Consultation Response:
New Criteria for Nordic Swan Ecolabelled Windows and Exterior Doors 062
22 August 2024

PVC and the Nordic Swan: Challenging the Bias Towards Aluminum and Timber

Introduction

This document highlights five key points for why PVC windows should be eligible for the Nordic Swan label: the safety of PVC production, its long durability, maintenance-free nature, recyclability, and affordability. The document argues that the current criteria are inconsistent and calls for a reconsideration of PVC's exclusion, urging the Nordic Ecolabelling Board to include PVC based on its overall performance and its 20+ years of dedicated sustainable development.

1. Safe PVC production, challenges with timber and aluminium

When comparing the production of the materials typically used for windows, including timber, PVC and aluminium, EU sources emphasize that the production of PVC is generally considered to be unproblematic in terms of environmental impact. Contrary to this, there are significant challenges associated with the production of both timber and aluminum windows, which can both achieve the Swan label.

The EU's Chemicals Agency ECHA has found in a major PVC investigation for the EU Commission from November 2023 that European PVC production is safe under current regulations and operating conditions.[1]

Vacuum impregnation, which is allowed in Swan-labelled timber windows to prevent rot, often involves the use of organic solvents which can release volatile organic compounds (VOCs). These pose a risk to the environment and human health.[2]

According to the EU Commission and recent peer-reviewed journal articles, aluminum production has a high carbon footprint. It is estimated that aluminium production is responsible for 1-2% of global greenhouse gas emissions due to the massive amounts of thermal energy involved in refining. Aluminium is also causing significant environmental pollution through the extraction of raw materials. Aluminum is known to be toxic to freshwater organisms, making its disposal potentially harmful to the environment. While much of the aluminium produced is still in use, primary aluminium production keeps increasing, with China as leading producer.[3]

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[1] https://echa.europa.eu/documents/10162/17233/rest_pvc_investigation_report_en.pdf
[2] https://eippcb.jrc.ec.europa.eu/reference/surface-treatment-using-organic-solvents-including-wood-and-wood-products-preservation ; https://eur-lex.europa.eu/EN/legal-content/summary/reducing-the-emissions-of-volatile-organic-compounds-vocs.html
[3] https://op.europa.eu/s/zLEc , p. 226; https://doi.org/10.1007/s11367-023-02257-8

It seems perplexing that PVC windows, whose production has been documented as low-risk and environmentally safe, are not eligible for the Swan label. Meanwhile, timber windows treated with harmful impregnation and aluminum windows, despite the significant environmental and climate challenges associated with their production, can achieve this certification. This raises questions about the fairness of the current labelling system.

2. Long durability in all kinds of weather

The main reason for choosing PVC windows is the very long durability of at least 50 years, which is the reference in Environmental Product Declarations (EPDs). The long service life has been documented by Aalborg University, among others.[4]

PVC windows remain unchanged, even under the strong influence of wind and weather, which among other things makes them ideal for coastal climates, which cover a good 30% of the EU. PVC windows do not discolor and retain their appearance and structural integrity over time. PVC is dimensionally stable, which prevents moisture from penetrating. In contrast, aluminum can corrode in salty air. Timber is not dimensionally stable, which can cause cracks to appear, where moisture can penetrate, with rot and fungus as a result.

It seems perplexing that PVC windows, which third-parties verify have a service life on par with alternative windows, and do not require maintenance during use, are not eligible for the Swan label. Meanwhile, the Swan promotes windows which require frequent maintenance that may involve uncontrollable risks for health and environment (see below).

3. Maintenance-free PVC versus frequent painting

PVC windows require minimal maintenance compared to timber and aluminum windows. Unlike timber, which needs to be painted regularly, and aluminum, which needs to be repainted because the powder coating dulls over time, PVC windows remain maintenance-free.

Paint and varnish often contain harmful substances such as formaldehyde and isocyanates, as well as organic solvents that lead to the release of VOCs to the indoor climate and can absorbed through the lungs or skin, leading to acute or chronic health effects.

