

# ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/



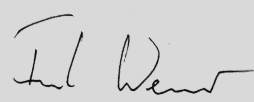
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Jura Limestone façade panels and wall cladding  
Franken-Schotter GmbH & Co. KG

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## 1. General Information

|  |   |  |  |  |  |                                     |  |
|--|---|--|--|--|--|-------------------------------------|--|
| <p><b>Franken-Schotter GmbH &amp; Co. KG</b></p> <hr/> <p><b>Programme holder</b><br/> IBU - Institut Bauen und Umwelt e.V.<br/> Panoramastr. 1<br/> 10178 Berlin<br/> Germany</p> <hr/> <p><b>Declaration number</b><br/> EPD-FRS-20170103-IBD1-EN</p> <hr/> <p><b>This Declaration is based on the Product Category Rules:</b><br/> Dimension stone for roof, wall and floor applications,<br/> 07.2014<br/> (PCR tested and approved by the SVR)</p> <hr/> <p><b>Issue date</b><br/> 02.08.2017</p> <hr/> <p><b>Valid to</b><br/> 01.08.2023</p> <hr/> <div style="text-align: center;"> <br/> <hr/> <p>Prof. Dr.-Ing. Horst J. Bossenmayer<br/> (President of Institut Bauen und Umwelt e.V.)</p> <hr/> <div style="text-align: center;"> <br/> <hr/> <p>Dr. Burkhard Lehmann<br/> (Managing Director IBU)</p> </div> </div> | <p><b>Jura Limestone façade panels and wall cladding</b></p> <hr/> <p><b>Owner of the Declaration</b><br/> Franken-Schotter GmbH &amp; Co. KG<br/> Hungerbachtal 1<br/> 91757 Treuchtlingen-Dietfurt<br/> Germany</p> <hr/> <p><b>Declared product / Declared unit</b><br/> 1 t Jura Limestone façade panels and wall cladding</p> <hr/> <p><b>Scope:</b><br/> This document relates to natural Jura Limestone stone products for wall and façade cladding, manufactured by Franken-Schotter GmbH &amp; Co. KG. The EPD data was collected at all production sites in the years 2016/2017. All production sites relevant for the declared products are included in the calculation. The average therefore represents 100 % of the declared products.<br/> This document is translated from the German Environmental Product Declaration into English. It is based on the German original version EPD-FRS-20170103-IBD1-DE. The verifier has no influence on the quality of the translation.<br/> 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.</p> <hr/> <p><b>Verification</b></p> <table border="1"> <tr> <td colspan="2">The CEN Norm /EN 15804/ serves as the core PCR</td> </tr> <tr> <td colspan="2">Independent verification of the declaration according to /ISO 14025/</td> </tr> <tr> <td><input type="checkbox"/> internally</td> <td><input checked="" type="checkbox"/> externally</td> </tr> </table> <hr/> <div style="text-align: center;"> <br/> <hr/> <p>Dr. Frank Werner<br/> (Independent verifier appointed by SVR)</p> </div> | The CEN Norm /EN 15804/ serves as the core PCR |  | Independent verification of the declaration according to /ISO 14025/ |  | <input type="checkbox"/> internally | <input checked="" type="checkbox"/> externally |
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| Independent verification of the declaration according to /ISO 14025/   |   |  |  |  |  |                                     |  |
| <input type="checkbox"/> internally  | <input checked="" type="checkbox"/> externally  |  |  |  |  |                                     |  |

## 2. Product

### 2.1 Product description / Product definition

The declared façade and wall cladding panels consist of Jura Limestone. This limestone came into being in the Mesozoic Age approximately 160 million years ago though limestone deposits from a tropical sea near the southern Franconian highlands. The geological formation is called Upper Jura, White Jura or Malm Delta.

