



natureplus e.V.

## **Guideline 0903**

# **Paper and Wood Glues from Renewable Raw Materials**

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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 economic sustainability. 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 the product group "Paper and Wood Glues from Renewable Raw Materials" (e.g. gluten and casein glues etc). This award guideline is to be applied exclusively to the named

product group. Dispersion adhesives and wallpaper pastes/adhesives from renewable raw materials and mineral-based adhesives are outside the scope of 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 product must be classified as “glue” in accordance with DIN EN 923 („Adhesives – Terms and Definitions“) Appendix A.

Wood glues must, in accordance with DIN EN 204 (“Classification of thermoplastic wood adhesives for non-structural applications”), be classified within the appropriate durability class D1, D2, D3 and D4 (the old classification according to DIN 68602 “Assessment of Adhesives for Joining Wood and Wood-Based Products, Durability classes, Bonding Strength" B1, B2, B3 and B4). The durability classes structure the glues according to their minimum shearing strength values and their performance characteristics under wet and moist conditions.

- D1 (old classification B1): Suitable for interior use where the wood moisture is below 15%.
- D2 (old classification B2): Suitable for interior use with occasional, brief periods of exposure to water or condensation. The wood moisture may not exceed 18%.
- D3 (old classification B3): Suitable for interior use with regular, brief periods of exposure to water or high air vapour levels. Suitable for exterior use when not directly exposed to the elements.
- D4 (old classification B4): Suitable for interior use with regular and prolonged exposure to running water or condensation. Suitable for exterior use with direct exposure to the elements when used in combination with an appropriate surface protection layer.

The bonding strength of wood glues must be tested in accordance with DIN EN 205 (“Adhesives- Wood adhesives for non-structural applications- Determination of tensile shear strength of lap joints“) and the reliability of the glues under static loading and warm conditions in accordance with DIN EN 14292 (“Wood adhesives- Determination of static load resistance with increasing temperature“). The manufacturer must provide proof in the form of independent assessments.

### 2.2 Composition, Forbidden Substances, Substance Restrictions

The product must be made to 99 M-% from mineral and renewable raw materials and water.

Preservatives may only be employed in ready-to-use liquid products, which are already available in retail or wholesale outlets, for the purpose of preserving the can or container.

Diisocyanates and organic tin compounds are not permitted.

The product must not be classified in WGK 2 or WGK 3 (Water Hazard Classes 2 and 3) according to VwVwS (Administrative Regulation on the Classification of Substances Hazardous to Waters into Water Hazard Classes) of the German Environmental Agency (Umwelt Bundes Amt).

Preserving agents not licensed as food additives (as per Directive 89/107/EEG or equivalent) or for cosmetics (as per Directive 2003/15/EC or equivalent), halogenic organic compounds, tin organic compounds, phthalates, APEOs, formaldehyde and formaldehyde releasing agents must not be added to the product.

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 methyl-cellulose is used as an additive, the following requirement must be complied with:

The production of the methyl-cellulose must not negatively impact upon the environment through waste water. Proof of compliance in accordance with the national implementation of the EU-guideline EU-GL 76/464/EEG and GL 9661/EG (IPPC) must be provided in the form of an independent expert assessment report.

## 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)

The tests in section 3 are performed according to the manufacturers information relating to the quantities required per coat or application. The tests are performed on a suitable test surface.

## 2.5 Recycling/Disposal

A disposal concept must be provided for the product (composite materials).

The adhesive should not have a significant negative affect on the disposal characteristics of the components.

