natureplus e.V.

Award Guideline 1105

Porous Concrete Blocks and Elements

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For the Awardance of the Eco-Label

1. Application Areas

The following criteria contain the requirements for the awardance of the natureplus eco-label for porous concrete blocks and elements for walls. This awardance guideline is to be applied exclusively to the named product group.

2. Award Criteria

The prerequisite for the awardance of the natureplus eco-label is the fulfilment of the basic criteria GL-0000 and the chemicals directive GL-5001.

2.1 Suitability of Application

The manufacturer must, through the submission of relevant documentation, prove conformity with EN 771-4, including the increased requirements of DIN V 4165-100. Standardised building block elements require a special proof of the applicability of the product e.g. in the form of a building inspectorate general certificate of approval. Proof of conformity with DIN 4166 or an equivalent standard for non load-bearing standardised building blocks must be supplied.

A design value of the thermal conductivity - the thermal conductivity including a moisture content supplement – for porous concrete which is used for single-skinned external walls must be demonstrated. This must not exceed the numerical value in accordance with EN 1745, Table A 10 for $\lambda_{10\ tr}$ (P = 90 %).

The manufacturer must demonstrate how an increased level of acoustic insulation (R_w = a minimum of 43 dB), for the exterior wall constructions that are 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.

2.2 Composition, Forbidden Substances, Substance Restrictions

The following components are permitted: building lime, sand, cement, recycling material from porous concrete waste (chunks/breakage), water, recycled gypsum or recycled anhydrite and pore-producing additives (foaming agents). The use of further additives must be technically justified. Any aluminium used in the foaming agents must be from a recycled source.

The product must consist of at least 95% mineral-based components based upon the dry weight of the product. The production facility must be designed in such a manner that it is capable of

utilising unmixed recycling material (from building site waste, demolition) according to its availability. The proportion of hydrophobic (water resistant/repellent) additives and other polymer additives within the product must not exceed 5 M%. Biocides and halogen-organic compounds are prohibited.
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 renewable raw materials. If mineral raw materials are used, the requirements of GL-5003 must be complied with. Evidence of compliance needs to be provided.

The production facility must meet the most modern standards relating to

- the efficiency of the steam production equipment and
- the concentration of emissions

Atmospheric emissions from the steam production equipment must comply with the following limits:

	Parameter	Limit value	Unit
1	Dust particle emissions through combustion using natural gas	5	mg/m³
	Soot number according to DIN 51 402 through combustion using heating oil	1	
2	Sulphur oxides		
	a) (declared as SO_2) through combustion using natural gas	35	mg/m³
	b) Sulphur content of the heating oil through combustion using heating oil	0,2	%
3	Carbon monoxide through combustion using		
	a) Natural gas	100	mg/m³
	b) Heating oil	170	mg/m³
4	Nitrogen oxide (declared as NOx) through combustion using		
	a) Natural gas	200	mg/m³
	b) Heating oil	250	mg/m³

The declared concentrations within the emitted gas should be determined under standard reference conditions (273 K, 1013 hPa), dry and with an O_2 volume concentration of 3 Vol.-%.

If quartz sand is used as an additive, the manufacturer must provide evidence that no danger was posed to the workforce from quartz dust during the production process. Relevant evidence includes: - the wet grinding of the quartz sand; no permanent workplaces in areas with high dust levels; dust extraction using high-efficiency filters; controls and inspections on a rotational basis by an official/governmental safety agency/inspectorate etc.

If the product contains more than 5% cement, the cement manufacturer must provide confirmation that the following requirements have been met:

- No raw materials have been used in the production of the cement which are classified as hazardous waste according to the German Directory of Waste Regulations (Abfallverzeichnisordnung (AVV)) or originate from areas which are classified are highly contaminated.
- The cement production equipment must meet modern standards for energy efficiency of the ovens and for the flue gas cleaning equipment. If waste products are also incinerated, then these waste products should be of a defined quality and not adversely affect the emission balance of the incineration process. The emissions must comply with the guideline 2000/76/EC of 4th December 2000 concerning the incineration of waste - Point II.1 “Special Regulations for Cement Ovens in which Waste Products are Incinerated”

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.