This sedimentary rock consists mainly of calcium carbonate (CaCO<sub>3</sub>) with admixtures of metal oxides and coloured clays. Jura limestone, also known as Jura marble, occurs in the Franconian limestone highlands in the vicinity of Eichstätt-Treuchtlingen. The material density, polishing ability, the numerous variations in colour and structure and its good abrasion resistance provide the decisive properties for the many possible uses for Jura limestone.

Jura limestone is the result of unique prehistoric developments. Each stone contains numerous testimonies to prehistoric flora and fauna. The force of

nature which created this natural stone and the visible geological documentation give it its special appeal and a timeless character.

The declared products are marketed under the material names of Jura Limestone, Dietfurt Limestone, Dietfurt Limestone gala and Dietfurt Travertine by the Franken-Schotter company.

The declaration applies to material thicknesses of 20 mm to 40 mm and all surface, format and colour variants.

Ordinance (EU) no. 305/2011/CPR (with the exception of Switzerland) applies for placing the product on the market. The product requires a declaration of performance taking into account DIN EN 1469:2015-05 Natural stone products – Slabs for cladding – Requirements and CE labelling.

The respective national regulations apply to its use.



## 2.2 Application

The declared products are used as cladding material for curtain-wall facing, rear ventilated facades, compound thermal insulation systems, facing formwork and also as a wall covering for decorative interior use. Due to its timeless character and excellent technical properties it is used in both commercial and public buildings and in the private sector. Furthermore, it can be used as floor slabs and also for treads and risers indoors and outdoors.

## 2.3 Technical Data

### Constructional data

Product performance data in accordance with the declaration of performance in relation to its main properties in accordance with DIN EN 1469:2015-05; Natural stone products – Slabs for cladding – Requirements:

| Name   | Value    | Unit              |
|--|----------|-------------------|
| Nominal thickness in accordance with DIN EN 12326                        | 20–40    | mm                |
| Flexural strength in accordance with DIN EN 12372 (MW)                   | 13.5     | N/mm <sup>2</sup> |
| Gross density in accordance with DIN EN 1936                             | 2570     | kg/m <sup>3</sup> |
| Reaction to fire, without testing, see 96/603/EG                         | Class A1 |                   |
| Burst load at anchor pin (d1=10 mm) in accordance with DIN EN 13364 (MW) | 1750     | N                 |

## 2.4 Delivery status

Jura Limestone façade and wall cladding panels are manufactured in different formats, thicknesses, colours and surfaces depending on where they are used and what is required and supplied in customised packaging units (packet and pallet packaging).

Any individual format as regards thickness and size is possible.

The following colours and surfaces can be supplied as standard:

- Colours: beige, grey, cream white, grey-beige banded, beige banded
- Surfaces: honed, polished, sand-blasted, sandblasted and brushed, bush-hammered and brushed, bush hammered and Castellina tumbled.

Further surfaces are available on enquiry.

## 2.5 Base materials / Ancillary materials

Jura Limestone is a natural sedimentary stone which is composed mainly of calcium carbonate (CaCO<sub>3</sub>) with metal oxides and coloured clays mixed in. The proportion of calcium carbonate is typically > 97 wt-%. In addition, dolomite, iron oxide and silicon oxide are present in measurable quantities.

The proportion of epoxy-based stone filler in the finished product is on average < 0.1 wt-% (see Section 2.6 – Manufacture).

## 2.6 Manufacture

As natural sedimentary stone, Jura Limestone is excavated by surface mining with the assistance of chain saw machines or drilling equipment fitted with a splitting cylinder. The raw blocks extracted are then transported sorted by type and colour to the works for further processing.

The raw blocks are cut into raw slabs which are used for further production with the assistance of large gangsaws with diamond-studded saw blades and saw gates with water circulation as a coolant. The raw slabs are first precisely calibrated to precise thickness with diamond cutter. The raw slabs are then dried and any pores and holes filled with epoxy-base stone filler. The required surface is then produced with the through-feed method on the polishing line. The subsequent formatting is then done with diamond circular saws. Following the quality control the cladding and wall panels are then packed in wooden pallets.

