ENVIROMENTAL PRODUCT DECLARATION
as per ISO 14025 and EN 15804+A1

Owner of the Declaration | nora systems GmbH
Programme holder | Institut Bauen und Umwelt e.V. (IBU)
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noracare®, resilient floor coverings made on basis of thermoplastic and rubber – according to EN 1817 (Resilient floor coverings – Specification for homogeneous and heterogeneous smooth rubber floor coverings)
nora systems GmbH
1. General Information

nora systems GmbH
Programme holder
IBU – Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

nora systems GmbH
Owner of the declaration
Höhnerweg 2-4
69469 Weinheim (Bergstrasse)
Germany

Declaration number
EPD-NOR-20190169-IAB1-EN

Declared product / declared unit
1m² resilient floor covering
(A1-A3: 1m² produced, A1-A5: 1m² installed)

Scope:
Product line noracare®
Floor coverings continuously manufactured in sheets in various colours and designs on the basis of rubber and thermoplastic elastomers.

This declaration is an Environmental Product Declaration according to ISO 14025 describing the specific environmental performance of the mentioned construction products produced in Germany (Weinheim/Bergstraße).

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A1. In the following, the standard will be simplified as EN 15804.

Verification

The standard EN 15804 serves as the core PCR

Independent verification of the declaration and data according to ISO 14025:2010

[ ] internally [x] externally

2. Product

2.1 Product description/Product definition

In this Environmental Product Declaration (EPD), resilient floor coverings on basis of thermoplastic elastomers and rubber of the nora systems GmbH product line noracare® with different designs are modelled.

Specific characteristics of the noracare® coverings are:

- manufacturing method: continuously manufactured floor coverings in sheets
- covering structure: multi-layer
- composition: thermoplastic elastomers, natural and synthetic rubber, minerals from natural sources, colour pigments, and processing aids
- award: Blue Angel according to DE-UZ 120 for resilient floor coverings "low emissions"


For the application and use the respective national provisions apply.

For the product line noracare® further standards apply:

- EN 1817: Resilient floor coverings - Specification for homogeneous and heterogeneous smooth rubber floor coverings
- ISO 10874: Resilient, textile and laminate floor coverings - Classification
- EN 13501-1: Fire classification of construction products and building elements

2.2 Application
For use and application the respective national provisions apply.
Floor coverings are classified according to ISO 10874. Floor coverings for high performance in domestic and professional use: (applicable according to ISO 10874: industrial (class 42)).

2.3 Technical Data
Excerpt from technical data sheets: (available at www.nora.com)

<table>
<thead>
<tr>
<th>Technical properties</th>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product thickness</td>
<td>ISO 24346</td>
<td>2</td>
<td>mm</td>
</tr>
<tr>
<td>Grammage ISO 23997</td>
<td>3.61</td>
<td>kg/m²</td>
<td></td>
</tr>
<tr>
<td>Product Form</td>
<td>rolls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of manufacture</td>
<td>continuousy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hardness ISO 7619</td>
<td>96</td>
<td>Shore A</td>
<td></td>
</tr>
<tr>
<td>Abrasion resistance at 5 N load ISO 4649 (procedure A)</td>
<td>100</td>
<td>mm³</td>
<td></td>
</tr>
<tr>
<td>Improvement in footfall sound absorption ISO 10140-3</td>
<td>5</td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>Anti-slip properties DIN 51130</td>
<td>R10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to EN 14041: Resilient, textile, laminate and modular multilayer floor coverings - Essential characteristics.

2.4 Delivery status
The delivery takes place as metre goods in rolls of 1.22 m width and different lengths. The backs of the coverings are sanded over their entire surface and have arrows indicating the installation direction.

2.5 Base materials/Ancillary materials
Simplified formulation of noracare®
Elastomers (thermoplastic elastomer, natural and synthetic rubber): 26 %
Minerals (chark): 69 %
various pigments: 3.5 %
Auxiliary substances: 1.5 %
The auxiliary substances used are hydrocarbon resins among others.

1) This product contains substances listed in the candidate list (REACH 09.2019) exceeding 0.1 percentage by mass: no

2) This product contains other carcinogenic mutagenic reprotoxic (CMR) substances in categories 1A or 1B which are not in the candidate list, exceeding 0.1 percentage by max: no

3) For the manufacturing of the declared product biocides, flame retardants or plasticisers are not used.

