



natureplus e.V.

Guideline 0502

Concrete Roof Tiles

Version: 22-05, Jan. 14, 2022

for the awardance of the eco-label

0 Introduction

The International Association for Sustainable Building and Living – natureplus e.V. – has set itself the goal, through the awardance of a quality label (eco-label), of promoting the use of those construction products which are especially suited to achieving the goal of economicsustainability. The three classic pillars of sustainability (the environment, social aspects and the economy) are reflected in natureplus's the three fundamental requirements: the environment, health and functional quality.

Every construction activity encroaches upon the natural environment and is connected with the consumption of limited resources. Our responsibility towards future generations requires us to undertake every effort to reduce these encroachments to the lowest level possible and to limit our use of resources to a necessary minimum. In view of the foreseeable exhaustion of the reserves of fossil fuels, for example, and the dangers to the earth's climate, such an approach is the only possible means to ensure sustainable and socially equitable development. For the building sector this means promoting the use and application of construction products which help to minimize the consumption of fossil fuels and limited resources. It is natureplus's intention to help promote the commercial success of those products which fulfil these demands.

Energy-saving building methods and the avoidance of uncontrolled ventilation facilitates the accumulation of volatile chemical compounds in the interior air that are emitted by building products and the inventory contained within the building. This presents a(n) (avoidable) danger to the health of the occupants. Also, the accretion of chemical contaminants (especially phthalates/plasticisers) from building products on house dust, the increasing use of biocides in everyday products and the dangers posed by mould growth due to negative product characteristics give rise for concern. An increasing proportion of the population are exhibiting reactions, such as allergies, to the negative health-related effects of these construction products. natureplus therefore evaluates the compatibility of construction products, especially in the usage phase, according to strict standards in order to actively promote those materials which pose no risk to health and are, in addition, conducive to a healthy room climate.

The natureplus®-Eco-label is an award for construction products which meet the highest standards of sustainability by exhibiting the best possible performance in terms of the environment, health and functionality. Scope of the assessment is the building material as raw material and as component. Only the best products in a particular product group are eligible for certification in order to act as an orientation for all building professionals and consumers towards the promotion of a culture of sustainable building. The natureplus®-Eco-label has anticipated the requirements of construction products of the European Construction Products Directive EU CPR 305/2011: In the future this regulation requires a declaration of performance with evidence of the sustainable use of natural resources and of compliance with requirements in terms of low impact, over their entire life cycle, on the environmental quality or on the climate, energy-efficiency and the hygiene, health and safety of people. The natureplus®-Eco-label already provides these proofs of performance in relation to the essential characteristics of construction products. This is gauged by natureplus according to criteria and requirements which, as a rule, far exceed the legal requirements and as a minimum comply in each case with the strictest recognised standards applicable.

The natureplus®-Eco-label is classified as a Type I environmental label as per ISO 14024, taking into consideration the EU Ecolabel Regulation and the EMAS regulation on environmental auditing, and is valid across the whole of Europe according to uniform criteria. The pre-requirements for a construction product to be certified with the natureplus®-Eco-label are its especially high performance characteristics in terms of the environment, health and sustainability. The main focuses are on the protection of limited resources by the minimisation of the use of petrochemical substances, sustainable raw material extraction/harvesting, resource-efficient production methods and the longevity of the products. Therefore, building products made from renewable raw materials, raw materials which are unlimited in their availability or from secondary raw materials will be favoured for certification.

I Application Areas

The following criteria contain the requirements for the awardance of the natureplus eco-label for concrete roofing tiles. This awardance guideline is to be applied exclusively to the named products.

2 Award Criteria

The prerequisite for a product to be awarded the natureplus® quality label in accordance with these guidelines is compliance with the following award guidelines:

- GL-5001 Chemicals Directive
- GL-5003 Nature Conservation when Exploiting Mineral Resources
- GL-5004 Transparency and Social Responsibility
- GL-5010 Low-emission building products
- GL-5020 Climate compatibility and energy efficiency

The prerequisite for a product to be awarded the natureplus quality label is compliance with the basic criteria RL-0000 and the chemicals directive RL-5001.

2.1 Functional Suitability

The manufacturer must provide documentary evidence of compliance with the requirements of EN 490 - Concrete roofing tiles and fittings for roof covering and wall cladding - Product specifications, and EN 491 - Concrete roofing tiles and fittings for roof covering and wall cladding - Test methods.

The manufacturer must provide details on the durability/lifespan of coated roof tiles and on the durability/lifespan of the coating. These details must be supported through the provision of appropriate expert assessment reports or other relevant proof.

If the product exhibits special, manufacturer-specific characteristics (e.g. lifespan, pollutant degradation properties, etc), these are to be supported by the provision of appropriate documentation and expert assessment reports.