## 2.7 Environment and health during manufacturing

Due to the manufacturing conditions, no environmental and health measures which go beyond the stipulations contained in the valid EU regulations and also national legal and other regulations are necessary. This also includes compliance with the regulations of professional bodies and also compliance with or undercutting workplace threshold values in the manufacturing process.

- Air: Any dusts which occur are collected in filter equipment. The emissions lie significantly below the threshold values of the Clean Air Guidelines.
- Water/ground: Waters accruing during manufacture are cleaned in waste water treatment plants on the works site and redeployed in the production process.
- Noise: Noise emissions from the production plant to the immediate environment are below the permissible threshold values of the noise pollution prevention regulations.

Environmental management:

A validated environmental management system in accordance with EMAS is present at all sites.

## 2.8 Product processing/Installation

Generally, the cladding or wall panels are supplied already in a ready-to-lay format cut to size, processed, notched and bored. The products must be stored in a dry place.

Processing on the building site is principally possible. The normal safety precautions (e.g. hearing protection for machines, protective goggles and a dust mask) should be taken into account. The sawdust produced must be sucked off. In case of commercial processing, please observe the regulations of the professional bodies. Tools and machines required may only be deployed in accordance with their purpose and in accordance with the respective manufacturer's user manual.

The cladding and wall panels are generally mounted on a metal substructure. The normal fixing options are:

Undercut anchor, anchor pin, hook. The manufacturer's instructions must be followed during installation.

Left over material which accumulates on the construction site (scrap pieces of material and packaging materials) should be collected separately by waste fraction. The prescriptions of the local disposal authorities and the instructions in 2.14 and 2.15 are to be complied with when disposing of waste.

## 2.9 Packaging

The products are bundled with PET packing tape and stacked by format on wooden pallets and secured with PET packaging tape. They are protected from the weather with polyethylene sheeting.

Packaging materials must be collected separately and recycled in accordance with local and statutory regulations. If Euro-pallets are used, these can be reused many times or recycled thermally as scrap wood.

## 2.10 Condition of use

The composition for the period of use corresponds to the composition of the base materials in accordance with Section 2.5 "Base materials/Ancillary materials".

## 2.11 Environment and health during use

There are no harmful health or environmental effects during the use phase.

## 2.12 Reference service life

With reference to the DNV sustainability study and from long-term professional experience, a use period of more than 50 years is possible. No declaration by the RSL according to the standard is given.

With appropriate use and application in accordance with the current state of technology there is no influence on ageing.

## 2.13 Extraordinary effects

### Fire

Jura limestone cladding and wall panels are not flammable. No sight-impairing and toxic gases are produced in case of fire.

Fire protection: Building material class A1 – not flammable (without test, see 96/603/EC).

### Water

No ingredients which can constitute a risk for water or the environment are washed out under the influence of water.

### Mechanical destruction

Mechanical damage or destruction represent no risks for the environment.

## 2.14 Re-use phase

Depending on the quantity and the material, cladding and wall panels can be re-used for their original purpose accordingly in case of the purposeful dismantling of buildings.

The material can be re-used as filling and backfill material for civil engineering, especially for road and path construction.

## 2.15 Disposal

Insofar as the material is not re-used, it may be deposited on a Class DK-0 landfill with waste key 170103.

## 2.16 Further information

Further information is available online at: [www.franken-schotter.com](http://www.franken-schotter.com)

# 3. LCA: Calculation rules

## 3.1 Declared Unit

The declaration relates to the manufacture of 1 ton of wall and cladding panels with an average thickness of 30 mm. The following table contains conversion factors:

### Declared Unit

| Name                      | Value | Unit              |
|---------------------------|-------|-------------------|
| Declared unit             | 1     | t                 |
| Gross density             | 2600  | kg/m <sup>3</sup> |
| Conversion factor to 1 kg | 0.001 | -                 |

1 ton corresponds to 12.82 m<sup>2</sup> of the 30 mm thick panel.