2.6 Manufacture
The production stages are weighing, mixing and subsequent granulating. The granules are continuously extruded into sheets. The surface of the sheets is refined and the backside is sanded. The sheets are rolled-up for transportation. The mass per unit area is 3.61 kg/m².
nora systems GmbH purchases the total electrical energy for production and administration at the site Weinheim from renewable energy sources of the Ørsted Offshore-Windparks in the Danish North and Baltic sea. Respective evidence is available at IBU.
Thermal energy is generated centrally and in heating boilers from natural gas.
The quality and energy management of nora systems GmbH is certified according to ISO 9001 and ISO 50001.

2.7 Environment and health during manufacturing
Regular measurements prove that all binding occupational exposure limit values for chemicals are consistently met, or rather, considerably under-run. In the high noise identified areas of heavy machines, hearing protection is used. The lifting of loads (raw materials) is facilitated in many ways through appropriate lifting assistances.
Since 2000, the environmental management system (existing since 1996) is certified to ISO 14001: Environmental management systems.

2.8 Product processing/installation
The installation of the floor covering is based on the technical regulations of DIN 18365: Construction contract procedures (VOB) - Part C: General technical specifications in construction contracts (ATV) – Flooring work. Suitable subfloors are made of screed – according to German construction procedures-Vergabe und Vertragsordnung für Bauanleitungen (VOB) Part C, DIN 18365: Floorcovering Work, hard poured asphalt according to DIN 18354: Asphalt flooring work, chipboards, plywood, etc. Before installing rubber floor coverings, the subfloor generally has to be levelled.
The application of the adhesives over the entire surface is done in accordance with the installation recommendations of the nora systems GmbH, using adhesives and further auxiliary material approved and suitable for noracare® rubber floor coverings (available e.g. at www.nora.com).
When selecting the installation materials the requirements of the basic award criteria of the Blue Angel – “Low-Emission Floor Covering Adhesive and other Installation Materials” (RAL-UZ 113) should be observed, alternatively GEV-EMICODE EC1plus. These specifications ensure excellent health protection due to minimised emissions.
In addition, the instructions of the laying material manufacturers are generally to be followed. When working with laying auxiliary material, the latest version of the German standard TRGS 610 is to be complied with.

Cuttings should be used for energy recovery.

Initial cleaning and initial polishing may only be carried out after the bonding phase of the adhesive, i.e. at the earliest 48 hours after installation.

2.9 Packaging

The rolled material is wrapped on cardboard cores made of recycled cardboard (the cardboard cores are taken back and re-used). The outer packaging is made of recyclable paper. The individual rolls are assembled vertically on wooden europool pallets (exchange system) and sealed in recyclable polyethylene foil.

2.10 Condition of use

Maintenance of the floor coverings depend on use of the building. For a typical application (e.g. hospitals) the following recommendation of the manufacturer is given:

- intensive cleaning once a year
- polishing with suitable polishing pad monthly
- maintenance cleaning with microfibre cloth
- cleaning agents below pH of 12

Further cleaning recommendations under:
www.nora.com

2.11 Environment and health during use

noracare® floor coverings meet the requirements of the German "Blue Angel" according to the Basic Award Criteria (RAL-UZ 120) for resilient floor coverings and the Finnish M1 Classification of Building Materials. In particular, the requirements on emissions of the Ausschuss zu gesundheitlichen Bewertung von Bauprodukten/Committee for health-related evaluation of building products (AgBB) scheme and the significant stricter requirements of the Blue Angel ensure to avoid any impact on health due to emissions of noracare®.

2.12 Reference service life

A calculation of the reference service life according to ISO 15686 is not possible. According to manufacturers’ estimation a technical service life of at least 30 years is possible.

Due to their very high abrasion resistance, the floor coverings hardly wear down even when extensively used. When used in the designated areas of application and under the usage conditions commonly associated, they stay fully functional and visually appealing during the indicated useful life.

2.13 Extraordinary effects

Fire

noracare® is according EN 13501-1 hardly inflammable (non-cemented Cfl-s1) and toxicologically safe in the event of fire according to DIN 53436-1 und DIN 53436-2.

