



natureplus e.V.

Guideline 0104

Wood Fibre Insulation Boards for Construction Purposes

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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 award criteria contain requirements for the natureplus®-ecolabel.

This guideline applies to wood fibre insulation boards without surface treatment according to EN 13171 for use as thermal insulation. They are to be applied exclusively to the products mentioned in this guideline.

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
- GL5002 Origin of Wood and Wood Production
- GL-5004 Transparency and Social Responsibility
- GL-5010 Low-emission building products
- GL-5020 Climate compatibility and energy efficiency

2.1 Functional Suitability

The manufacturer provides information about technical and physical characteristics of the product and specifies the standards, test procedures and methods used to determine these properties. If the applied standards contain requirements for the products, it is to be clearly indicated whether they are met.

The product meets the requirements for the suitability of application by holding the state-specific or the European technical approval.

The product must be in compliance with the standard EN 13171.

The thermal nominal value at 10°C and u_{dry} as per EN ISO 10456 or a comparable standard must comply with the following requirements:

Application areas	$\lambda_{90,90}$ [W/mK]
Insulation not subject to pressure load (W, WL, WV)	$\leq 0,045$
Insulation subject to pressure load (WD)	$\leq 0,065$
Insulation functioning as plaster base (WD-PT)	$\leq 0,050$

The fire behaviour of the product must correspond at least to building material class E according to EN 13501-1.

In case the product is supplied to countries in which other requirements apply as the ones in the standards mentioned so far, these requirements must be met as well. The manufacturer states the countries where the product is distributed and provides official certification by approved testing institutions to confirm compliance with the requirements.

The product must not, however, fall short of the requirements established by natureplus. The product must not be treated with compounds which prevent or strongly reduce its ability for water uptake or water release.

The product must be resistant to mould growth under the conditions of a professional installation. Evidence has to be provided in form of a rating of mould fungus growth as category 0 (no growth visible with microscopic analysis) according to EN ISO 846.

2.2 Composition, Forbidden Substances, Substance Restrictions

At least 85% of the product based upon its dry weight must be made from renewable or mineral raw materials.

The employed wood must comply with § 2.3 with regard to the proportion of freshly cut wood and the origin of wood. At least 50 M-% should be made from secondary rawmaterials such as sawmill residue, chippings, slabs and offcuts from trees.

The proportion of synthetic binding agents is restricted to a maximum of 4% of the dry weight of the product.

The use of synthetic supportfibres is restricted to a maximum of 15% of the dry weight of the product. Chlorinated polymers are not permitted. The application of biozides are not permitted.

The use and addition of biozides is not permitted.

Only mineral additives such as inorganic ammonium phosphates (diammonium phosphate, ammonium polyphosphate, etc.), other water-releasing minerals (aluminum hydrate, etc.) or expanded graphite are permitted as flame retardants. The proportion of ammonium phosphates within the product may not exceed 4 kg per m³. The proportion of waterproofing agents within the product may not exceed 2% of the dry weight of the product. The use of bitumen is prohibited, as is use of boron compounds as flame retardants or as protectant against microbial infestation.

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

A certificate of origin must be provided for lignocellulose based raw materials. At least 80 % of the lignocellulose shavings, chippings and fibres contained within the product must originate from a source within a radius of no further than a 300 road-kilometre-equivalent ⁽¹⁾ from the production plant.

⁽¹⁾ 1 km Road ≈ 2.5 km Train ≈ 27 km Ship-Overseas ≈ 4 km Ship-Inland waterways.

The requirements of the guideline GL-5002 for the origins of wood and wood production must be met for wood as a raw material.

The manufacturer has to state and to place his suppliers under the obligation that no synthetic plant protecting product with agents included on the list of banned pesticides of the chemicals directive GL-5001 are used during growing, harvest, storage or transport of lignocellulose based materials. Compounds based on arsenic or mercury must not be employed. Implementing the obligation and the supplier's declarations are a part of the certification procedures.

