natureplus e.V.

Guideline 1101

Masonry building materials

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for the awardance of the eco-label

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Introduction

The International Association for Sustainable Building and Living - natureplus association - pursues the goal of promoting sustainable building products and increasing their popularity and use. To this end, sustainability criteria for building products are defined and verified as part of regular conformity assessments at the applicant's premises.

Three comprehensive sustainability definitions are created to achieve a holistic understanding of quality.

CLIMATE PROTECTION

The climate crisis is worsening, and the consequences are becoming increasingly visible. The construction sector is one of the largest emitters, accounting for around 40% [1] of global greenhouse gas emissions. Energy-intensive manufacturing processes, long transport routes and short renovation cycles are often still characteristic of the status quo.

The natureplus certification requires manufacturers to meet strict limits on CO2 emissions and primary energy consumption.

[1] UNEP, 2020, 2020 Global Status Report for Buildings and Construction, p. 4.

HEALTHY LIVING

In Western societies, we spend about 90% [2] of our lives in buildings. Pollutants emitted by building materials can accumulate in the indoor air we breathe daily, posing unnecessary health risks to occupants. The accumulation of chemical pollutants from building products in house dust and the increasing use of biocides in everyday products are also a cause for concern.

The natureplus certification ensures that hazardous input materials are avoided or used in quantities that are harmless to health. Emissions from building products are strictly regulated and regularly monitored.

[2] Umweltbundesamt, o. D., Ausschuss für Innenraumrichtwerte (AIR)

CONSERVATION OF RESOURCES

All construction activities have an impact on nature and the environment, with the consumption of finite resources remaining unacceptably high. The production of building materials in Germany consumes about 60% of our resources, and as much as 90% if only mineral raw materials are considered. At the same time, the construction sector is responsible for 50% of the waste generated. [3]

The natureplus certification sets out requirements for increased transparency in the supply chain, respect for human rights and the environment, and the responsible use of resources throughout the life cycle of a building product.
In addition, future-oriented materials should be durable, reusable and/or recyclable.

[3] VDI ZRE, 2019, Ressourceneffizienz im Bauwesen – Von der Planung bis zum Bauwerk, p. 5.

Notes on this product guideline:

The eco-label, the certification programme including all associated documents is the property of the non-profit natureplus® environmental organisation. The Association and its specially appointed Criteria Commission are therefore responsible for the further development of the requirements.

The label is awarded by the European cooperative natureplus Institute SCE mbH.

Should there be any textual differences between this guideline and the English language version, the English version shall apply.

In the event of conflict between the basic guidelines (50XX) and this product guideline, the product award guideline shall prevail.

For questions, criticism and suggestions, please contact:

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1 Application Areas

The following award criteria contain requirements for the natureplus®-ecolabel.

The guideline applies to building products made of mineral and renewable raw materials used as bricks for the construction of masonry. The following product groups are examples of those covered by the Directive:

- Vertical hollow brick (solid brick, vertical hollow brick, masonry brick with integrated thermal insulation, clinker brick) according to EN 771-1
- Sand-lime bricks according to EN 771-2
- Aerated concrete blocks according to EN 771-4
- Clay bricks according to national standards (e.g. DIN 18945, ÖNORM B 3230-1)
- Hemp limestone bricks
- Straw clay blocks
- ...

Construction products must have a current European Technical Approval, or at least a national technical approval.

The certified products must be load-bearing, but at least self-supporting, and be suitable for use as constructive wall-building materials.

Integrated insulation materials and aggregates are permissible within the framework of the further requirements of this guideline.

The guideline does not apply to the following product groups:

- Solid wood building components
- Wood-concrete shuttering blocks according to EN 15498
- Wood-concrete according to EN 14474
- Concrete masonry according to EN 771-3
- Cast stone to EN 771-5

The following insulating materials (e.g. in filler blocks or sandwich elements) are not permitted:

- Polystyrene (EPS) to EN 13163
- Rigid polyurethane foam (PU) according to EN 13165
- Phenolic foam (PF) according to EN 13166

2 Award Criteria

References and links are provided at the appropriate points in the document to indicate compliance with basic guidelines 5001, 5002, 5003, 5004, 5010, 5020.

2.1 Functional Suitability

The product must fulfil the requirements for functional suitability by having a national or European technical approval or by following a harmonised standard.

