

natureplus e.V.

Award Guideline 0105

## **Blown-In and Loose-Fill Insulation from Ligno-Cellulose Fibres**

Issued: June 2015

For the Awardance of the Eco-Label





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## 1. Application Areas

The following criteria contain the requirements for the awardance of the natureplus® eco-label for blown-in and loose-fill insulation from ligno-cellulose fibres. The award guideline is to be applied exclusively to those products mentioned in this guideline.

## 2. Award Criteria

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

### 2.1 Suitability of Application

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)  $\lambda_{90,90} \leq 0,045$  W/mK
- Insulation subject to pressure load (WD)  $\lambda_{90,90} \leq 0,065$  W/mK
- Insulation functioning as plaster base (WD-PT)  $\lambda_{90,90} \leq 0,050$  W/mK

The thermal design value must be  $\leq 0,1$  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



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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 obligate 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 ligno-cellulose based raw materials.

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. The use of boron compounds as flame retardants or as protectant against microbial infestation is prohibited.

The application of biozides are not permitted.

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 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<sup>(2)</sup> from the production plant.

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



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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 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.

## 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 comply with the limits for heavy metals under section 3 (Laboratory Tests).



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## 2.6 Ecological Parameters

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

|                                                                                              | <b>Guide values<sup>1</sup></b>                    |
|----------------------------------------------------------------------------------------------|----------------------------------------------------|
| <b>Ecological parameters per FU<sup>2</sup></b>                                              | <b>Apparent density<br/>&lt;90kg/m<sup>3</sup></b> |
| Primary energy input of non renewable total resources (PENRE <sup>3</sup> ) [MJ]             | 50                                                 |
| Primary energy input of non renewable and renewable total resources (PET <sup>4</sup> ) [MJ] | 90                                                 |
| Photochemical ozone creation potential (POCP) [kg ethylen-equiv.]                            | 0,0015                                             |
| Acidification potential (AP) [kg SO <sub>2</sub> -equiv.]                                    | 0,012                                              |
| Eutrophication potential (EP) [kg PO <sub>4</sub> <sup>3-</sup> -equiv.]                     | 0,007                                              |
| Global-warming potential (GWP) [kg CO <sub>2</sub> equiv.]                                   | 3                                                  |
| Abiotic depletion potential (ADP) [kg Sb equiv.]                                             | 0,00003                                            |

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.

<sup>1</sup>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

<sup>2</sup> FU: Functional Unit, corresponds to a thermal resistance of 1 m<sup>2</sup>K/W.

<sup>3</sup> PENRE: **p**rimary **e**nergy input of **n**on renewable **e**nergy resources

<sup>4</sup> PET: **p**rimary **e**nergy inputs of renewable and non renewable **t**otal resources



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### 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.

- 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<sup>3</sup>
- Thermal nominal value  $\lambda_D$  according to EN ISO 10456 or an equivalent standard
- Thermal design value  $\lambda_R$  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



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## 2.8 Processing

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 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 VOC - TVOC

The product is subject to a test-chamber examination to survey the emissions of VOC, SVOC and other volatile compounds and to check compliance with the limit values. Measurements usually occur after 3 and 28 days. When low VOC emissions are to be expected, the emissions test can be terminated early, if a measurement 7 days after loading of the test chamber does not object to this. The test-chamber examination is performed according to the current version of the test method TM-01 VOC.

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**Emission measurement after 3 days**

| Test parameters                                                                                                                                                                                                         | Limits      | Unit                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------------------|
| VOC (VOC, VVOC, SVOC) classified in:<br><br>Regulations (EC) No. 1272/2008: categories Carc. 1A und 1B, Muta 1A und 1B, Repr. 1A und 1B; TRGS 905: K1, K2, M1, M2, R1, R2; IARC groups 1 u. 2A; DFG MAK-list III1, III2 | < 1         | $\mu\text{g}/\text{m}^3$ |
| Total volatile organic compounds (TVOC)                                                                                                                                                                                 | $\leq 3000$ | $\mu\text{g}/\text{m}^3$ |

