background to requirement O18

The purpose of the requirement is to facilitate the recycling of materials used in windows and doors by the end of these products' service life. Today, a large quantity of windows and doors in the Nordic countries end up in landfill or for incineration[6,61]. Another purpose of the requirement is to facilitate replacement and refurbishment/repair, such as the replacement of an insulation glass unit during the lifetime of the window/window door.

O19 Material recycling and take-back system

If no national waste collection systems for windows and doors are established, the manufacturer of window and doors must:

- offer a system for taking back products, e.g., old used windows and doors, incorrect deliveries, faulted products and so on,

  or

- be in a process/test/pilot phase to establish a system for taking back products, e.g., old used windows and doors, incorrect deliveries, faulted product and so on.

✉ Description of the offered or planned/tested take-back system.

[61] Meeting with Sverre Valde, CEO at Ruteretur AS, March 2024

Background to requirement O19

The requirement is new in this generation 5. Product take-back systems and focus on recovering value by taking back products to be material recycled, re-manufactured or refurbished, are fundamental for circular economy. In theory, the expected value from circularity is undeniable. However in practice, product take-back systems for windows and doors are often in small scale but the interest is increasing in the window industry[17,21,61,62] due to several benefits such as stronger customer relationship, reduction of environmental impacts by material recycling and lower cost due to secondary material supply and alternative supply of critical raw materials like glass.

When national waste collection systems are established for windows, these systems should be used to increase the material recycling of float glass from old windows. If no such systems are available, the producers should themselves start a process to establish some sort of system for taking back their products for material recycling and/or remanufacturing. This will reduce the amount of windows ending up on landfill or for incineration. There is not a requirement for how the manufacturer uses the collected products e.g., remanufacture into new equivalent products or other types of products.

O20 Recycling of float glass and production waste management

Window, window door and external door manufacturers, as well as manufacturers of insulating glass units, shall separate by source the waste generated in connection with the production.

A plan for the waste separation/sorting must be made, stating waste fractions and describing how the waste is dealt with (e.g. material recovery, incineration or landfill).

Waste/spill of float glass from the production of insulation glass units must be recycled into new float glass i.e. collected and sent back to a float glass producer.

Waste/spill of float glass from the production of windows and doors must as a minimum be collected and recycled to new glass i.e. to make glass packaging, insulation or fiberglass.

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

✉ A waste plan for the window/door producer detailing the waste fractions and the recipients of each waste fraction.

✉ A waste plan for the supplier of insulation glass units to the window/door producer. The waste plan must detail the waste fractions and the recipients of each waste fraction.

Background to requirement O20

Enabling the production waste to be recycled and processed for material recovery relies on good waste planning to ensure systems for sorting of the production waste/spill.

[62] Meeting with Jon Lille-Schulstad, Director of Business Development at Ragn-Sells AS, January 2024

Production of glass is related to environmental aspects as energy use and consume of sand which is a limited raw material[6]. Based on this, the requirement has been updated with specific requirements for material recycling of float glass. Waste/spill of float glass from the insulation glass production, must be recycled into new float glass, and waste/spill of float glass from the window/door production, must be as a minimum recycled into new glass.

3.9 Durability and functional requirements

O21 Durability of exposed wood parts

Wood that is exposed to the elements* must meet one of the options in Table 6, according to the type of wood treatment.

In addition, regardless of wood protection method, the systems for surface treatment are to be tested according to EN 927 "Coating materials and coating systems for exterior wood". The system must fulfil the limit values "stable end use category" in Table 1 of EN 927-2. The "Exposure condition" defined in Table 2 of EN 927-1 shall be "Medium".

Table 6 Various methods for protecting wood and the requirements for documentation of durability

Wood protection method	Required documentation of durability
Preservative treated wood in accordance with NTR	NTR B
Preservative treated wood not classified in accordance with NTR	The following (all bullet points) must be tested by an accredited laboratory: - EN 113-1 (not C. versicolor) after separate accelerated ageing with EN 73 and EN 84 or CEN/TS 839 (not C. versicolor) after separate accelerated ageing with EN 73 and EN 84. - EN 330 In addition, presented values shall be reviewed by an accredited party or by a corresponding independent body.
Heartwood (>90%) in combination with wood preservative.	- Calculation of percentage of heartwood. - Tests in accordance with EN 152 achieve grade 1, for the overall basic and surface treatment system or a certificate showing that the treatment system fulfils the industry standard 2ØKO.
Nordic Swan Ecolabelled durable/resistant wood	Licence number and product name.