Fire protection

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building material class</td>
<td>EN 13501-1</td>
<td>Cfl-s1</td>
</tr>
</tbody>
</table>

Water

Resistant to water exposure to the extent of what is typical for indoor use. Not suitable for real wet areas (e.g. showers, wading pools, etc.)

Mechanical destruction

not relevant

2.14 Re-use phase

For noracare® floor coverings there are basically the following options for a re-use phase:

- Material recycling (e.g. granulating and processing into landing mats, industrial or stable mats, and coverings of sports areas or silent asphalt)
- Thermal recycling (e.g. use as a substitute fuel in thermal power plants)
- full material and thermal recycling for energy recovery in the cement industry. Use of stored thermal energy as well as the use of mineral filler as raw material.

2.15 Disposal

The manufacturer recommends introducing the products after their use stage into thermal recycling (alternative fuel for waste incineration) or utilization as an alternative fuel and alternative raw material (mineral fillers) in the cement industry (material and thermal recycling). EWC-No. e.g. 17 02 03.

2.16 Further information

Further information under www.nora.com

3. LCA: Calculation rules

3.1 Declared Unit

The reference unit is 1 m² of floor covering. The values of module A1-A3 refer to 1 m² produced. This EPD represents a product declaration, i.e. the production and disposal of offcuts during the installation stage are assigned to module A5. The combined modules A1-A3, A4 and A5 refer to a reference unit of 1 m² installed.

The material for subfloor preparation and adhesive bonding, needed during installation, is not considered.

Information on the complete floor structure can be found in Environmental Product Declarations based on the PCR „Dispersion adhesives and primers for floor coverings“ and „Mineral factory-made mortar“.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Declared unit</td>
<td>1</td>
<td>m²</td>
</tr>
<tr>
<td>Conversion factor to 1 kg</td>
<td>0.277</td>
<td>-</td>
</tr>
</tbody>
</table>
3.2 System boundary
Type of EPD: from cradle to gate with options

The analysis of the product life cycle includes the following stages:
- Production stage A1-A3: Consideration of production of the basic materials and the manufacturing of the floor covering incl. packaging material (input of waste paper for paper/cardboard production).
- Transport A4: Assumption for the transport of the products to the construction site.
- Installation A5: Production, transport and incineration of the off-cut material, incineration of offcut material (gained energy is declared in D as avoided environmental burden), disposal of the packaging (incineration of polyethylene (PE) film). The pretreatment of the underground surface (prime coat, levelling compound, adhesive) is not considered. This treatment depends on the building and the application and need to be specified for the particular case.
- Use stage B2: Scenario for maintenance/cleaning according to the manufacturer’s recommendation (see 4.)
- End-of-Life stage C1, C2, C3: Scenario for the incineration of the floor covering incl. removal from the building and transport to the waste incineration plant (gained energy is declared in D as avoided environmental burden).
- Benefits for the next product system D: Extraction for electrical and thermal energy from the waste incineration process of the product, the offcuts and the packaging material.

Contributions of waste flows are considered in the modules where they occur.

3.3 Estimates and assumptions
The datasets for the upstream chain of the basic material production are taken from the database GaBi 9. Inventories of some materials are not completely available and so are partly approximated by datasets on similar chemicals or estimated by consolidation of existing datasets and literature research.

The assumptions about the cleaning scenario are described in chapter 4, scenarios.

3.4 Cut-off criteria
All data from the production data acquisition, i.e. on all raw material used as per formulation, are considered. The information available for one auxiliary material is not sufficient for generating an approximation of the supply chain. The mass proportion is below 0.3%; significant contributions to the impact categories while producing this substance are not assumed. This substance is neglected in the calculation.

Transport expenditures are taken into account for all essential basic materials, the dispatch of the products and the end-of-life scenario. Transport processes for packaging materials are neglected.

With the LCA calculation, the production waste resulting directly from production, the electrical and thermal energy needed, and the packaging materials, are taken into account.

Machines, facilities and infrastructure used in the manufacture are ignored.

Thus, even material and energy flows with a proportion of less than 1% are considered. Thus, no input or output flows are neglected, which may contribute to the impact assessment significantly.

3.5 Background data
For life cycle modelling of the considered products, the GaBi 9 Software System for Life Cycle Engineering, developed by thinkstep AG, is used. Upstream data specific Information that is not available are taken from the GaBi 9 database, SP 39.