## 3.2 System boundary

EPD type: Cradle-to-gate with options

The following lifecycle phases are considered: Product stage (Module A1-A3), transport to building site (Module A4), maintenance/cleaning (Module B2), disposal stage (Module C4).

The system boundaries of the EPD comply with the modular approach of EN 15804. The declared modules are described briefly below.

**Modules A1–A3** cover the manufacturing phase, beginning with the extraction of the natural stone and preparation through to further processing and packaging. Internal company transport between the production sites are also included. The specific production steps (sawing, grinding, polishing, formatting, edge processing, etc.) refer to panels of the medium thickness of 30 mm. Certified green electricity is credited for Franken-Schotter. This is 100% hydro-electric power from Norway (certificate, N-ergie AG).

**Module A4** contains transport to the customer or the construction site. A standard value for calculating the transport scenario is used. 100 km by truck. The results can be scaled accordingly for individual cases.

**Module B2** contains the annual cleaning impacts with water and cleaning agent.

**Module C4** covers waste disposal, i.e. disposal on the construction waste landfill.

### 3.3 Estimates and assumptions

The auxiliary materials oil and fat are modelled together as lubricants due to their identical chemical base. Their influence on the LCA is irrelevant.

### 3.4 Cut-off criteria

All operating data collected, i.e. all basic materials deployed according to production planning, the thermal and electrical energy used, internal fuel consumption and power consumption, all direct production waste and also all available emissions measurements is included in the balance. This means that material and energy flows with a share of under 1 percent are also included. Material flows which contribute significantly to the environmental impact of the product were consciously included. Machines, plant and infrastructure needed for manufacturing were not included.

### 3.5 Background data

Data is available from the GaBi database for the base materials used and also energy provision and all other necessary background data (e.g. waste treatment and transport processes). The data base was last updated in 2016.

### 3.6 Data quality

The data quality can be described as good. The foreground is current and was carefully recorded. All relevant energy and material flows were included.

### 3.7 Period under review

Collection of the foreground data relates to the 2016/2017 period (annual average 02/2016-02/2017, a 12 month period).

### 3.8 Allocation

The entire production of Franken-Schotter GmbH & Co. KG includes further products apart from the declared product. A differentiation to these further products was made when collecting data. This means therefore that no allocation is integrated in the software model used.

### 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 background database used is /GaBi ts/.

### 3.10. Factors for different thicknesses

The declared LCA results in this EPD relate to one ton of natural stone panels based on an average thickness of 30 mm.

The following table enables the user of the EPD to scale the LCA results to thicknesses of 20 mm and 40 mm.

#### Factors for calculating results for different thicknesses:

| Parameter | 1 t (corresponds to 19,23 m <sup>2</sup> of 20 mm thickness) | 1 t (corresponds to 12,82 m <sup>2</sup> of 30 mm thickness) | 1 t (corresponds to 9,62 m <sup>2</sup> of 40 mm thickness) |
|-----------|--|--|---|
| GWP       | 1,29   | 1,00   | 0,85  |
| ODP       | 1,37   | 1,00   | 0,81  |
| AP        | 1,18   | 1,00   | 0,90  |
| EP        | 1,19   | 1,00   | 0,90  |
| POCP      | 1,27   | 1,00   | 0,86  |
| ADPE      | 1,41   | 1,00   | 0,78  |
| ADPF      | 1,31   | 1,00   | 0,85  |
| PERT      | 1,36   | 1,00   | 0,79  |
| PENRT     | 1,31   | 1,00   | 0,84  |

## 4. LCA: Scenarios and additional technical information

The following technical information forms the basis for the declared modules or can be used for the development of specific scenarios in the context of a building assessment.