**Profiles covered with aluminium or other materials are not considered to be exposed to the elements.*

✉ Documentation / certificate in accordance with Table 6.

✉ Test report and test certificate under EN 927 for surface treatment system.

Background to requirement O21

The purpose of the requirement is to ensure that Nordic Swan Ecolabelled products have satisfactory durability of parts exposed to the elements over time, since durability is a good indicator that the products will have a long service life. It should be noted that wood structures that are protected by metal (e.g. aluminium clad wooden windows) are not considered to be exposed to the elements.

For wooden windows, there are several different methods to treat the wood to ensure good durability. The producers are free to use their systems, as long as the durability can be documented through testing. The requirement thus lists several options to document durability, depending on method used.

However, the wood treatment systems used must comply with other requirements regarding for example chemicals and VOC-emissions.

NTR standard

The Nordic Wood Preservation Council (NTR) is a co-operation body for the Nordic industry associations in the field of wood protection. NTR has developed a common Nordic standard for impregnated wood which is supplemented with a system for approval of wood preservatives and quality control of impregnated wood[63].

Wood treated through impregnation with wood preservative is divided by the Nordic Wood Preservation Council (NTR) into four classes: NTR M, NTR A, NTR AB and NTR B. The classification is based on EN 351-1 and is linked to the use classes defined in EN 335. For windows and doors only the class NTR B is relevant.

Heartwood

Thanks to its natural content of preservatives, heartwood has a natural resistance to rot. However, to guarantee the durability, some wood preservation is normally used. The requirement is set according to the Danish window association's requirements for the 2ØKO treatment system.[64]

Preservative treated wood not classified in accordance with NTR

The test methods required are the same tests required for use class 3.1 in the overall standard for wood preservation EN 599-1. The requirement accepts either EN 113 or CEN/TS 839. EN 113 is the standard relevant for penetrating processes, while CEN/TS 839 is the standard relevant for superficial treatment.

O22 Functional requirements

Nordic Swan Ecolabelled windows, window doors and external doors must meet technical requirements regarding thermal transmittance, air permeability, climate testing and water tightness.

Thermal transmittance: See requirement O2.

Air permeability and climate testing: See requirement O4.

Water tightness: Windows, window doors and external doors must be tested according to method A or method B* according to EN 1027. If method A is used, at least Class 9A according to EN 12208 must be fulfilled. If method B is used, at least Class 7B must be fulfilled.

Products tested according to method B must have descriptions of required shielding such that declared performances are not compromised.

[63] https://www.ntr-nwpc.com/om-ntr/om-ntr
[64] https://www.vinduesindustrien.dk/professionel/de-tekniske-bestemmelser-for-dvv-1

** Method B is used for external doors installed under roof overhangs/protection.*

Water tightness is to be measured through tests based on the methods stated in product standard EN 14351-1. Presented values shall be determined by or reviewed by an accredited party or by a corresponding independent body, see Appendix 1.

✉ Test report of the water tightness test.

Background to requirement O22

The requirement has been updated from the previous generation. In the previous generation, the Nordic Swan Ecolabelled windows and doors were required to meet one of the established, relevant certifications in the Nordic region, such as SFDK, NVDK, DVV, the FI quality mark or the P-labelling. This was required to ensure that the products were functional and of good quality. However, some of these certifications like SFDK, the FI quality mark and P-labelling do not longer exist for windows and doors.

Nordic Ecolabelling considers thermal transmittance, air permeability and water tightness to be the parameters that are most important for the function and quality of all windows and doors under all conditions[13] Other parameters may be relevant in specific cases and under particular circumstances, but Nordic Ecolabelling aims to set a minimum requirement for technical function that all products must fulfil. The requirements for thermal transmittance and air permeability can be found in the energy requirements section, while the requirement for water tightness is specified separately in this requirement.

Water tightness is crucial for the durability of the product since a combination of wind and rain can squeeze water into openings and cavities, damaging the materials. Also, climate change increases the challenges of rain and wind, which is why it's essential to have strict requirements for water tightness.[65]

O23 Warranty

The window and window door manufacturer must provide a warranty of at least

- 20 years against wood rot
- 10 years guarantee of function, i.e. minimum both the opening/closing function of the window/window door and for water tightness and air permeability.
- 10 years guarantee of insulating glass unit, i.e. guarantee against condensation between glasses.
- The external door manufacturer must provide a 10-year guarantee for dimensional stability and function i.e. minimum both the opening/closing function of the door and for water tightness and air permeability.