## 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.

- General data (type, name, batch numbers, designation etc.)
- Stability, storage suitability, storage conditions
- Density in  $\text{kg}/\text{m}^3$
- pH-value (in accordance with DIN ISO 976)
- The dynamic viscosity in  $\text{mPa} \times \text{s}$  (in accordance with DIN EN 2555)
- Solids content in% (in accordance with DIN ISO 1625)
- Water resistance in  $\text{N}/\text{mm}^2$
- Thermal resistance in  $\text{N}/\text{mm}^2$
- Creep resistance (resistance to cold flowing under static loading)
- Minimum Film Forming Temperature (MFFT) in  $^{\circ}\text{C}$  (in accordance with DIN ISO 2115)
- Usage time when open, in minutes
- Usage time when closed (pot-life)
- Suitable surfaces for application, general requirements for the surface characteristics
- Preparation of the surface and the treatments or priming required
- Quantity required in  $\text{g}/\text{m}^2$
- Contact pressure required in  $\text{N}/\text{mm}^2$  (equiv.  $\text{t}/\text{m}^2$ )
- Minimum contact pressure period in minutes
- Setting speed in  $\text{N}/\text{mm}^2$
- Airing time
- Cleaning instructions (tools, appliances, clothing)

## 2.8 Processing and Installation

For appropriate and professional processing, detailed and comprehensible processing instructions must be provided in the respective national language along with the product.

## 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 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)	≤ 5
Cadmium (Cd)	≤ 0,5
Cobalt (Co)	≤ 10
Chromium (Cr)	≤ 2
Copper (Cu)	≤ 20
Mercury (Hg)	≤ 0,1
Nickel (Ni)	≤ 10
Lead (Pb)	≤ 5
Antimon (Sb)	≤ 1
Tin (Sn)	≤ 1

### 3.3 Other Analyses

#### Halogenic organic compounds

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

#### Halogenic organic compounds

Test parameters	Limit values	Unit	Method
Aromatic hydrocarbons (total)	≤ 30	mg/kg	Headspace GC/MSanalog EN ISO 17895

#### CMR- individual aromatics

C = carcinogenic; M = mutagenic; R = toxic for reproduction; classified according to German Prohibited Chemical Substances Regulations (GefStoffV)

Test parameters	Limit values	Unit	Method
Polycyclic aromatic hydrocarbons	≤ 1	mg/kg	Headspace GC/MS analog EN ISO 17895

#### Delta-3-Caren

Test parameters	Limit values	Unit	Method
Delta-3-Caren	≤ 20	mg/kg	Solvent extraction und GC/MS

#### Glykolether/-ester

Test parameters	Limit values	Unit	Method
Glykolether/-ester	≤ 20	mg/kg	Solvent extraction und GC/MS

#### Phtalate Este

Test parameters	Limit values	Unit	Method
Phtalate Ester	≤ 10	mg/kg	Solvent extraction und GC/MS

#### Monomer Acrylate

Test parameters	Limit values	Unit	Method
Monomer Acrylate	≤ 1	mg/kg	Headspace GC/MS analog EN ISO 17895

#### Free Formaldehyde

Test parameters	Limit values	Unit	Method
Free Formaldehyde	≤ 20	mg/kg	UV-Vis (VdL-RL 03) steam dest., AcAc, UV

#### Organic tin compounds

Test parameters	Limit values	Unit	Method
single values for MBT, DBT, TBT	≤ 50	µg/kg	

#### Asbestos fibres

If the product contains secondary materials:

Test parameters	Limit values	Unit	Method
Asbestos fibres	asbestos free per DAB <sup>1</sup>		SEM

1: DAB: German Register of Medicines

#### Odour

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

#### 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	≤ 0,1	mg/kg	TM-05 Pesticides
Organophosphate pesticides: Dimethoat, Fenthion, Parathion-methyl, Parathion-ethyl, Phosalon			
Pyrethroids: Cypermethrin, Lambda-Cyhalothrin, Permethrin			
Other: Benomyl, Carbendazim, Prochloraz			

#### Halogenated isothiazolinones

Test parameters	Limit values	Unit	Method
Halogenated isothiazolinones	≤ 0,1	mg/kg	

## 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

TM-10 PAH: HPLC / GC-MS, sum according to EPA