#### Transport to building site (A4)

| Name  | Value | Unit              |
|---|-------|-------------------|
| Transport distance                          | 100   | km                |
| Capacity utilisation (including empty runs) | 85    | %                 |
| Gross density of products transported       | 2600  | kg/m <sup>3</sup> |

Further transport distances can be derived from this distance.

#### Installation into building (A5)

Module A5 is not declared as part of this EPD.

The following packaging materials accrue on the building site per 1 m<sup>2</sup> of product:

| Name                                | Value | Unit              |
|-------------------------------------|-------|-------------------|
| Wooden pallets (returnable pallets) | 0,29  | kg/m <sup>2</sup> |
| Polyethylene sheet                  | 0,003 | kg/m <sup>2</sup> |
| Polypropylene packaging tape        | 0,002 | kg/m <sup>2</sup> |
| Polystyrene                         | 0,02  | kg/m <sup>2</sup> |

#### Maintenance (B2)

Maintenance (B2) consists of water and cleaning agent used for cleaning. The environmental impact of the

annual cleaning of one tonne of cladding and wall panels is calculated and declared in the EPD. The following figures include a typical cleaning interval of once every three months (four cleaning sessions per year).

The cleaning results in B2 can be flexibly multiplied if hygienic requirements of highly frequented areas dictate more frequent cleaning.

| Name   | Value  | Unit           |
|--|--------|----------------|
| Water consumption (per year)                 | 0.005  | m <sup>3</sup> |
| Auxiliary Cleaning agent additive (per year) | 0.0103 | kg             |

#### Reference service life

| Name                                       | Value | Unit |
|--|-------|------|
| Service life (according to the literature) | 50    | a    |

With reference to the DNV sustainability study and from long-term professional experience, a use period of more than 50 years is possible. No declaration by the RSL according to the standard is given.

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

The products examined are disposed of on a landfill at

the end of the use phase.

| Name                                  | Value | Unit |
|---------------------------------------|-------|------|
| Collected as mixed construction waste | 1000  | kg   |
| Landfilling                           | 1000  | kg   |

## 5. LCA: Results

The following tables contain the LCA results for 1 ton of cladding and wall panels in relation to the declared stages of service life. 1 ton corresponds to 12.82 m<sup>2</sup> of panels of the medium thickness (30 mm). Module B2 refers to the annual cleaning of 1 ton of panels.

### DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

| PRODUCT STAGE       |           |               | CONSTRUCTION PROCESS STAGE          |          | USE STAGE |             |        |             |               |                        |                       | END OF LIFE STAGE          |           |                  |          | BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES |
|---------------------|-----------|---------------|-------------------------------------|----------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|---|
| Raw material supply | Transport | Manufacturing | Transport from the gate to the site | Assembly | Use       | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential              |
| A1                  | A2        | A3            | A4                                  | A5       | B1        | B2          | B3     | B4          | B5            | B6                     | B7                    | C1                         | C2        | C3               | C4       | D   |
| X                   | X         | X             | X                                   | MND      | MND       | X           | MNR    | MNR         | MNR           | MND                    | MND                   | MND                        | MND       | MND              | X        | MND   |

### RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 t Jura Limestone façade panels and wall cladding (corresponds to 12.82 m<sup>2</sup>, 30 mm thick)