3.6 Data quality
The primary data collected from the manufacturer are based on annual quantities, or are projected from measurements on the specific facilities of the year 2018.

The GaBi 9 database contains datasets for some of the basic materials used in the respective formulations. Further datasets on the upstream chain of the basic material production are approximated with datasets on similar chemicals or are estimated by the consolidation of existing datasets and literature information.

3.7 Period under review
The manufacturing data display the average of the year 2018 and are based on projections of measurements and calculations form the years 2018/2019.

3.8 Allocation
Allocation of upstream data
For all refinery products, allocation by mass and net calorific value has been applied. The manufacturing route of every refinery product is modelled and the product-specific effort associated with their production is calculated. For other materials’ inventory used in the production process calculation the most suitable allocation rules are applied. Information on single LCIs is documented - link under GaBi 9.
Allocation in the foreground data
The production process does not deliver any co-products. The applied software model does not contain any allocation.
The total production of nora systems GmbH includes further products besides the declared product family. The values for thermal and electrical energy as well as for operating materials are assigned respectively while data collection on the site. Allocation keys are mass, area, pieces or retention time in the plant.
**Allocation for waste materials**

Production waste is fed into an energy recovery process. The energy gained is looped back in the module A1-A3. The quality of the thermal energy can be considered equal to the thermal energy needed for production processes.

The calculation of emissions from the waste incineration plant follows a partial stream consideration for the combustion process, according to the specific composition of the incinerated material.

A waste incineration plant with an R1-value higher than 0.6 is assumed. The environmental burdens of the incineration process of installation offcut and the product in the end-of-life scenario are assigned to the system (A5, C3); resulting energy gain for thermal and electrical energy are declared in module D. The avoided environmental burdens are considered according to European average data for electrical and thermal energy generated from natural gas.

### 3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to **EN 15804** and the building context, respectively the product-specific characteristics of performance, are taken into account.

The used background database has to be mentioned. The software and database **GaBi** 9 is used. Service pack 39 is applied.

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4. **LCA: Scenarios and additional technical information**

The following technical information serves as basis for the declared modules. The values refer to the declared unit of 1m².

#### Transport to the construction site (A4)

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Litres of fuel (truck)</td>
<td>0.00716</td>
<td>l/100km</td>
</tr>
<tr>
<td>Transport distance (truck)</td>
<td>1000</td>
<td>km</td>
</tr>
<tr>
<td>Litres of fuel (boat)</td>
<td>0.00148</td>
<td>l/100km</td>
</tr>
<tr>
<td>Transport distance (boat)</td>
<td>500</td>
<td>km</td>
</tr>
</tbody>
</table>

#### Installation (A5)

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material loss</td>
<td>5</td>
<td>%</td>
</tr>
</tbody>
</table>

#### Nutzung (B1) siehe Kap. 2.12 Nutzung

#### Maintenance (B2)

Dependent on use area based on **ISO 10874**, dependent on the manufacturers’ technical service life and the expected stress for the flooring, the service life can be determined case specifically. The effects on module B2 need to be calculated according to the actual service life, in order to achieve the total environmental impact.

Cleaning of the floor covering depends on the use of the premises. For a typical application (e.g. school building), the following manufacturer’s recommendations are considered in this declaration:

- Intensive machine cleaning (single-disc machine with a suitable red pad/soft brush and an aqua-vacuum cleaner), once a year, with a suitable cleaning agent. The surface of the floor covering must be free of any dirt residues.
- In order to achieve a uniform and compact protective film, the floor covering should be polished once a month with a suitable polishing pad or polishing brush.
- Routine cleaning should be done manually, thrice weekly, with suitable microfibre covers and suitable wash polishes.

Further cleaning recommendations are available at [www.nora.com](http://www.nora.com).

Cleaning agents with a pH-value higher than 12 are not to be used.

The following values refer to a cleaning scenario of 1 year.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information on maintenance</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Electricity consumption</td>
<td>0.074</td>
<td>kWh</td>
</tr>
<tr>
<td>Water consumption</td>
<td>16</td>
<td>l</td>
</tr>
<tr>
<td>Cleaning agent</td>
<td>181</td>
<td>g</td>
</tr>
</tbody>
</table>

#### Reference Service Life

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Span</td>
<td>30</td>
<td>a</td>
</tr>
</tbody>
</table>

See also chapter 2.12.