✉ A copy of the warranty or information on the manufacturer's website, that states the terms and conditions of the product guarantee. If different warranty

[65] https://gemini.no/2024/01/gjorde-1130-tester-pa-norske-vinduer-dette-fant-forskerne-ut/?utm_source=RSS+Nyhetsbrev&utm_campaign=a1ba419932-RSS_CAMPAIGN_ALT&utm_medium=email&utm_term=0_de4d883975-a1ba419932-73667128

times are used for the same product because of commercial reasons, information for a product's longest warranty time should be used as documentation.

Background to requirement O23

A Nordic Swan Ecolabel product must have a good quality, and together with requirements related to durability, warranty is a factor that signals the product's lifetime and says something about what the customer can expect from the product. However, warranty should not be equated with longevity alone. Longevity is affected by many factors, including correct installation and correct and sufficient maintenance of the product.

A warranty can be designed in many different ways, but Nordic Ecolabelling set as a minimum requirement that states which parameters must be included.

The requirement has been tightened compared to the previous criteria generation. The required warranty period is now set to 20 years against wood rot, instead of 10 years, for windows and window doors. For doors the function warranty has been increased to 10 years compared to 2 years in the previous generation.

O24 Customer information

Manufacturers of Nordic Swan Ecolabelled products shall submit:

- Information on the window/window door's g-value and U-value and the external door's U-value in line with O2.
- Information on how to select U- and g-values based on the window/window door's position in order to achieve good heating economy and a good indoor climate.
- Information on various sun screening solutions and the importance of such, either as part of the licence applicant's own product portfolio or through an agreement with partners.
- Descriptions of required shielding for external doors if relevant so that declared water tightness performance are not compromised.
- Information on how the window/window door/external door should be handled at end-of-life for instance by using national waste collection systems for windows or by using some sort of a take-back system established by the window/door producer.
- Instructions describing the recommended maintenance for the window/window door/external door. Care instructions must contain details on how often the finish should be checked and maintenance performed, and which surface treatment is recommended.

✉ Information about the above on website or in brochure.

O25 Installation information

The following shall be attached to each window or external door delivery, or alternatively a reference to information available on a website:

- Instructions on handling the window/window door/external door during transportation, reception and storage at the building site.

- Instructions on how the window/window door/external door shall be installed into a wall, adjusted and protected during the construction period. General physical parameters for fitting must be specified.
    - Instructions must specify how the window/window door/external door should best be installed from an energy point of view in order to prevent heat loss as a result of poor installation.
    - Instructions must also specify how window/window doors/external doors should be installed to avoid damages caused by moisture.

✉ Written recommendations included with the delivery of the window/window door/external door to the customer, or reference to the website where such information is available.

Background to requirements O24 and O25

To enable a long service life for windows, window doors and external doors, which is an important environmental aspect, there is a requirement concerning customer information about recommended maintenance. And to improve material recycling and to ensure the environmentally best handling of windows and doors by end-of-life, there is a requirement regarding information on how the product should be handled at the end of its life.

To help the customers to select the optimal window/window door in order to achieve good heating economy and a good indoor climate, the producers must inform their customers on how the U- and g-values should be chosen based on the positioning of the window/window door. In addition, the licensee must inform the customer of the importance of sun screening solutions in order to avoid an increased need for cooling.

Correct installation of windows and doors is essential to avoid heat leakage from a building and also to avoid moisture from rain and snow damaging the wall construction and the window/door frames. To avoid poor installation work, there is a requirement concerning installation information for window and doors.

4 Licence Maintenance

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

O26 Customer complaints

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

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

✉ Send in your company's routine for handling and archiving customer complaints.

Background to requirement O26

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

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

O27 Traceability

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

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

✉ Please send in your routine or a description.

Background to requirement O27

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

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

5 Changes Compared to Previous Generation

Table 7 Overview of changes to criteria for generation 5 compared with previous generation 4.