2.2 Composition, Forbidden Substances, Substance Restrictions

The following components are permitted:

- Mineral-based binding agents such as cement, fly-ash, pulverised limestone,
- Aggregates such as sand, gravel and
- Water

Recycled materials should also be used as aggregates e.g. crushed concrete.

Mineral-based coatings or pure acrylate-based synthetic coatings are permitted as surface coatings, if it can be proven that the coating exhibits a sufficient durability/lifespan. This proof will be considered to have been provided if, for example, the manufacturer offers a 10 year guarantee on the product or can provide relevant results from long-term studies.

Only pigments from iron oxide or inorganic substances with a comparable or lower level of toxicity are permitted. Under no circumstances are metal compound additives permitted which are prohibited according to GL-5001.

The use of synthetically produced so-called nano materials which can detach themselves from the product matrix is not permitted as long as a conclusive evaluation of the health risks and the toxicological risks to the environment of these materials has not been

completed and compliance shown with the requirements of the natureplus Basic Criteria. The manufacturer is responsible for providing such proof.

The use of any additional additive must be technically justified. The use of halogen-organic compounds is not permitted. Any separating agents used in the production of the roof tiles must fulfil the requirements of the natureplus Basic Criteria.

The product is subject to laboratory analyses as laid down in section 3 and has to comply with the limit values stated therein.

2.3 RawMaterial Sourcing, Production of Preliminary Products, Production

Proof of the origin and quality of the raw materials must be provided. In particular, it must be ensured that the secondary raw materials are of a consistent quality level.

Through the application of quality assurance procedures in the processing plant and the roof tile works, it should be ensured that no harmful or toxic substances are introduced into the product. In particular, the materials must be free from impurities (proportion of impurities less than 1 M%). The product must not contain any tar or asbestos components. Hazardous wastes according to the German Directory of Waste Regulations (Abfallverzeichnisordnung (AVV)) as aggregates are not permitted.

If cement is employed as a binding agent, the cement manufacturer must provide confirmation that the following requirements have been met:

- The cement production equipment must meet modern standards of energy efficiency for the ovens and for the flue gas cleaning equipment.
- If waste products are also incinerated, the emissions must comply with the guideline 2000/76/EG of 4. December 2000 concerning the incineration of waste - Point II.1 "Special Regulations for Cement Ovens in which Waste Products are Incinerated"

Proof must be provided of compliance with statutory regulations relating to the extraction of the raw materials for the binding agent(s). Documentation on the energy consumption levels and emission analyses must be provided in order that they can be confirmed.

The roof tiles must exhibit an above average ecological performance, in the areas of the conservation of natural resources and energy efficiency in both the extraction of resources and the production process, in order to be eligible for the awardance of the natureplus®-eco Label. A product eligible for certification must exhibit a distinct, above-average performance in at least one of these areas and must not fall below the level of accepted comparative standards in the other areas. The manufacturer must provide suitable proof of compliance with these criteria. For products which are not normally sold in markets beyond national borders, the comparative standards shall be deemed to be the normal industry standards of the domestic country; otherwise the standards of the target country shall apply. Included in these areas are:

- Sustainable use of raw materials and resource-efficient production
 - The use of suitable secondary raw materials e.g. production and building-site waste, binding agents that include a recycled proportion (e.g. super-sulphated cement), recycled aggregates, etc.
 - The use of especially environmentally- and health compatible, mineral-based, coating materials or a reduction of the coating quantity if synthetic-based coating materials are employed or refraining completely from the use of a coating.
 - Weight reduction e.g. through the use of lightweight aggregates
 - Overfulfilment of the ecological indicator requirements, in particular with respect to a proven, especially long durability/lifespan
- Sustainable usage
 - A proven, especially long durability/lifespan e.g. through the use of a special coating technology

- Excellent functional suitability e.g. high levels of frost resistance, high resistance to the development of algae and moss, etc.
- Recycling and reuse
 - The recovery of roof tile production waste and its reuse within the production process or an alternative form of reuse
 - A system for recycling building-site waste and/or the reuse of the products

2.4 Usage

The product must not exhibit any unpleasant or foreign smells or odours. The emissions during use have to be in compliance with the limit values according to section 3.

Emissions must not exceed the natureplus limits according to section 3 during the use phase. (see section 3 and RL5010)

2.5 Recycling/Disposal

A disposal concept must be provided for the products.

2.6 Ecological Parameters

All products in this product group must be manufactured in such a way that the ecological parameters listed in RL 5020 are fulfilled.

2.7 Declaration

The product packaging should display a full declaration of the input materials listed, analogue to the EU-Cosmetic Regulations, according to the declining mass percentage. If it is not possible to display this information directly on the product packing, it should be provided with the product in a technical datasheet or sales leaflet (in English or in the national language). If intermediate/preliminary products or formulations are used as input substances and the proportion present in the final product is >0.1 M-%, then all the substances used within these must also be taken into account for the declaration.