#### End-of-life (C1-C4)

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy recovery from waste</td>
<td>3.61</td>
<td>kg</td>
</tr>
</tbody>
</table>

**Re-use, Recyclingpotential (D)**, relevant data for scenarios

Module D covers the energy gain of the incineration processes form A5 (offcut of flooring installation, packaging waste) and C3 (incineration of the floor covering). A waste incineration plant with an R1-value > 0.6 is assumed.
The characterisation factors of the publication of CML in the Version of April 2013 apply. The characterisation factors comply with the requirements of EN 15804.

5. LCA: Results

The values of the indicators in module B2 “Maintenance” refer to a time period of 1 year. The environmental impact of the total use phase in the specific building is calculated via multiplication of the values of B2 with the assumed years used.

### RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1 m² noracare®

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>A1-A3</th>
<th>A4</th>
<th>A5</th>
<th>B2</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>GWP</td>
<td>[kg CO₂eq.]</td>
<td>4.01E+0</td>
<td>1.94E-1</td>
<td>3.75E-1</td>
<td>3.38E-1</td>
<td>4.18E-2</td>
<td>8.49E-3</td>
<td>2.61E+0</td>
<td>-1.01E+0</td>
</tr>
<tr>
<td>ODP</td>
<td>[kg CFC11-Eq.]</td>
<td>1.02E+1</td>
<td>4.52E-17</td>
<td>5.23E-13</td>
<td>5.06E-11</td>
<td>1.17E-15</td>
<td>2.17E-18</td>
<td>3.34E-18</td>
<td>-1.39E-14</td>
</tr>
<tr>
<td>AP</td>
<td>[kg SO₂- Eq.]</td>
<td>1.35E-2</td>
<td>1.14E-3</td>
<td>6.84E-4</td>
<td>8.62E-4</td>
<td>1.06E-4</td>
<td>1.98E-5</td>
<td>1.72E-4</td>
<td>-1.13E-3</td>
</tr>
<tr>
<td>EP</td>
<td>[kg PO₄-3-Eq.]</td>
<td>1.68E-3</td>
<td>1.71E-4</td>
<td>9.78E-5</td>
<td>1.44E-4</td>
<td>1.07E-5</td>
<td>4.59E-6</td>
<td>3.61E-5</td>
<td>-1.80E-4</td>
</tr>
<tr>
<td>PCOP</td>
<td>[kg ethene-Eq.]</td>
<td>2.10E-3</td>
<td>-7.36E-5</td>
<td>1.05E-4</td>
<td>2.99E-4</td>
<td>7.59E-5</td>
<td>5.98E-6</td>
<td>1.66E-5</td>
<td>-1.36E-4</td>
</tr>
<tr>
<td>ADPE</td>
<td>[kg Sb-Eq.]</td>
<td>2.10E-5</td>
<td>1.44E-6</td>
<td>1.08E-5</td>
<td>6.42E-6</td>
<td>1.23E-5</td>
<td>6.68E-10</td>
<td>4.17E-9</td>
<td>-1.91E-7</td>
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<tr>
<td>ADPF</td>
<td>[MJ]</td>
<td>9.73E+1</td>
<td>2.59E+0</td>
<td>2.96E+0</td>
<td>5.17E+0</td>
<td>7.97E+0</td>
<td>4.37E+1</td>
<td>3.72E+1</td>
<td>-1.43E+1</td>
</tr>
</tbody>
</table>