Proposed requirement generation 5	Requirement generation 4	Same requirement	Change	New requirement	Comment
O1 Description of the product and the production	O1	X			
O2 Thermal transmittance	O2		X		Tighter limits for wood windows with water-based impregnation. Limits are now the same for wooden windows regardless of impregnation method.
O3 Daylight transmittance	O3		X		Limit value tightened. Limit of g-value removed.
O4 Air permeability and climate testing	O4		X		Test for climate testing in accordance with latest version of EN 14351-1.
O5 Tree species with restricted use	O10		X		Updated in accordance with Nordic Ecolabelling's principles concerning tree species.
O6 Traceability and certification of wood	O11	X			Same requirement level, but slightly updated wording.
O7 Production of steel	O5		X		The material requirement for steel can now be fulfilled both with recycled steel, or strict requirements to virgin steel.
O8 Production of aluminium	O5		X		The material requirement for Al can now be fulfilled both with recycled Al or strict requirements to primary Al.
O9 Excluded substances in insulation materials	O12		X		More substances are prohibited.
O10 Requirements for filler gas	O9	X			
O11 Classification of chemical products	O14		X		Updated according to Nordic Ecolabelling's latest knowledge. Updated list of exemptions.
O12 Classification of ingoing substances	O15		X		Updated according to Nordic Ecolabelling's latest knowledge. Updated list of exemptions.

Proposed requirement generation 5	Requirement generation 4	Same requirement	Change	New requirement	Comment
O13 Preservatives				X	New list of prohibited preservatives.
O14 Prohibited substances	O16		X		Updated list according to Nordic Ecolabelling's latest knowledge.
O15 Nanomaterials	O17		X		Chemically modified calcium carbonate is not exempted.
O16 Emissions to air from wood impregnation	O18		X		Limit tightened.
O17 Emissions to air from surface treatment	O18		X		Only need to be fulfilled if solvent-based surface treatment is used.
O18 Design for disassembly	O13	X			
O19 Material recycling and take-back system				X	New requirement related to take-back systems.
O20 Recycling of float glass and production waste management	O19		X		It is now specified that glass spill must be sent for recycling. And waste/spill of float glass from the production of insulation glass units must be recycled into new float glass.
O21 Durability of exposed wood parts	O20		X		The requirement is clarified, and CEN/TS 839 and EN 152 added as test methods.
O22 Functional requirements	O21		X		National standards are no longer required. Limit for water tightness has been added.
O23 Warranty	O22		X		Longer warranty against rot has been added.
O24 Customer information	O23		X		Information regarding shielding of doors and end-of-life handling is added.
O25 Installation information	O24	X			
O26 Customer complaints	O28	X			
O27 Traceability	O31	X			

Regulations for the Nordic Ecolabelling of Products

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

More information on graphical guidelines, regulations and fees can be found at www.nordic-swan-ecolabel.org/regulations

Follow-up Inspections

Nordic Ecolabelling may decide to check whether window and/or external door producers fulfil Nordic Ecolabelling requirements during the licence period. This may involve a site visit, random sampling or testing.

The licence may be revoked if it is evident that the window and/or external door producer does not meet the requirements.

Criteria Version History

Nordic Ecolabelling adopted version 5 of the criteria for windows and external doors on DAY MONTH YEAR. The criteria are valid until DAY MONTH YEAR.

Appendix 1 Laboratories and methods for testing and analysis

General requirements for test and analysis laboratories

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

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

The applicant's laboratory can be approved if it is accredited and complies with the requirements of the standard EN ISO 17025.

When testing quality and performance properties, the applicant's own laboratory can be approved even if it is not accredited. The following applies:

- The laboratory has a certified quality system (ISO 9001) which includes testing, and
- The laboratory can show that the test results obtained are similar to the results from an accredited test laboratory through initial tests performed as parallel tests. Parallel tests must as a minimum be performed when test standards are updates, and
- The laboratory performs the tests in accordance with an established plan for the current test standard and documents the selection of products in a product series for worst case tests, and
- An independent inspection body shall, on the basis of test reports, confirm that the manufacturer's test results are consistent with the results of an accredited laboratory. This can, for example, be evaluated as part of an inspection of the laboratory's quality system carried out by the inspection body for certification of the quality system.

Sampling methods for measuring the energy requirements

The thermal transmittance (U-value), daylight transmittance, air permeability and climate testing must be measured and/or calculated according to the standards and methods in accordance with EN 14351 -1.

Submitted/Presented values shall be determined by or reviewed by an accredited party or by a corresponding independent body.