For naming the input materials as part of the declaration the following applies:

- More than 1 M-% - designation of the substance in question
- Less than 1 M-% - at least a functional designation (e.g. "moth proofing agent")

When using ingredients with an environmentally hazardous potential, the manufacturer must indicate at an appropriate place which measures are to be taken within the framework of dismantling and demolition work to protect the environment (e.g. controlled dismantling).

Furthermore, it is obligatory to provide the following information in a suitable form to the consumer or user (eg. online):

- Instructions for use and safety precautions
- Indications for storage and disposal
- Batch numbers
- City/town and country of production
- Indication of geographical origin of the key input material

Additionally, the following product-specific information must be made available to the consumer or user.

- Type and field of application
- Awardance reason as per 2.3 (field of above-average performance)
- Or otherwise, the declaration of the additional positive characteristic(s) and a reference to the corresponding expert assessment report.
- Guarantee and guarantee period

2.8 Processing and Installation

No further requirements in this section.

2.9 Packaging

The packaging used must be recyclable. The manufacturer must belong to a recycling system, if one exists for the corresponding material.

Paper and cardboard packaging must be made from recycled paper. Alternatively, paper from sources as per GL-5002 is also permitted.

Plastic packaging must be made from polyolefins. PET, polystyrene or polycarbonates are allowed exceptionally in reasonable cases.

PVC packaging is generally not permitted.

Packaging must not contain biocides.

The natureplus certification mark has to be printed on the packaging after it has been awarded.

3 Laboratory Tests

The products are subject to laboratory analyses to test for harmful substances and undesirable ancillary ingredients. A representative sample is collected during the production audit. If the sample collection cannot be conducted by a natureplus examiner, an independent person designated by natureplus can collect the sample. For products with different sizes but the same composition, a single sample is sufficient.

3.1 Volatile Organic Compounds VOC / TVOC

To check the emission of VOC and to determine the TVOC and TSOC, an emission chamber test is carried out with the product. Measurements are usually performed after 3 and 28 days. If a low VOC emission is to be expected, a termination measurement can also be carried out after 7 days. The test-chamber examination is performed according to the current version of natureplus guideline 5010. The product must comply with the limit values specified in guideline 5010.

3.2 Element Analyses

The product is subject to an element analysis to determine the content of harmful elements and to check for undesirable contaminations. The measurements have to be in compliance with the limit values. The analysis is performed according to the current version of the test method TM-02 metals.

Element	Limit value [mg/kg]
Arsenic (As)	≤ 5
Cadmium (Cd)	≤ 1
Cobalt (Co)	≤ 20
Chromium (Cr)	≤ 50
Copper (Cu)	≤ 35
Mercury (Hg)	$\leq 0,5$
Nickel (Ni)	≤ 40
Lead (Pb)	≤ 15
Antimon (Sb)	≤ 5
Tin (Sn)	≤ 5
Zinc (Zn)	≤ 300

If the metal limit values are exceeded, an additional analysis of the raw materials (binding agents and aggregates) is performed to establish whether the increased metal/metalloid concentration(s) within the product is/are caused by particular raw materials. If the raw materials are established as the cause of the increased concentration(s), the product will be subject to an additional eluate analysis. If the product complies with the eluate limits then compliance with the requirements of the metal/metalloid tests will be deemed to have been successful. If the metal/metalloid concentrations can not be attributed to the raw materials, additional research is necessary to elucidate the causes of the element contents.

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For the eluate analysis, the following limit values apply:

Element	Limit value [mg/kg]
Arsenic (As)	$\leq 0,05$
Barium (Ba)	≤ 2
Cadmium (Cd)	$\leq 0,005$
Chromium (Cr)	≤ 1
Copper (Cu)	$\leq 0,1$
Mercury (Hg)	$\leq 0,001$
Nickel (Ni)	$\leq 0,2$
Lead (Pb)	$\leq 0,04$

3.3 Other Analyses

Chromium VI

Test parameters	Limit values	Unit	Method
Chromium VI (Cr VI)	≤ 2	mg/kg	TRGS 613

4 Appendix

Test methods

TM-01 VOC : Volatile Organic Compounds VOC/TVOC, formaldehyde, acetaldehyde and TSVOC; DIN EN ISO 16000 series expanded by the natureplus implementation rules.

TM-02 Metals: ICP-MS measurements according to DIN EN ISO 17294-2, supplemented with the natureplus implementation rules and a sample preparation adjusted to the issue analysed.

TM-03 Halo: Halogenic organic compounds after combustion, determined by microcoulometry according to the natureplus implementation rules "AOX/EOX".

TM-04 Odour: natureplus implementation rules "odour intensity", 6-degree grading scale 24h after loading the test chamber

TM-05 Pesticides: DFG S 19 extended by natureplus implementing regulations

TM-08 Foreign fibres and foreign substances: scanning electron microscopy SEM

TM-09 Monomeric isocyanates: 24h after test chamber loading