



natureplus e.V.

Guideline I 102

Vertically Perforated Bricks

Version: 22-05, April 10, 2024

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 economic sustainability. 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 award criteria contain requirements for the natureplus®-ecolabel.

The guideline applies to vertically perforated bricks made of clay and loam.

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-5020 Climate compatibility and energy efficiency

2.1 Functional Suitability

The manufacturer must provide documentary evidence of compliance with EN 771-1 or a comparable standard.

The manufacturer must demonstrate how an increased level of acoustic insulation ($R_w =$ a minimum of 43 dB), for the exterior wall constructions that they have recommended, may be achieved.

If this can not be demonstrated, the manufacturer must indicate that the product is not suitable for applications in which increased acoustic insulation requirements are necessary.

Bricks without insulation materials and blocks which may be used for single-skin exterior walls (36.5 cm thickness and above) must exhibit a thermal conductivity (calculation value) according to EN 1745 of 0.14 W/(mK).

This requirement does not apply to products which are to be used for other purposes. Also, this requirement does not apply to bricks, for which it can be proven, that they are only sold in regions in which the heating degree days in the heating period are below 2500 Kd/a.

2.2 Composition, Forbidden Substances, Substance Restrictions

At least 98% of the brick-product based upon its state of moisture balance must be made from mineral and renewable raw materials. The following main components are permitted: Clay, loam, mineral sand/meals, water and pore-producing additives (foaming agents).

The use of any additional additive must be technically justified.

As a rule only additives from waste/recycling materials may be used as foaming agents. Proof of the origin and quality of the foaming agents must be provided. Foaming agents for masonry blocks, which are used in single-skin exterior walls, may also be produced from primary materials e.g. freshly foamed polystyrene, if the manufacturer can prove that the necessary technical requirements could not be met using secondary materials. A continuation of the period of this exemption ruling should be investigated at the next major test examination. The manufacturer must provide evidence of his efforts to find an alternative, which is comprised from renewable or recycled raw materials, to the polystyrene foaming agent.

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 Raw Material Sourcing, Production of Preliminary Products, Production

A certificate of origin must be provided for all raw materials.

When using mineral raw materials, the requirements of [RL-5003](#) must be complied with.

The requirements for transparency and social responsibility along the supply chain according to [RL-5004](#) apply.

The brick production facility must meet the most modern standards relating to

- the efficiency of the kiln and
- the flue gas cleaning.

Atmospheric emissions of

- dust
- sulphur dioxides, nitrous oxides, hydrogen chloride, hydrogen fluoride
- benzene, phenol, styrene, formaldehyde
- volatile organic compounds (specified as the total level of carbons)

must comply with the limitation requirements of the technical code of practice for the prevention of air pollution (TA-Luft) or a comparable standard and/or the regulations for tile production facilities (BGBl. 720/1993).

Periodic controls through internal and external personnel, the throughput levels, the height of the chimney and the location of the facility must all be sufficient to ensure that no plant damage is caused by the effects of any fluoride emissions. If there remains any suspicion of plant damage then measurements on the surrounding vegetation are to be performed. As a guideline, in this case the limits of the Austrian forestry regulations for measurements on vegetation (indicator – fir tree) should be applied:

- 0.8% total fluoride in the first year of needle growth
- 1% total fluoride in the second and third years of needle growth

2.4 Usage

No further requirements in this section.

2.5 Recycling/Disposal

Masonry bricks must comply with the requirements for the disposal of construction waste in accordance with DepVO (Austria: BGBl. 1996/164, Germany: DepV of 24.7.2002, BGBl. I S. 2807) or an equivalent standard.

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")

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 [1] of the main input material [2]

[1] Designation of countries or more specific regions

[2] Key input material: The input material with the highest proportion in the product

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).

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

- Details of warranty and warranty period
- Details of compatible renders and mortars

2.8 Processing and Installation

The manufacturer must recommend a natureplus-certified mortar to be used for applying the product.

If such a mortar is not available, at least one low-emission mortar based on mineral compounds is to be recommended. This mortar must not contain more than a maximum of 5 M-% organic components and a maximum of 0.1 M-% volatile organic compounds. This is subject to testing based on the full declaration of all input materials, supplemented with information supplied by the manufacturer of the mortar.