Acute effects include headaches, dizziness, fatigue, and intoxication after inhaling fumes, along with irritation of the eyes, nose, and throat. Skin contact can cause eczema. Chronic effects develop after prolonged exposure, primarily affecting painters and craftsmen who were historically exposed to high concentrations. The solvents damage the brain and nervous

[4] https://www.epddanmark.dk/media/h0vjs0oz/md-22126-da.pdf
https://vbn.aau.dk/ws/portalfiles/portal/465276076/BUILD_Levetidstabel_version_2021.pdf , p. 42;

system, resulting in memory loss, nervousness, irritability, and potentially psychological changes.[5]

Common preservatives in paint include formaldehyde-releasing agents and isothiazolinones, both effective but also allergenic. In recent years, attention has focused on isothiazolinones. According to the Danish Consumer Council, the substance methylisothiazolinone (MI) is present in most water-based paints and is allowed in eco-labeled paints.[6]

A 2012 study by the Danish Allergy Research Center analysed 19 water-based paints purchased in Denmark. All contained methylisothiazolinone (MI), with some also containing methylchloroisothiazolinone (MCI) and benzisothiazolinone (BIT). MI concentrations in some paints exceeded the limits allowed in cosmetics. Even paints labeled with environmental certifications like the EU Ecolabel and the Nordic Swan had similar MI concentrations as non-certified paints.[7]

A 2015 European study found MI in 93% of paints and BIT in 96%, with high concentrations of MI not listed on labels or safety sheets. Environmental labels did not correlate with lower MI levels. In rooms with freshly painted walls, MI can be detected in the air for at least 42 days, MCI is also measurable, while BIT evaporates less. This explains why some individuals develop MI allergies after being in freshly painted rooms, with symptoms like eczema, asthma, or hay fever persisting long after painting. Painters are particularly at risk, with a study from Gentofte Hospital in Denmark showing 27% of painters tested had an MI allergy. Once sensitised, they may also react to other isothiazolinones, potentially ending their careers as painters.[8] Further, Asthma-Allergy Denmark reports a significant increase in allergies in the general population due to MI.[9] According to the Danish Consumer Council, MI-free paints are available, however they may contain other harmful isothiazolinones.[10]

Further, cleaning brushes often involves the use of harmful chemicals such as turpentine or cellulose thinner.[11] In addition to the risks for professional and DIY painters, as well as residents, research has shown that paint is the largest source of microplastics entering the maritime environment.[12]

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[5] https://www.bolius.dk/sundhedsskadelig-maling-18709
[6] https://taenk.dk/kemi/plejeprodukter-og-kosmetik/mi-saadan-undgaar-du-det-allergifremkaldende-stof
[7] https://www.videncenterforallergi.dk/produkter/maling/
[8] https://www.videncenterforallergi.dk/produkter/maling/
[9] https://www.bolius.dk/sundhedsskadelig-maling-18709
[10] https://taenk.dk/kemi/bolig-og-fritid/maling-saadan-vaelger-du-den-sikreste
[11] https://www.bolius.dk/sundhedsskadelig-maling-18709
[12] https://www.forbes.com/sites/jamiehailstone/2022/02/09/paint-is-the-largest-source-of-microplastics-in-the-ocean-study-finds/

It seems perplexing that PVC windows, which emit no substances during their service life, contribute to a safer working environment and a healthier indoor climate, are not eligible for the Swan label. Meanwhile, other types of windows which involve risks that cannot be controlled, can easily receive this certification.

4. Unique recyclability and existing collection schemes

PVC windows can be mechanically recycled multiple times and new windows can contain up to 70% recycled material. By including recycled PVC in production, the environmental impact can be further reduced, as it reduces the need to produce new PVC plastic. Already today, waste from the window manufacturers is included in the production of new window profiles, and since 1997 manufacturers of rigid PVC building products in Denmark have collected end-of-life PVC windows through the WUPPI scheme. In other EU countries, recycling rates are up to 90%.[13]

A recently adopted EU regulation ensures that recycled material with up to 1.5% lead can be used as the inner core in window profiles with minimal risk to people and the environment. The regulation is based on several years of thorough risk assessments. In 2026, a closed circuit will be introduced for windows, which will increase circularity.[14]

In contrast, while timber from windows is in principle recyclable, there are so many barriers for successful recycling that the timber is often incinerated, contributing to carbon emissions. First, the timber may have been exposed to moisture and mechanical stress, affecting its strength. Careful sorting into different strength classes is necessary before it can be repurposed for new construction products. Second, timber may contain hazardous substances, such as oil-based paints, further complicating recycling.[15] Aluminium is easily recyclable, yet small impurities may be introduced during each recycling cycle, which may affect its quality over time. The presence of paint may also pose a barrier for effective recycling.

It seems perplexing that PVC windows, which are fit for the circular economy and in some countries have nearly 100% recycling rates, are not eligible for the Swan label. Meanwhile, recycling challenges exist for Swan-labeled timber and aluminium windows.