U-values shall be determined and verified according to:

- EN ISO 10077-1 (simplified calculation) or EN ISO 10077-1 and ISO 10077-2 (detailed calculation) or
- EN ISO 12567-1 or EN ISO 12567-2 (hotbox-method)

Daylight transmittance-values shall be determined and verified according to EN 410. Validated software from established glass manufacturers (for example Pilkington and Saint-Gobain) can be used for calculations.

Air permeability shall be tested according to EN 1026 and air permeability class shall be determined and presented according to EN 12207.

Climate testing of external doors must be performed pursuant to standard EN 1121 and fulfil at least Class 2 according to EN 12219. Unless otherwise stated, a door of normal size is to be tested.

Appendix 2 Measures for efficient energy consumption in steel production

Blast furnaces	BAT is to maintain a smooth, continuous operation of the blast furnace at a steady state to minimise releases and to reduce the likelihood of burden slips. BAT is to use the extracted blast furnace gas as a fuel. BAT is to recover the energy of top blast furnace gas pressure where sufficient top gas pressure and low alkali concentrations are present.
BOF	BAT is to collect, clean and buffer BOF gas for subsequent use as a fuel. BAT is to reduce energy consumption by using ladle-lid systems. BAT is to optimise the process and reduce energy consumption by using a direct tapping process after blowing BAT is to reduce energy consumption by using continuous near net shape strip casting, if the quality and the product mix of the produced steel grades justify it.

Appendix 3 Declaration for insulation materials

This is a declaration for excluded substances in insulation materials used in windows and doors and applies to the manufacturers of the insulation material.

This declaration is completed and signed by the manufacturer of the insulation materials based on their knowledge at the time of the application, and based on tests and/or declarations from raw material manufacturers, with reservations for new advances and new knowledge. Should such knowledge arise, the undersigned is obliged to submit an updated declaration to Nordic Ecolabelling.

Name of the product
Manufacturer

Are any of the following substances present in the insulation material in concentrations higher than 100 ppm?

Substances categorised as Substances of Very High Concern (SVHC) and included on the EU REACH Candidate List*	Yes ☐	No ☐
Substances evaluated by the EU to be persistent, bioaccumulative, and toxic (PBT) or very persistent and very bioaccumulative (vPvB), in accordance with the criteria in Annex XIII of REACH	Yes ☐	No ☐
Substances classified as carcinogenic, mutagenic or toxic for reproduction (CMR) Category 1A and 1B	Yes ☐	No ☐
Endocrine disruptors: Substances on the EU member state initiative "Endocrine Disruptor Lists", List I, II and III.	Yes ☐	No ☐
Short-chain chlorinated paraffins (C10-C13) and medium-chain chlorinated paraffins (C14-C17)	Yes ☐	No ☐
Perfluoroalkyl and polyfluoroalkyl substances (PFASs)	Yes ☐	No ☐
Alkylphenols, alkylphenol ethoxylates (APEO) and other alkylphenol derivates (APD).	Yes ☐	No ☐
Brominated flame retardants**	Yes ☐	No ☐
Phthalates (Esters of phthalic acid (orthophthalic acid / phthalic acid /1,2- benzene dicarboxylic acid).	Yes ☐	No ☐
The heavy metals lead, cadmium, arsenic, chromium (VI), mercury and their compounds	Yes ☐	No ☐
Bisphenol A (CAS No. 80-05-7), bisphenol S (CAS No. 80-09-1) and bisphenol F (CAS No. 620-92-8).	Yes ☐	No ☐
Boric acid, sodium perborate, perboric acid, sodium borate (borax) and any other boron compounds classed as carcinogenic, mutagenic or reprotoxic in category 1A/1B/2/Lact.	Yes ☐	No ☐
Organotin compounds	Yes ☐	No ☐

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

Signature of manufacturer/supplier of the insulation material

Date	Company
Name of contact person in CAPITAL letters	Signature by contact person
Phone	E-mail

Appendix 4 Declaration of chemical products

To be used in conjunction with an application for a licence for the Nordic Swan Ecolabel of windows, window doors or external doors.

This appendix shall be completed and signed by the manufacturer of the chemical product based on the best of their knowledge at the given time, also based on information from raw material manufacturers and available knowledge on the chemical product with reservations for new advances and new knowledge. Should such new knowledge arise, the undersigned is obliged to submit an updated declaration to Nordic Ecolabelling.