The applicant shall meet this requirement by submitting one of the following documents:

- a valid European Technical Assessment (ETA)
- a declaration of performance and conformity according to a European harmonised technical specification (e.g. standard)
- a valid national technical approval (e.g. in Germany a general technical approval - abZ, in Austria a technical approval - BTZ)
- a national declaration of performance and conformity to a national technical specification (e.g. standard)

2.2 Composition, Forbidden Substances, Substance Restrictions

Requirements for input materials

Ingredients in the end product:

The product must consist of 99 M-% mineral and/or biobased raw materials.

Auxiliary materials for manufacturing the end product:

Porosifying agent (if used): Only residual materials may be used as porosity agents. Deviations from this requirement must be justified in writing by the manufacturer from a technical point of view.

Aeration agent (if used): Any aluminium used in the aeration agents must be from a recycled source.

All **input materials** (i.e. ingredients and auxiliary materials) must fulfil the requirements of RL5001 "Chemicals Directive".

The input materials and recipe compliance of the ingredients in the end product must be checked by means of inspections at the production facility (PSI).

Samples for laboratory tests are taken by the inspector or an independent third party.

Verification by laboratory analysis

Material-specific controls exclude product risks as defined below.

The limit values and methodology are contained in Section 3.2/3.3 of this guideline.

Contamination of the input materials must be checked by means of element analysis. The solubility of metals and metalloids must be excluded if limit values are exceeded.

If secondary raw materials from post-consumer recycling occur as ingredients in the end product, the limit values for PAHs must be complied with.

If secondary raw materials from post-consumer recycling occur as ingredients in the end product, a purity check for respirable foreign fibres (trigger for the disease asbestosis) must be carried out.

If calcareous input materials or talc are present as ingredients in the end product, geogenic asbestos must be excluded using the same procedure.

If cementitious ingredients are present in the end product, the limit values for sensitising chromium VI must be complied with.

If organic substances are present in the end product, the limit values for organohalogen compounds must be complied with.

If products from forestry and agriculture are present in the end product, pesticide inputs must be excluded. The limit values must be complied with.

2.3 Raw Material Sourcing, Production of Preliminary Products, Production

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

Where wood is used as an ingredient, compliance with GL-5002 "Wood extraction and origin" must be ensured.

When using mineral raw materials, the requirements of RL-5003 " Nature conservation in the mining of mineral raw materials" must be complied with.

The requirements according to RL-5004 "Transparency and social responsibility" apply.

Requirements for the plant technology of the production facilities

European and national laws and regulations must be complied with, whereby EU regulations take precedence. This specifically applies to production sites outside the EU. Conformity must be demonstrated for the following topics:

- Air pollution
- Water pollution and water protection
- Waste treatment
- Environmental information

Requirements for occupational health and safety in the production facilities

European and national laws and regulations must be complied with, whereby EU regulations take precedence. This specifically applies to production sites outside the EU.

2.4 Usage

During use, the product must not have any odour or any odour foreign to the product.

Grenzwerte und Methodik sind in Abschnitt 3.3 dieser Richtlinie enthalten.

This criterion does not need to be checked if the product consists of 99 M% mineral ingredients.

The emissions must not exceed the natureplus limit values in accordance with RL5010 "Low Emission Building Products" during the utilisation phase.

See also section 3.3 Volatile organic compounds (VOC - TVOC)

The requirement may be waived if the product consists of 99 M% mineral ingredients.

2.5 Reuse, recycling and disposal

A concept for a circular economy must be presented. In particular, the concept must address the following points:

- reuse of the products to be certified
- separation of input materials, components and building elements
- recycling scenarios for recyclates

A take-back system for residual materials / offcuts / product remnants must be implemented or designed. Systems operated by third parties are permitted. (e.g.

cross-manufacturer take-back of construction waste and provision of RC material for production).

A recycling system for demolition material must be designed (post-consumer recycling).

2.6 Ecological Parameters

All products in this product group must be manufactured in such a way that the ecological parameters listed in GL5020 are fulfilled.

2.7 Public Declaration

A public declaration of ingredients [1] (in the national language or in English) must be provided according to decreasing mass content. The public declaration of ingredients must be mentioned in one of the following publicly available documents:

- Product packaging
- Technical data sheet
- Sales brochures
- Other publicly available document

Furthermore, after succesful certification, it is mandatory to add the public declaration of ingredients to the product data set on the natureplus database.

Ingredients from preliminary products or preparations that remain in the final product with a content of >1 M% must also be included in the full declaration.