### RESULTS OF THE LCA - RESOURCE USE according to EN 15804+A1: 1 m² noracare®

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>A1-A3</th>
<th>A4</th>
<th>A5</th>
<th>B2</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERE</td>
<td>[MJ]</td>
<td>3.23E+1</td>
<td>1.38E-1</td>
<td>1.77E+0</td>
<td>4.37E-1</td>
<td>3.03E-1</td>
<td>6.06E-3</td>
<td>1.75E+0</td>
<td>-3.63E+0</td>
</tr>
<tr>
<td>PERM</td>
<td>[MJ]</td>
<td>1.70E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
</tr>
<tr>
<td>PERT</td>
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<td>1.77E+0</td>
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<td>1.75E+0</td>
<td>-3.63E+0</td>
</tr>
<tr>
<td>PENRE</td>
<td>[MJ]</td>
<td>5.90E+1</td>
<td>2.81E+0</td>
<td>5.33E+0</td>
<td>8.11E+0</td>
<td>7.52E+0</td>
<td>1.15E+1</td>
<td>4.18E+1</td>
<td>-1.80E+1</td>
</tr>
<tr>
<td>PENRM</td>
<td>[MJ]</td>
<td>4.13E+1</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
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<td>0.00E+0</td>
<td>0.00E+0</td>
</tr>
<tr>
<td>PENRT</td>
<td>[MJ]</td>
<td>1.00E+2</td>
<td>2.81E+0</td>
<td>5.33E+0</td>
<td>8.11E+0</td>
<td>7.52E+0</td>
<td>1.15E+1</td>
<td>4.38E+1</td>
<td>-1.80E+1</td>
</tr>
<tr>
<td>SM</td>
<td>[kg]</td>
<td>8.48E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>4.36E-3</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
</tr>
<tr>
<td>RSF</td>
<td>[kg]</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
</tr>
<tr>
<td>NRSF</td>
<td>[kg]</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
</tr>
<tr>
<td>FW</td>
<td>[m³]</td>
<td>8.78E+1</td>
<td>2.33E+4</td>
<td>9.56E-3</td>
<td>1.45E-3</td>
<td>3.57E-4</td>
<td>1.61E+0</td>
<td>5.26E+3</td>
<td>-4.28E+3</td>
</tr>
</tbody>
</table>

### RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES according to EN 15804+A1: 1 m² noracare®

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>A1-A3</th>
<th>A4</th>
<th>A5</th>
<th>B2</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHWD</td>
<td>[kg]</td>
<td>1.19E+0</td>
<td>1.97E-4</td>
<td>6.16E-2</td>
<td>1.56E-2</td>
<td>5.48E-4</td>
<td>9.73E-6</td>
<td>7.86E-2</td>
<td>-7.75E-3</td>
</tr>
<tr>
<td>RWD</td>
<td>[kg]</td>
<td>1.37E+3</td>
<td>5.08E-6</td>
<td>6.51E-5</td>
<td>2.19E-4</td>
<td>2.21E-4</td>
<td>2.37E-7</td>
<td>2.65E-5</td>
<td>-1.45E-3</td>
</tr>
<tr>
<td>CRU</td>
<td>[kg]</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
</tr>
<tr>
<td>MFR</td>
<td>[kg]</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>1.06E-1</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
</tr>
<tr>
<td>MER</td>
<td>[kg]</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
</tr>
<tr>
<td>EEE</td>
<td>[kg]</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>2.51E-1</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>4.06E+0</td>
<td>0.00E+0</td>
</tr>
<tr>
<td>EET</td>
<td>[kg]</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>4.60E-1</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>7.29E+0</td>
<td>0.00E+0</td>
</tr>
</tbody>
</table>

### RESULTS OF THE LCA – BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES

The product contains renewable raw materials. In the manufacturing of the declared unit of 1m² of the product noracare® 0.13 kg CO₂ are sequestered. This bound carbon is emitted in the EoL as CO₂ emission.

6. LCA: Interpretation
The environmental impact of the life cycle of nora floor coverings is mainly determined by the production of the basic materials (A1). The impact of the manufacturing at nora system referring to the category GWP is significant; else the influence on the total production phase is low.

Besides, the maintenance referring to the total use stage is an important factor. The calculation depends strongly on the assumption for the cleaning scenario.

The negative values in module D describe the energy gain of the incineration of packaging material (A5), the off-cuts of the installation (A5) and the product in the end-of-life scenario (C3).

### 7. Requisite evidence

#### 7.1 VOC emissions - Germany

noracare® has been audited for emissions at the approved test Eurofins.

The product complies with criteria for the Blue Angel RAL-UZ 120 for resilient floor coverings with the following requirements on emissions:

<table>
<thead>
<tr>
<th>Compound or Substance</th>
<th>3rd Day</th>
<th>Final Value (28th Day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total organic compounds within the rotation range C₃ - C₄ (TVOC)</td>
<td>&lt; 1000 µg/m³</td>
<td>&lt; 30 µg/m³</td>
</tr>
<tr>
<td>Total organic compounds within the rotation range C₅ - C₁₀ (TSVOC)</td>
<td>-</td>
<td>&lt; 30 µg/m³</td>
</tr>
<tr>
<td>Carboxylic substances</td>
<td>&lt; 20 µg/m³</td>
<td>&lt; 2 µg/m³ per single value</td>
</tr>
<tr>
<td>Total VOC without TCV</td>
<td>-</td>
<td>&lt; 100 µg/m³</td>
</tr>
<tr>
<td>R value</td>
<td>-</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>-</td>
<td>&lt; 60 µg/m³ (0.05 ppm)</td>
</tr>
</tbody>
</table>

Testing on volatile N-nitrosamines according to TRGS 552 at the Institut für Kautschuktechnologie e.V. confirm the absence of any N-nitrosamines.