This declaration shall be filled out for chemical products used in the production/assembly of the Nordic Swan Ecolabelled windows and doors such as impregnation, paints, lacquers, glues, putty, fillers and sealants.

Manufacturer of the chemical product:
Name of the chemical product:
Function of the chemical product:
For surface treatment chemical products: is the product solvent-based? Yes/No?

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

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

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

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

Classification of chemical products according to CLP regulation 1272/2008		
Is the chemical product classified with any of the hazard phrases below? Including all combinations of stated exposure routes and stated specific effect. For example, H350 also covers classification H350i.	Yes	No
H400 – Toxic to the environment Aquatic Acute 1	☐	☐
H410 – Toxic to the environment Aquatic Chronic 1	☐	☐
H411 – Toxic to the environment Aquatic Chronic 2	☐	☐
H420 – Toxic to the environment Ozone	☐	☐
H300 – Acute toxicity; Acute Tox 1 or 2	☐	☐
H310 – Acute toxicity; Acute Tox 1 or 2	☐	☐
H330 – Acute toxicity; Acute Tox 1 or 2	☐	☐
H301 – Acute toxicity; Acute Tox 3	☐	☐
H311 – Acute toxicity; Acute Tox 3	☐	☐
H331 – Acute toxicity; Acute Tox 3	☐	☐
H370 – Specific organic toxicity, STOT SE 1	☐	☐
H372 – Specific organic toxicity, STOT RE 1	☐	☐
H350 – Carcinogenic, Carc. 1A or 1B	☐	☐
H351 – Carcinogenic, Carc. 2	☐	☐
H340 – Germ cell mutagenic, Mut. 1A and 1B	☐	☐
H341 – Germ cell mutagenic, Mut. 2	☐	☐
H360 – Reproductive toxicity, Repr. 1A or 1B	☐	☐
H361 – Reproductive toxicity, Repr. 2	☐	☐
H362 – Reproductive toxicity, Lact.	☐	☐

The following are exempted from the requirement:

- *Classification H411 for all impregnation and surface treatment.*
- *Classification H351 for adhesive products containing methylene diphenyl diisocyanate (MDI).*
- *Classifications H350, H341, H301, H311 and H331 for adhesive products and resins containing formaldehyde (CAS No. 50-00-0). For these products, up to 0.2% by weight (2000 ppm) of free formaldehyde is permitted. The requirement applies to the pure adhesive before mixing with any hardener.*
- *Classification H360 for propiconazole (CAS No. 60207-90-1) used as wood preservative.*

If the answer to any of the above questions is Yes, state the CAS No. (where possible), chemical name and level (in ppm, % by weight or mg / kg). Also state whether the substance is contained in the form of an impurity or an added substance. Please state also if the above-mentioned exceptions apply.

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Classification of ingoing substances according to CLP regulation 1272/2008		
Does the chemical product contain substances classified with any of the hazard phrases below? Including all combinations of stated exposure routes and stated specific effect. For example, H350 also covers classification H350i.	Yes	No
H350 – Carcinogenic, Car 1A or 1B	☐	☐
H351 – Carcinogenic, Carc. 2	☐	☐
H340 – Germ cell mutagenic, Mut. 1A or 1B	☐	☐
H341 – Germ cell mutagenic, Mut. 2	☐	☐
H360 – Reproductive toxicity, Repr. 1A or 1B	☐	☐
H361 – Reproductive toxicity, Repr. 2	☐	☐
H362 – Reproductive toxicity, Lact.	☐	☐
EUH380 - Endocrine disruption for human health, ED HH 1	☐	☐
EUH381 - Endocrine disruption for human health, ED HH 2	☐	☐
EUH430 - Endocrine disruption for the environment, ED ENV 1	☐	☐
EUH431 - Endocrine disruption for the environment, ED ENV 2	☐	☐
EUH440 - Persistent, Bioaccumulative and Toxic properties, PBT	☐	☐
EUH441 - Very Persistent, Very Bioaccumulative properties, vPvB	☐	☐
EUH450 - Persistent, Mobile and Toxic properties, PMT	☐	☐
EUH451 - Very Persistent, Very Mobile properties, vPvM	☐	☐
For **two-component products** it is the added ingredients in the separate components that shall comply with the requirement. **An exemption is made if it can be documented that protective equipment was worn when the hardener was mixed with the paint/varnish and that the finished two-component product was applied in a closed system**.		
Is the declaration about classification of ingoing substances done for a hardened two-component product?	☐	☐
If yes, will the exemption from the classification requirement for two-component products be applied? If yes, please give below a description of the application system and how employees are protected from exposure.	☐	☐
The following are also exempted from the requirement: • *Classification H351 for methylene diphenyl diisocyanate (MDI).* • *Adhesive and resin containing formaldehyde (CAS No. 50-00-0) classified as H350 and H341. For these products, up to 0.2% by weight (2000 ppm) of free formaldehyde is permitted. The requirement applies to the pure adhesive before mixing with any hardener.* • *Titanium dioxide (CAS No. 13463-67-7) classified as H351.* • *1,1,1-Trimethylolpropane (TMP, CAS No. 77-99-6) classified as H361.* • *Classification H360 for propiconazole (CAS No. 60207-90-1) in wood preservatives.*		