| Parameter  | Unit                                      | A1-A3    | A4       | B2       | C4       |
|--|---|----------|----------|----------|----------|
| Global warming potential   | [kg CO <sub>2</sub> -Eq.]                 | 59.90    | 4.73     | 0.04     | 16.14    |
| Depletion potential of the stratospheric ozone layer             | [kg CFC11-Eq.]                            | 6.33E-11 | 6.00E-13 | 2.21E-9  | 1.52E-11 |
| Acidification potential of land and water                        | [kg SO <sub>2</sub> -Eq.]                 | 1.80E-1  | 1.96E-2  | 9.75E-5  | 9.54E-2  |
| Eutrophication potential   | [kg (PO <sub>4</sub> ) <sup>3</sup> -Eq.] | 2.72E-2  | 4.84E-3  | 6.26E-5  | 1.30E-2  |
| Formation potential of tropospheric ozone photochemical oxidants | [kg ethene-Eq.]                           | 1.25E-2  | -7.24E-3 | 2.47E-5  | 7.51E-3  |
| Abiotic depletion potential for non-fossil resources             | [kg Sb-Eq.]                               | 8.61E-5  | 4.92E-7  | -6.13E-9 | 5.79E-6  |
| Abiotic depletion potential for fossil resources                 | [MJ]                                      | 842.44   | 64.26    | 0.59     | 208.74   |

### RESULTS OF THE LCA - RESOURCE USE: 1 t Jura Limestone façade panels and wall cladding (corresponds to 12.82 m<sup>2</sup>, 30 mm thick)

| Parameter  | Unit              | A1-A3   | A4    | B2   | C4     |
|--|-------------------|---------|-------|------|--------|
| Renewable primary energy as energy carrier                 | [MJ]              | 1188.26 | 4.25  | 0.15 | 25.24  |
| Renewable primary energy resources as material utilization | [MJ]              | 0.00    | 0.00  | 0.00 | 0.00   |
| Total use of renewable primary energy resources            | [MJ]              | 1188.26 | 4.25  | 0.15 | 25.24  |
| Non-renewable primary energy as energy carrier             | [MJ]              | 850.92  | 64.45 | 0.61 | 216.11 |
| Non-renewable primary energy as material utilization       | [MJ]              | 14.29   | 0.00  | 0.00 | 0.00   |
| Total use of non-renewable primary energy resources        | [MJ]              | 865.22  | 64.45 | 0.61 | 216.11 |
| Use of secondary material                                  | [kg]              | 0.00    | 0.00  | 0.00 | 0.00   |
| Use of renewable secondary fuels                           | [MJ]              | 0.00    | 0.00  | 0.00 | 0.00   |
| Use of non-renewable secondary fuels                       | [MJ]              | 0.00    | 0.00  | 0.00 | 0.00   |
| Use of net fresh water                                     | [m <sup>3</sup> ] | 2.02    | 0.00  | 0.01 | 0.04   |

### RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 t Jura Limestone façade panels and wall cladding (corresponds to 12.82 m<sup>2</sup>, 30 mm thick)

| Parameter                     | Unit | A1-A3   | A4      | B2      | C4      |
|-------------------------------|------|---------|---------|---------|---------|
| Hazardous waste disposed      | [kg] | 1.32E-5 | 4.06E-6 | 1.12E-5 | 3.42E-6 |
| Non-hazardous waste disposed  | [kg] | 1.35E+3 | 4.70E-3 | 8.28E-3 | 1.00E+3 |
| Radioactive waste disposed    | [kg] | 9.03E-3 | 7.40E-5 | 5.89E-6 | 2.92E-3 |
| Components for re-use         | [kg] | 0.00    | 0.00    | 0.00    | 0.00    |
| Materials for recycling       | [kg] | 0.00    | 0.00    | 0.00    | 0.00    |
| Materials for energy recovery | [kg] | 0.00    | 0.00    | 0.00    | 0.00    |
| Exported electrical energy    | [MJ] | 0.00    | 0.00    | 0.00    | 0.00    |
| Exported thermal energy       | [MJ] | 0.00    | 0.00    | 0.00    | 0.00    |

#### Information on the fuel value of the product including packaging:

This products included in this study contain no flammable resources according to their composition. Just the packaging materials used (polypropylene, polyethylene and polystyrene) contain raw materials which are fossil resources (fuel value for PP and PE 44 MJ/kg, fuel value for polystyrene 40 MJ/kg). The calculation of the PENRM indicator (non-renewable primary energy as material utilisation) is merely based on the specified packaging materials.