#### 7.2 VOC emissions - Finland

noracare® floorcoverings comply also with the Finnish M1 Classification of Building Materials.

#### 7.3 VOC emissions - IRK

Additionally, the following relevant values are met, derived from the guidelines values for indoor air, according to the German Indoor Air Hygiene Commission (IRK):
- styrene ≤ 30 µg/m³
- naphthaline ≤ 2 µg/m

(Eurofins)

### 8. References

AgBB-Schema

CML
Characterisatin factors published by Centre of Environmental Science at Leiden.

CPR

DE-UZ 113
DE-UZ 113, Award Criteria Blue Angel: Low-Emission Floor-covering adhesives.

DE-UZ 120
DE-UZ 120, Award Criteria Blue Angel: Elastic Floor Covering.

DIN 51130

DIN 18365
DIN 18365:2016-09, German construction contract procedures (VOB) - Part C: General technical specifications in construction contracts (ATV) - Flooring works.

DIN 18353
DIN 18353:2016-09, German construction contract procedures (VOB) - Part C: General technical specifications in construction contracts (ATV) - Laying of floor screed.

DIN 18354
DIN 18354:2016-09, German construction contract
procedures (VOB) - Part C: General technical specifications in construction contracts (ATV) - Asphalt flooring works.

DIN 53436-1

DIN 53436-2

EN 1817
DIN EN 1817:2010-11, Resilient floor coverings - Specification for homogeneous and heterogeneous smooth rubber floor coverings.

EN 13501-1
DIN EN 13501-1:2010-01, Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire Tests.

EN 14041
DIN EN 14041:2018-05, Resilient, textile, laminate and modular multilayer floor coverings - Essential characteristics.

EN 16810

EN 15804

Eurofins
Eurofins testing Eurofins Product Testing A/S; Galten Denmark.
Test report No. 392-2018-00233301_K_DE_02

EWC No./EAK-Nummer

GaBi 9

GEV-EMICODE EC1plus
EMICODE Label for flooring installations from the Association for the Control of Emissions in Products for Flooring Installation, Adhesives and Building Materials e.V..

IBU 2016

ISO 14025
DIN EN ISO 14025:2011-10, Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

ISO 10140-3

ISO 14001
DIN EN ISO 14001: 2010-11, Environmental management systems - Requirements with guidance for use.

ISO 10874

ISO 14040

ISO 14044

ISO 24346

ISO 23997
DIN EN ISO 23997:2012-04, Resilient floor coverings - Determination of mass per unit area.

ISO 4649
DIN ISO 4649:2014-03, Rubber, vulcanized or thermoplastic - Determination of abrasion resistance using a rotating cylindrical drum device.

ISO 7619
DIN ISO 7619:2012-02, Rubber, vulcanized or thermoplastic - Determination of indentation hardness - Part 1: Durometer method (Shore hardness).

ISO 9001
ISO 9001:2015-09, Quality management systems - Requirements.

ISO 50001

ISO 15686-1

M1 classification
M1-classification, Emission classification of building
Environmental Product Declaration nora systems GmbH – noracare®

materials: general instruction, Rakennustieto, Finland.
Test report No. 392319 (Työterveyslaitos, Helsinki, Finland)

Part A

Part B
Part B, Requirements on the EPD for Floor coverings, version 1.2, IBU, 02-2018.

REACH

TRGS 610
TRGS 610:2011-01, Substitues, substitution of working methods for solvent based primer and adhesives for floorings.

TRGS 552
TRGS 552:2018-09, Technische Regeln für Gefahrstoffe - Krebserzeugende N-Nitrosamine der Kat 1A und 1B.
Test report No. G18N0712 (Deutsches Institut für Kautschuktechnologie)