If the answer to any of the above questions is Yes, state the CAS No. (where possible), chemical name and level (in ppm, % by weight or mg / kg). Also state whether the substance is contained in the form of an impurity or an added substance. Please state also if the above-mentioned exceptions apply.

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Preservatives*			
* *Wood preservatives used as impregnation agents are exempted from this requirement. Wood preservatives used in surface treatment like paint and oil, are not exempted from this requirement*			
Please state if content of preservatives exceeds the limit values below		Yes	No
Preservative:	Limit value		
Bronopol (CAS No. 52-51-7)	≤ 500 ppm (0.05% by weight)	☐	☐
IPBC (iodopropynyl butylcarbamate, CAS No. 55406-53-6)	≤ 4500 ppm (0.45% by weight)	☐	☐
Mixture (3:1) of CMIT/MIT (5 chloro-2-methyl-4-isothiazolin-3-one / 2-methyl-4-isothiazolin-3-one, CAS No. 55965-84-9)	≤ 15 ppm (0.0015% by weight)	☐	☐
MIT (2-methyl-2H-isothiazol-3-one, CAS No. 2682-20-4)	≤ 100 ppm (0.01% by weight)	☐	☐
Total amount of isothiazolinones	≤ 1500 ppm (0.15% by weight).	☐	☐

If the answer to any of the above questions is Yes, state the CAS No. (where possible), chemical name and level (in ppm, % by weight or mg / kg) for each preservative.

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Prohibited substances		
Does the chemical product contain any of the following substances?	Yes	No
Substances on the Candidate List The Candidate List can be found on the ECHA website: http://echa.europa.eu/candidate-list-table D4 (CAS No. 556-67-2), D5 (CAS No. 541-02-6) or D6 (CAS No. 540-97-6) must only be included in the form of residues from raw material production and are allowed in concentrations up to 1000 ppm each in the silicone raw material.	☐	☐
Substances that have been judged in the EU to be PBT (Persistent, Bioaccumulative and Toxic) or vPvB (very Persistent and very Bioaccumulative) PBT and vPvB in accordance with the criteria in Annex XIII of REACH	☐	☐
Endocrine disruptors: Substances on the EU member state initiative “Endocrine Disruptor Lists”, List I, List II and List III, see following links: List I: https://edlists.org/the-ed-lists/list-i-substances-identified-as-endocrine-disruptors-by-the-eu List II: https://edlists.org/the-ed-lists/list-ii-substances-under-eu-investigation-endocrine-disruption List III: https://edlists.org/the-ed-lists/list-iii-substances-identified-as-endocrine-disruptors-by-participating-national-authorities *Substances that are transferred to one of the corresponding sub-lists “Substances no longer on list” and that no longer feature on Lists I–III are not prohibited. However, this does not apply to the substances listed in Sub-List II that were evaluated on the basis of regulations or directives that do not have provisions for identifying endocrine disruptors (e.g., the Cosmetics Regulation). These substances may have endocrine disrupting properties. Nordic Ecolabelling will assess these substances on a case-by-case basis, based on the background information provided in sub-List II.*	☐	☐
Halogenated organic compounds, such as short-chain chlorinated paraffins (C10-C13), medium-chain chlorinated paraffins (C14-C17). Halogenated organic pigments that comply with the Council of Europe recommendation "Resolution AP (89) 1 on the use of colorants in plastic materials coming into contact with food", point 2.5. Exemptions apply for bronopol, IPBC, MIT and CMIT/MIT (3:1), see requirement O13.	☐	☐
Per- and polyfluoroalkyl substances (PFASs), e.g., PFOA and PFOS	☐	☐