The PERM indicator (renewable energy resources as material utilisation) is specified as zero as the wooden pallets (returnable pallets) used can be regarded as load-free.

#### Remark on Module A4:

A standard value is used for calculating the transport scenario. 100 km by truck.  
The results can be scaled accordingly for individual cases.

#### Remark on Module B2:

No RSL to the standard is declared as part of the EPD. The values specified refer to annual cleaning and can be scaled accordingly for individual cases.

## 6. LCA: Interpretation

### Manufacture

On examining the PENRT (total non-renewable primary energy), GWP (greenhouse gas potential) and the ADPF (abiotic depletion potential of fossil resources) the resin plant shows up as being a relevant impact, with ODP (ozone depletion potential) and ADPE (abiotic depletion potential for elementary resources) as significant impact. This is attributable approximately equally to the epoxy's upstream chain and the energy used to treat the surface.

In all impact categories, the slabbing has a moderately important to significant impact, and the cutting also exhibits a relevant impact.

The raw block extraction and the used of the large circular saw provide a low impact.

The influence of intralogistics and packaging is negligibly small.

### Entire lifecycle

Across the lifecycle phases examined, the dominance of the finishing process is evident within Modules A1-A3. Transport to the building site has a low impact assuming a transport distance of 100 km by truck. Cleaning makes a negligible contribution. Disposal in the end-of-life phase has a certain impact.

This EPD reflects the environmental impact of the manufacture of an average panel in relation to the declared unit of 1 t (mean thickness 30 mm). The following can be said with regard to the results for other thicknesses:

Generally, it can be said that the thinner the product, the higher the results of the LCA per mass. The results of production depend on the thickness of the panel. Fluctuations lie within the range of minus 20% to plus 40% of the average value.

## 7. Requisite evidence

### 7.1 Radioactivity

Following examination for radioactivity (gamma spectrometric measurement) by LGA Nuremberg, measurement report 5921 104 B, yellow Jura Limestone, the radioactivity concentration for Ra-226 is < 5.5 Bq/kg, for Th-232 it is < 2,1 Bq/kg and for K-40 15 Bq/kg.

Measurement report M 5921 104 B: Examination for radioactivity (gamma spectrometric measurement, yellow Jura Limestone, TÜV Rheinland LGA Bautechnik GmbH, Products division, radiation protection and radiation physics, Tillystrasse 2 90431 Nuremberg, 2002

## 8. References

### DIN EN 12372

DIN EN 12372:2007-02: Test procedure for natural stone – determination of bending strength under centre line load.

### DIN EN 13364

DIN EN 13364:2002-03: Test procedure for natural stone - determination of burst load at the anchor pin

### DIN EN 12371

DIN EN 12371:2010-07: Test procedure for natural stone – determination of frost resistance

### DIN EN 1936

DIN EN 1936:2007-02: Test procedure for natural stone – determination of bulk density

### EN 1469:2015

Natural stone products – Slabs for cladding – Requirements  
Ordinance (EU) No. 305/2011 CPR of the European Parliament and Council of 9th March 2011 to determine harmonised conditions for the marketing of building products

**Sustainability study:** LCAs for cladding designs with natural stone and glass, DNV - German Natural Stone Association, Sanderstrasse 4  
97070 Würzburg, 2010

**Declaration of performance no. LE-1469/1**, Franken-Schotter GmbH & Co KG, 2016.

**EMAS:** Ordinance (EC) no. 1221/2009 of 25th

November 2009 on the voluntary participation of organisations in a joint system for environmental management and environmental auditing and to rescind Ordinance (EC) no. 761/2001, as well as the Commission's resolutions 2001/681/EC and 2006/193/EC.

### Institut Bauen und Umwelt

Institut Bauen und Umwelt e.V., Berlin(pub.):  
Generation of Environmental Product Declarations (EPDs);

### General Principles

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