The following additives are prohibited:

- Glycol ethers and -esters
- APEO's (Alkyl phenol ethoxylate)
- Formaldehyde separators/dispersers
- Halogen organic compounds

Thin-bed mortars containing cement must comply with EU-Guideline 2003/53/EC.

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.

Once awarded, the natureplus label must be printed on the packaging or made visible to the consumer in another suitable place.

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

No requirements according to guideline 5010 are imposed for masonry bricks without insulating material content.



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)	≤ 20
Cadmium (Cd)	≤ 1
Chromium (Cr)	≤ 100
Copper (Cu)	≤ 100
Mercury (Hg)	≤ 0,5
Molybdenum (Mo)	≤ 5
Nickel (Ni)	≤ 100
Lead (Pb)	≤ 20
Antimon (Sb)	≤ 5

In case the limit values are exceeded, an element analysis will be performed for the raw materials.

If the metal/metalloid concentrations recorded can be linked to the raw materials, an additional eluate analysis of the product will be conducted. This is used to check the solubility of the metals/metalloids in the product.

The requirements of the elemental analysis are deemed to be met if the measurements are in compliance with the eluate limit values as listed below.



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.

Element	Limit value [mg/l]
Arsenic (As)	≤ 0,05
Cadmium (Cd)	≤ 0,004
Chromium (Cr)	≤ 0,05
Copper (Cu)	≤ 0,2
Mercury (Hg)	≤ 0,001
Molybdenum (Mo)	≤ 0,2
Nickel (Ni)	≤ 0,04
Lead (Pb)	≤ 0,05
Antimon (Sb)	≤ 0,006

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

TM-10 PAH: HPLC / GC-MS, sum according to EPA



Atmospheric emissions from the kiln must comply with the following limits:



Pos.	Prüfparameter	Limit value	Unit
1	Dust particle emissions	50	mg/ m ³
2	Sulphur oxides (declared as SO ₂) at a mass flow rate ≥ 5 kg/h and a raw material sulphur content of:		
	a) less than 0,12%	500	mg/ m ³
	b) 0,12% or more than 0,12% Upon request, authorities have to permit the exceedance of this limit value in an individual case, if the exceedance is technically justified by the state of the kiln technology used for brick production and by the sulphur content of the raw materials.	500	mg/ m ³
3	Fluorine (declared as HF) at a mass flow rate ≥ 0.05 kg/h	5	mg/ m ³
4	The expected levels of organic carbon compounds resulting from the production process (without methane) are declared as the total level of carbon at a total mass per unit volume ≥ 2 kg/h. These include:	100	mg/ m ³
	a) Ethanal (Acetaldehyde) at a mass flow rate ≥ 0.1 kg/h	20	mg/ m ³
	b) Benzene (independent of the mass flow rate)	5	mg/ m ³
	c) Ethenyl benzene (styrene) at a mass flow rate ≥ 2 kg/h	100	mg/ m ³
	d) Methanal (Formaldehyde) at a mass flow rate ≥ 0.1 kg/h	20	mg/ m ³
	e) Phenol at a mass flow rate ≥ 0.1 kg/h	20	mg/ m ³
	The total mass per unit volume of the substances a) to e) in the above list must not exceed 100 mg/m ³ . The sum of the mass per unit volume of Acetaldehyde, Methanal (Formaldehyde) and Phenol must not exceed 20 mg/m ³ .		
5	Nitrogen oxide (declared as NO ₂) at a mass flow rate ≥ 5 kg/h		
	a) without an afterburning system	200	mg/ m ³
	b) with afterburning system	300	mg/ m ³

6	Inorganic vapour or gaseous chlorine compounds (declared as HCl) at a mass flow rate ≥ 0.3 kg/h	30	mg/ m ³
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Source: BGBl 1993/720 (Austria)

The limit values according to [RL 2010/75](#) apply to newly constructed firing kilns.

The mass per unit volume and threshold limits correspond to the volume of the flue gases - which have been reduced by the volume of the steam produced during the manufacturing process - at 0 °C and 1013 mbar and with an oxygen content of 18 %. In the case of nitrous oxide emissions produced using an afterburner unit, the oxygen content level of the reduced volume of the flue gases is 15%.