2.5 Recycling/Disposal

The products must be suitable for disposal in an inert materials disposal site/facility according to the “Decision of the EU council of the 19th December 2002 on the definition of criteria and procedures for the receipt and acceptance of waste products at waste disposal sites according to article 16 and appendix 2 of the guideline 1999/31/EC”.

2.6 Ecological Parameters

The manufacturing of all products of this product group must be in compliance with the ecological parameters listed below.

Ecological parameters per m³	Guide values[1]	
	Strength class 2	Strength class 4
Primary energy input of non renewable total resources (PENRE[2]) [MJ]	2000	2400
Primary energy input of non renewable and renewable total resources (PET[3]) [MJ]	2200	2600
Photochemical ozone creation potential (POCP) [kg ethylen-equiv.]	0,5	0,8
Acidification potential (AP) [kg SO_2-equiv.]	0,2	0,26
Eutrophication potential (EP) [kg PO_4^{3-}-equiv.]	0,05	0,07
Global-warming potential (GWP) [kg CO_2 equiv.]	200	200

If a single guide value is exceeded, it will be decided on a case by case basis whether this is permissible for the purpose of optimising the complete product manufacturing process.

[1]Testing method: Calculation of the ecological parameters according to natureplus® implementing provisions for life cycle assessments; inventory analysis analogous to ISO 14040ff; efficiency categories according to CML-IA version 4.1 from October 2012 and characterised as baseline; primary energy requirement according to Frischknecht 1996; global-warming potential 1994/100 years; system limits: raw material sourcing to products ready for shipment

[2] PENRE: **p**rimary **e**nergy input of **n**on **r**enewable **e**nergy resources

[3] PET: **p**rimary **e**nergy inputs of renewable and non renewable **t**otal resources

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 of the key input material

When employing components with a potential for environmental hazard, the manufacturer has to suitably indicate measures to be taken to ensure environmental protection during removal and demolition (i.e. controlled deconstruction).

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

If the porous concrete is advertised as possessing increased storage capacity characteristics which serve to improve the quality of the room climate, then the specific heat capacity of the porous concrete must demonstrate a level of at least 1.50 kJ/(kg•K).

2.8 Processing and Installation

If the product must be used in conjunction with a thin-bed mortar, the manufacturer must recommend a natureplus-certified mortar. 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 be participate in a recycling system if there is one for the corresponding material.

Paper and cardboard packaging must be made from recycled paper. Alternatively, paper from sources as per GL-5002 is permitted.
Plastic packaging must be comprised from polyolefins. PET, polystyrene or polycarbonates are allowed exceptionally in reasonable cases. Packaging made from PVC is generally not permitted.

Packaging must not contain biocides.

The natureplus certification mark has to be printed on the packaging after the awardance of the product.

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 site inspection. If the sample collection can not 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 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 analysis after acid digestion:

Element	Limit value	Unit
Arsenic (As)	10	mg/kg
Chromium (Cr)	50	mg/kg
Copper (Cu)	35	mg/kg
Mercury (Hg)	0,3	mg/kg
Nickel (Ni)	20	mg/kg
Lead (Pb)	15	mg/kg

Antimony (Sb)	5	mg/kg
Tin (Sn)	5	mg/kg
Zinc (Zn)	120	mg/kg

In case the limit values are exceeded, an element analysis will be performed for the sand and cement 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. 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.

Eluate analysis:

Element	Limit value	Unit
Arsenic (As)	0,05	mg/l
Cadmium (Cd)	0,005	mg/l
Copper (Cu)	0,1	mg/l
Mercury (Hg)	0,001	mg/l
Nickel (Ni)	0,2	mg/l
Lead (Pb)	0,04	mg/l

3.2 Other Analyses

Test parameters	Limit values	Unit	Method
Chromium VI (Cr VI)	≤ 2	**mg/kg**	TRGS 613
Radioactivity			
Artificial radioactivity Cs-137	not measurable		
Natural radioactivity: total avalue according to ÖNORM S 5200	≤ 0,75	**Bq/kg**	

Test Methods

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.