**Emission measurement after 28 days**

| Test parameters                                                                                                                                                               | Limits     | Unit                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------|
| Total volatile organic compounds (TVOC)                                                                                                                                       | $\leq 300$ | $\mu\text{g}/\text{m}^3$ |
| of which:                                                                                                                                                                     |            |                          |
| Total bicyclic terpenes                                                                                                                                                       | $\leq 200$ | $\mu\text{g}/\text{m}^3$ |
| Total sensitising substances per MAK IV, BgVV-list cat. A, TRGS 907                                                                                                           | $\leq 100$ | $\mu\text{g}/\text{m}^3$ |
| Total VOC (VOC, VVOC, SVOC) classified in:<br><br>Regulation (EC) No. 1272/2008: Kategorie Carc. 2, Muta 2, Repr. 2; TRGS 905: K3, M3, R3; IARC: group 2B; DFG MAK-list: III3 | $\leq 50$  | $\mu\text{g}/\text{m}^3$ |
| Total aldehyde, C4-C11, acyclic, aliphatic                                                                                                                                    | $\leq 100$ | $\mu\text{g}/\text{m}^3$ |
| Styrene                                                                                                                                                                       | $\leq 10$  | $\mu\text{g}/\text{m}^3$ |
| Methylisothiazolinone (MIT)                                                                                                                                                   | < 1        | $\mu\text{g}/\text{m}^3$ |
| Benzaldehyde                                                                                                                                                                  | $\leq 20$  | $\mu\text{g}/\text{m}^3$ |
| Total (VOC) without non-identified compounds                                                                                                                                  | $\leq 100$ | $\mu\text{g}/\text{m}^3$ |

A calculation of the r-value is performed. The limit value is  $\leq 1$ .

**Other emission measurements after 28 days**

| Test parameters                               | Limit values | Unit                     |
|-----------------------------------------------|--------------|--------------------------|
| Total semi-volatile organic compounds (TSVOC) | $\leq 100$   | $\mu\text{g}/\text{m}^3$ |



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|              |                     |                   |
|--------------|---------------------|-------------------|
| Formaldehyde | ≤ 36 <sup>(1)</sup> | µg/m <sup>3</sup> |
| Acetaldehyde | ≤ 36 <sup>(1)</sup> | µg/m <sup>3</sup> |

<sup>(1)</sup> 36 µg/m<sup>3</sup> ≈ 0,03 ppm

**Termination criteria:**

The emissions test can be terminated 7 days after loading the test chamber, if the values measured at this time are lower than 50% of the 28-day threshold limits.

### 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 | Unit  |
|------------------------------|-------------|-------|
| Arsenic (As)                 | 2           | mg/kg |
| Cadmium (Cd)                 | 0,5         | mg/kg |
| Cobalt (Co)                  | 5           | mg/kg |
| Chromium (Cr)                | 10          | mg/kg |
| Copper (Cu)                  | 50          | mg/kg |
| Mercury (Hg)                 | 0,2         | mg/kg |
| Nickel (Ni)                  | 10          | mg/kg |
| Lead (Pb)                    | 5           | mg/kg |
| Antimony (Sb) <sup>(1)</sup> | 2           | mg/kg |
| Tin (Sn)                     | 10          | mg/kg |
| Thallium (Tl)                | 1           | mg/kg |
| Zinc (Zn)                    | 500         | mg/kg |

<sup>(1)</sup> 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.



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### 3.3 Other Analyses

| Test parameters                                                                                                                                         | Limit values | Unit            | Method           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------|------------------|
| Halogenic organic compounds: AOX/EOX                                                                                                                    | ≤ 1          | mg/kg           | TM-03 Halo       |
| Odour                                                                                                                                                   | ≤ 3          | Odour intensity | TM-04 Odour      |
| 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                                                            | ≤ 0,5        | mg/kg           | TM-05 Pesticides |
| Pyrethroids: Cypermethrin, Lambda-Cyhalothrin, Permethrin                                                                                               |              |                 |                  |
| Other: Benomyl, Carbendazim, Prochloraz                                                                                                                 |              |                 |                  |

### 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 supplemented with the natureplus implementation rules.