The manufacturer must demonstrate that a hazardous substance management according to national standards and regulations is available at the production facility for employee protection. Information on dust release and compliance with general dust limit values must be included therein. Where compliance with the general dust limit values or other occupational limit values cannot be guaranteed despite technical and organisational measures, personal protection equipment must be available. It must be aimed for a minimisation of avoidable burdens of the employees.

If the boards are produced using a wet-process, the manufacturer should aim to keep the water used in the production process in a closed circulation system.

If an open circulation system is employed, the following points apply: The specific amount of waste water should not exceed 2 m³ per ton of wood fibre board.

If the waste water is discharged into flowing water systems (i.e. rivers, canals) or into the public sewerage/drainage system, the following emission limits should be observed:

	Discharge into a flowing water system	Discharge into a public sewer
General parameters		
Temperature	30°C	35°C
Bacterial toxicity G_L	4	a)
Fish toxicity G_F	2	a)
Settleable matter	0,3 ml/l	10ml/l
pH value	6,5-8,5	6,0-9,5
Anorganic parameters		
Ammonium as nitrogen (N)	5,0 mg/l	-
Sulfate as SO_4	-	200 mg/l
Organic parameters		
COD (chemical oxygen de-mand) as O_2	1 kg/t	-
BOD5 (5 day biochemical oxygen demand) as O_2	25 mg/l	-
AOX as chlorine (Cl)	0,2 g/t	0,2 g/t
Total Hydrocarbons	10 mg/l	20 mg/l
Phenol	0,3 g/t	60 g/t

a) A discharge must not detrimentally affect the biological decomposition processes within a public water treatment facility.

If the waste water is discharged into a flowing water system, the level of aluminium contained in the waste water must be below 2 mg/l.

If the waste water is discharged directly into a water treatment facility, special rules may be agreed with the water treatment authorities on a case by case basis. The guideline values may be exceeded under special conditions if circumstances permit or if it is necessary and authorised/prescribed by the responsible authorities.

The production equipment air emissions must comply with the emission levels in accordance with the air cleanliness regulations for boiler plant equipment Austria (BGBl. 1989/19 and/or 1997/324) or a comparable regulatory standard.

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

The product must be suitable for safe disposal in a waste incineration facility.

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 of the key input material

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.

- Labelling according to the guidelines of the European Community (Communauté Européenne, CE marking) or the respective general technical approval, including a scope specification
- Apparent density in kg/m^3
- Thermal nominal value λ_D according to EN ISO 10456 or an equivalent standard
- Thermal design value λ_R according to EN ISO 10456 or an equivalent standard

- Type and field of application, i.e. as per DIN 4108, Austrian standard ÖNORM B 6000
- Fire performance Euro class according to EN 13501-I

2.8 Processing and Installation

The manufacturer must demonstrate whether working procedures avoiding dust release are available for the processing of the product. If this is the case, these procedures are to be recommended and suitably presented within the processing guidelines. If compliance with the general dust limit values might not be guaranteed, wearing personal protection equipment must be recommended.

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)	≤ 2
Cadmium (Cd)	$\leq 0,5$
Cobalt (Co)	≤ 5
Chromium (Cr)	≤ 10
Copper (Cu)	≤ 50
Mercury (Hg)	$\leq 0,2$
Nickel (Ni)	≤ 10
Lead (Pb)	≤ 5
Antimon (Sb) ⁽¹⁾	≤ 2
Tin (Sn)	≤ 10
Thallium (Tl)	≤ 1
Zinc (Zn)	≤ 500

(1) As antimony acts as a catalyst in polyester production, the limit value for antimony does not apply for products containing supporting fibres on polyester basis.

3.3 Other Analyses

Odour

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

Halogenic organic compounds

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

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	$\leq 0,1$	mg/kg	TM-05 Pesticides

Foreign substances/fibres

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

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