Butylhydroxytoluene (BHT, CAS No. 128-37-0)	☐	☐
Aziridine and polyazidirines An exemption is made for aziridines/polyaziridines, if the substance is not classified as carcinogenic, mutagenic or reprotoxic from any manufacturer or in ECHA	☐	☐
Bisphenols and bisphenol derivatives 34 bisphenols* that have been identified by ECHA for further EU regulatory risk management that are known or potential endocrine disruptors for the environment or for human health, or that can be identified as toxic for reproduction. **Assessment of regulatory needs: Bisphenols. ECHA – 16 December 2021: Section 2.1: Bisphenols for which further EU RRM is proposed – restriction* https://echa.europa.eu/documents/10162/c2a8b29d-0e2d-7df8-dac1-2433e2477b02	☐	☐
Organotin compounds	☐	☐
APEO (alkylphenol ethoxylates) and APD (alkylphenol derivatives/alkylphenols) Alkylphenol derivatives are defined as substances that release alkyphenols when they break down. An exemption is made for sterically hindered phenolic antioxidants with molecular weight (MW) >600 g/mole.	☐	☐
Phthalates - Phthalates are esters of 1,2-benzenedicarboxylic acid (orthophthalic acid).	☐	☐
Pigments, dyes and additives based on lead, tin, cadmium, chromium VI and mercury, and their compounds.	☐	☐

If the answer to any of the above questions is Yes, state the CAS No. (where possible), chemical name and level (in ppm, % by weight or mg / kg). Also state whether the substance is contained in the form of an impurity or an added substance. Please state also if the above-mentioned exceptions apply.

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Nanomaterials		
	Yes	No
Does the chemical product contain nanomaterials/-particles*? **Nanomaterials/-particles are defined according to the EU Commission Recommendation on the Definition of Nanomaterial (2022/C 229/01):* *'Nanomaterial' means a natural, incidental or manufactured material consisting of solid particles that are present, either on their own or as identifiable constituent particles in aggregates or agglomerates, and where 50% or more of these particles in the number-based size distribution fulfil at least one of the following conditions:* *(a) one or more external dimensions of the particle are in the size range 1 nm to 100 nm;* *(b) the particle has an elongated shape, such as a rod, fibre or tube, where two external dimensions are smaller than 1 nm and the other dimension is larger than 100 nm;* *(c) the particle has a plate-like shape, where one external dimension is smaller than 1 nm and the other dimensions are larger than 100 nm.*	☐	☐
The following are exempted from the requirement: • *Pigments. This exemption does not apply to pigments added for other purposes than imparting colour.* • *Naturally occurring inorganic fillers. This exemption applies to fillers subject to Annex V, paragraph 7 of REACH.* • *Synthetic amorphous silica (SAS). This exemption applies to non-modified synthetic amorphous silica. Chemically modified colloidal silica can be included in the products as long as the silica particles form aggregates in the final product. Any surface treatment must meet the chemical requirements in O11,O12 and O13.*		

- *Unmodified calcium carbonate ($CaCO_3$). This exemption applies to unmodified ground calcium carbonate (GCC) and unmodified precipitated calcium carbonate (PCC).*
- *Polymer dispersions.*
- *Aluminium oxide.*

If the answer to any of the above questions is Yes, state the CAS No. (where possible), chemical name and level (in ppm, % by weight or mg / kg). Also state whether the substance is contained in the form of an impurity or an added substance. Please state also if the above-mentioned exceptions apply.

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Signature of manufacturer/supplier

Date	Company
Name of contact person in CAPITAL letters	Signature by contact person
Phone	E-mail

Appendix 5 Declaration for nanomaterials/-particles in glass used in windows and doors

Name of the product
Manufacturer/supplier

Are nanomaterials/-particles* added or present in the glass used in the windows or doors? ☐ Yes ☐ No

If yes, please specify which nanomaterials/-particles:

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**Nanomaterials/-particles are defined according to the EU Commission Recommendation on the Definition of Nanomaterial (2022/C 229/01), see Table 1 for full definition.*

Signature of manufacturer/supplier

Date	Company
Name of contact person in CAPITAL letters	Signature by contact person
Phone	E-mail