5. PVC windows are the most affordable option

PVC windows are the most cost-effective option available. Firstly, their initial purchase price is considerably lower than that of timber windows and significantly more affordable than aluminum windows:

[13] https://www.bkv-gmbh.de/news-reader-4/rewindo-again-more-pvc-waste-windows-recycled-in-germany.html
[14] https://pvc.dk/2023/05/04/eu-forordning-bly/
[15] https://www.danskskovforening.dk/skoven/danmark-spilder-stort-potentiale-for-at-genbruge-trae/

Reference: https://www.bolius.dk/plastvindue-98188

Another significant economic benefit of PVC windows is the minimal maintenance costs, as mentioned above. PVC windows do not require any painting or varnishing, unlike timber windows, which must be regularly treated to protect against rot and fungus. Timber windows not only require expenses for paint and varnish, but also for materials such as brushes and possible labor. In addition, there may be a need to erect scaffolding, which further increases the cost of maintaining timber windows. Aluminum windows may also require expensive powder coating maintenance during their service life.

The low price of PVC helps to keep the costs of new construction and renovation down, which is crucial for affordable housing.

It seems perplexing that PVC windows, which have the lowest total cost of ownership and thus most effectively supports the economic and social pillars of sustainability, are not eligible for the Swan label.

Concluding remarks

As is hopefully evident from the above, PVC is probably the least harmful choice for health and environment when it comes to windows and doors. Based on this, Nordic Ecolabelling is encouraged to reconsider whether the decision to exclude PVC is in line with the Swan's purpose, namely to promote the best environmental choices.

The Swan's latest argument against environmental labeling of PVC, namely the alleged lack of interest from manufacturers, is, in our view, highly problematic. Because some current manufacturers have not found it appropriate to apply, this should not preclude manufacturers from applying in the future.

As more and more builders make demands for Swan-labelled products, window manufacturers would naturally like to be able to supply Swan-labelled products. If the exclusion of PVC windows is maintained, it will thus have market-distorting effects, because producers will be denied access to the market on questionable environmental grounds.

Further, part of the Swan's purpose is to show manufacturers what measures they must take to improve the environmental profile of their products. The Swan label must therefore create incentives. By depriving PVC producers of the opportunity to obtain the Nordic Ecolabel, a potential incentive to invest in environmental improvements is removed.

What is worse, based on the above, one cannot rule out environmental burden shifting, which the Swan seeks to avoid as a matter of principle.[16] This means that if the exclusion of PVC is maintained, other and perhaps more serious environmental problems may arise. After all, the Swan cannot ensure that the maintenance of Swan-labelled timber windows takes place with Swan-labelled products, nor that paints do not end up in the maritime environment as microplastics. Added to this is the environmentally harmful vacuum impregnation of the wood in the Swan-labelled windows, a process which is not even necessary to produce a functional timber window.

In conclusion, it is worth asking when will PVC be considered on a level playing field with other materials? Today's PVC is fundamentally different from the PVC that was produced, used, recycled and finally disposed of 25 years ago. This is due to the systematic transformation of an entire value chain, which has been carried out by the European PVC industry's extensive sustainable development commitment VinylPlus, which is unique within plastics and has required large investments. VinylPlus is recognised by the UN as a role model for how an industry can initiate a sustainable development process.[17]

Already today, PVC windows carrying the VinylPlus® Product Label are recognised in BREEAM and are promoted along Type 1 eco-labels such as the Swan in the official guide for green public procurement in Belgium.[18]

It is our hope that the Nordic Ecolabelling Board will enter a constructive process of setting up criteria that can include PVC as a material for windows and doors, and the PVC industry will of course make itself available with the necessary data.

Signatories – The Nordic PVC Network:

PVC Information Council Denmark, https://pvc.dk
PVC Forum Norway, https://pvc-forum.no/
PVC Forum Sweden, https://www.ikem.se/pvc-forum/
Finnish Plastics Industries Federation, https://www.plastics.fi/eng/

[16] https://www.nordic-swan-ecolabel.org/nordic-ecolabelling/criteria-development/environmental-burden-shifting/
[17] https://www.vinylplus.eu/about-us/what-they-say-about-us/
[18] https://guidedesachatsdurables.be/fr/content/fenetres-et-portes-exterieures; https://www.vinylplus.eu/news/vinylplus-product-label-first-sustainability-scheme-dedicated-to-plastics-recognised-in-breeam/

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