



natureplus e.V.

Guideline 0107

Blown-In Cellulose-Based Insulation

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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 criteria contain the requirements for the awardance of the natureplus® eco-label for blown-in insulation from recycled/recovered paper. The award guideline is to be applied exclusively to those 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 thermal nominal value at 10°C and u_{dry} as per EN ISO 10456 or a comparable standard must comply with the following requirements:

- Insulation not subject to pressure load (W, WL, WV) $\lambda_{90,90} \leq 0,045 \text{ W/mK}$
- Insulation subject to pressure load (WD) $\lambda_{90,90} \leq 0,065 \text{ W/mK}$

The thermal design value must be $\leq 0,1 \text{ W/mK}$ for loose-fill thermal insulation materials used as a levelling fill in accordance with EN ISO 10456 or an equivalent standard.

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. Evidence must be provided for the different applications that the product retains its volume and stably fills the intended cavity on a long term basis. The manufacturer must attest to at least one safe method of inserting the insulation into the intended cavity and ensure that this method is available to the installer. The manufacturer must oblige the installer to an installation method for which the results of every installation can be checked. The manufacturer must declare that he has committed the installer to provide proof to the customer of a sufficient compaction of the insulating material for every installation.

2.2 Composition, Forbidden Substances, Substance Restrictions

At least 85% of the product based upon its dry weight must be made from recycled newspaper of group 2.01 according to EN 643. Only mineral additives are permitted as flame retardants.

The proportion of flame retardants within the product may not exceed 15% of the dry weight of the product. Notwithstanding the natureplus standard rules for prohibited substances relating to substances of very high concern (SVHC), boron compounds may be employed to provide protection against smouldering and combustion in consideration of high fire risks in this case. The quantity is restricted to the proportion stated in the directive for obligatory labelling⁽¹⁾ (5.5 M-% Boric acid-equivalent or 8.5 M-% Borax-equivalent).

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

⁽¹⁾Regulation (EC) No 1272/2008 (Annex VI, Table 3.1)

2.3 RawMaterial Sourcing, Production of Preliminary Products, Production

In order to protect resources and ensure that resources which have already been used remain within the production cycle, recycled/recovered paper, as a secondary raw material, should be used exclusively for the production of cellulose.

Through appropriate supplier agreements and the intake controls, the manufacturer must ensure that for the cellulose fibres from recycled/recovered paper that no paper contaminated with heavy metals or other harmful substances is deployed. 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.

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. The product may be installed or processed in the factory. If the product is to be used on the building site, the manufacturer must ensure that the installer is provided with adequate instructions on the appropriate method of installation and processing and the avoidance of dust production. This is to be accomplished by informing and training the installers on the use of suitable methods (e.g. ventilated blower technologies/equipment). This information is to be displayed on the packaging in an appropriate form (pictograph and text). The product may only be delivered to correctly trained installers. The product may only be used within the designated user-company by trained personnel and in compliance with the rules for Health and Safety at Work. The manufacturer must provide the installer with sufficient information to ensure the correct installation and settlement of the product.

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

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
- A full declaration of the country of origin of the main components

If components are employed which are potentially environmentally damaging, the manufacturer must, in an appropriate place, provide information on the environmental protection measures to be taken during removal and demolition (i.e. controlled deconstruction).

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
- Euro class according to EN 13501-1

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 the dust release is higher than the general dust limit values, the manufacturer has to commit himself to presenting a system which ensures that the product is only processed by companies that are equipped with the operational and personnel prerequisites.

2.9 Packaging

The packaging used must be recyclable. The manufacturer must 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 manufactured from polyolefins. In cases when sufficient grounds can be presented, the use of PET, polystyrene or polycarbonates may be permitted. Packaging made from PVC is generally not permitted. Packaging must not contain biocides. Upon award of a natureplus certification, the natureplus logo must be printed/displayed on the packaging.

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 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.

Element	Limit value [mg/kg]
Arsenic (As)	≤ 2
Cadmium (Cd)	≤ 0,5
Cobalt (Co)	≤ 5
Chromium (Cr)	≤ 10
Copper (Cu)	≤ 50
Mercury (Hg)	≤ 0,2
Nickel (Ni)	≤ 10
Lead (Pb)	≤ 10
Antimon (Sb)	≤ 2
Tin (Sn)	≤ 10
Thallium (Tl)	≤ 1
Zinc (Zn)	≤ 500

3.3 Other Analyses

Halogenic organic compounds

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

Odour

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

Polycyclic aromatic hydrocarbons (PAH)

If the product contains secondary materials:

Test parameters	Limit values	Unit	Method
Polycyclic aromatic hydrocarbons	≤ 10	mg/kg	HPLC/GC-MS

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