The following applies to the public declaration of ingredients:

- above 1 M% the name of the ingredient
- below 1 M% at least the functional name of the ingredient, the mass order is cancelled.

[1] Ingredients: substances and mixtures that remain in the final product. Reactants and processing aids are part of the full declaration but do not need to be publicly declared.

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 applicant 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).

For thermal insulation materials, the following product-specific information shall be provided to the consumer or user, as applicable.

- Labeling in accordance with the guidelines of the European Community (Communauté Européene, CE marking) or the respective building approval with an indication of the scope of validity
- Bulk density in kg/m³
- Nominal thermal insulation value λ_D according to EN ISO 10456 or equivalent standard
- Thermal insulation design value λ_R according to EN ISO 10456 or equivalent standard
- Type of application or areas of application according to DIN 4108, ÖNORM B 6000 or equivalent standard
- Fire behavior Euroclass according to EN 13501-1

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

- Details of warranty and warranty period
  - statutory warranty
  - voluntary manufacturer's guarantee
- Recommendation of compatible plasters and mortars for masonry construction

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 GL5002 is also permitted.

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

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 LaboratoryTests

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 TSVOC, 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.

An eluate analysis is mandatory if the required values of the content analysis are not met.

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.

Lists of elements and limit values can be found in the appendix ‘Material limit values for heavy metals’.

3.3 Other Analyses

Halogenic organic compounds

Test parameters	Limit values	Unit	Method
Halogenic organic compounds: AOX/EOX	≤ 1	mg/kg	TM-03 Halo

Chromium VI

Test parameters	Limit values	Unit	Method
Chromium VI (Cr VI)	≤ 1	mg/kg	DIN EN 196-10:2016-11 (appendix D)

Polycyclic aromatic hydrocarbons (PAH)

If the product contains secondary materials:

Test parameters	Limit values	Unit	Method
Polycyclic aromatic hydrocarbons	≤ 16	mg/kg	HPLC/GC-MS

Foreign substances/fibres

To be examined only if necessary:

Test parameters	Limit values	Unit	Method
Foreign substances/fibres	NAD		TM-08 foreign fibres

Pesticides

Test parameters	Limit values	Unit	Method
Total pesticides	≤ 1	mg/kg	TM-05 Pesticides
Individual pesticides Organochlorine pesticides: Aldrin, Chlordane, DDD, DDE, DDT, Dichlofluanid, Dieldrin, Endrin, Heptachlor, Hexachlorobenzene, Lindane, Pentachlorophenol Organophosphate pesticides: Dimethoat, Fenthion, Parathion-methyl, Parathion-ethyl, Phosalon Pyrethroids: Cypermethrin, Lambda-Cyhalothrin, Permethrin Other: Benomyl, Carbendazim, Prochloraz	≤ 0,1	mg/kg	TM-05 Pesticides

Odour

Test parameters	Limit values	Unit	Method
Odour	≤ 3	Odour intensity	TM-04 Odour

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 3 days after loading the test chamber following VDA 270:2018.

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

Material limit values for heavy metals

Clay Bricks, Building bricks

Element	Total dissolution limit value [mg/kg]	Eluate limit value [mg/l]
Arsenic (As)	≤ 20	≤ 0,05
Cadmium (Cd)	≤ 1	≤ 0,005
Chromium (Cr)	≤ 100	≤ 0,05
Copper (Cu)	≤ 100	≤ 0,2
Mercury (Hg)	≤ 0,5	≤ 0,001
Molybdenum (Mo)	≤ 5	≤ 0,2
Nickel (Ni)	≤ 100	≤ 0,04
Lead (Pb)	≤ 20	≤ 0,05
Antimon (Sb)	≤ 5	≤ 0,006

Sand-lime brick and Aerated concrete

Element	Total dissolution limit value [mg/kg]	Eluate limit value [mg/l]
Arsenic (As)	≤ 10	≤ 0,05
Cadmium (Cd)	-	≤ 0,005
Chromium (Cr)	≤ 50	≤ 0,05
Copper (Cu)	≤ 35	≤ 0,1
Mercury (Hg)	≤ 0,3	≤ 0,001
Nickel (Ni)	≤ 20	≤ 0,2
Lead (Pb)	≤ 15	≤ 0,04
Antimon (Sb)	≤ 5	≤ 0,006
Tin (Sn)	≤ 5	-