

# ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025 and EN 15804

## Additional information in accordance with NF EN 15804/CN and French legal requirements on environmental product declarations

Corresponding IBU DEP number:

DEP-LIN-20160235-IAA1-DE

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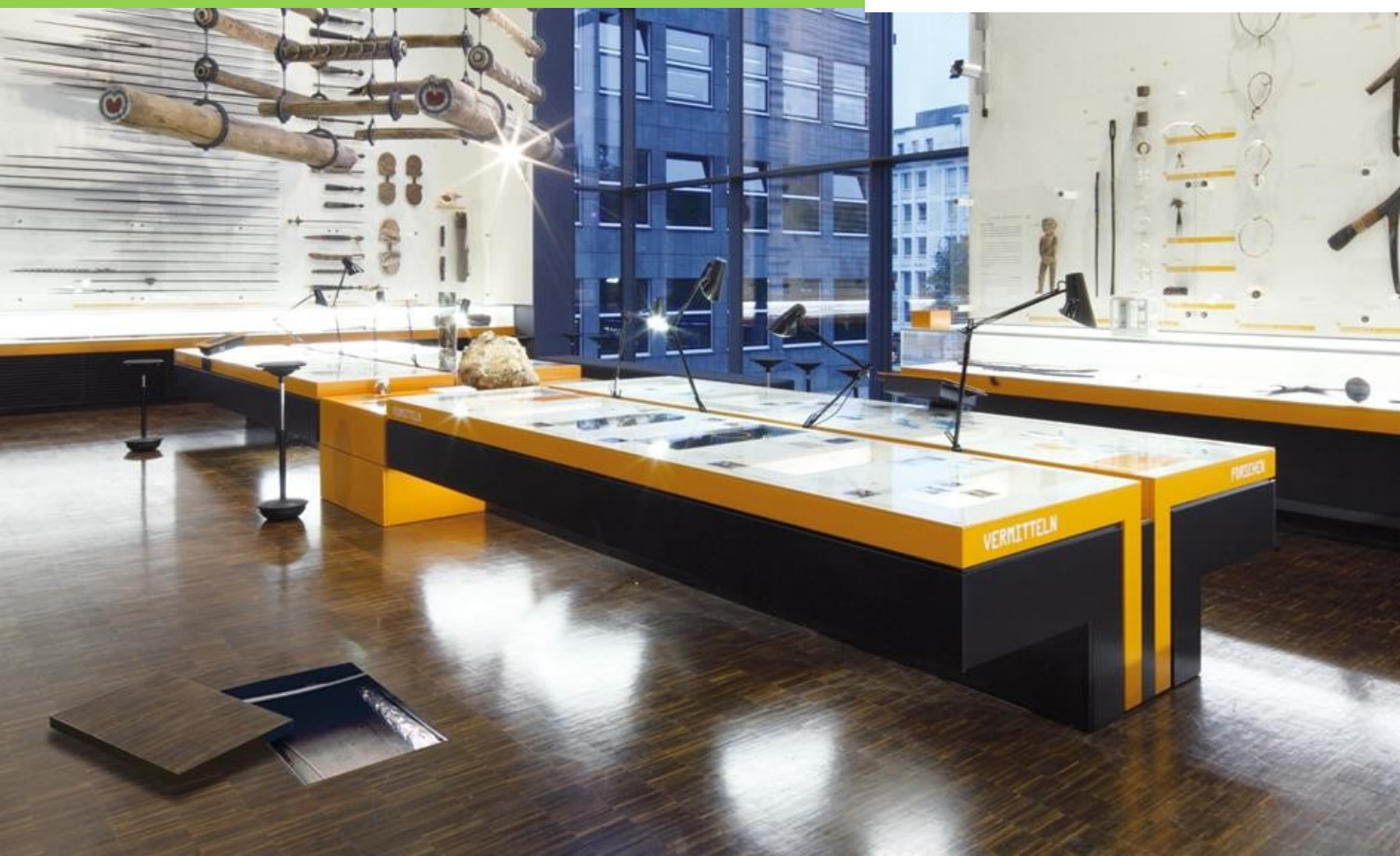
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Expiry date :

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### Raised floor system, Type LIGNA Lindner Group

Appendix version: 2019-01



## 1. Scope of this annex

This appendix to DEP-LIN-20160235-IAA1-DE for the LIGNA raised access floor system by Lindner Group contains additional information to comply with the following French standards and legislation:

- NF EN 15804+A1:2014-04, Contribution of construction works to sustainable development - Environmental product declarations - Rules for construction product categories
- NF EN 15804/CN : 2016-06, Contribution of construction works to sustainable development - Environmental product declarations - Rules for construction product groups - National supplement to NF EN 15804+A1
- Arrêté du 23 décembre 2013 relatif à la déclaration environnementale des produits de construction et de décoration destinés à un usage dans les ouvrages de bâtiment, Version consolidée au 23 juin 2016.

## 2. Warning

The information contained in this appendix and in the corresponding EPD has been provided under the responsibility of Lindner Group in accordance with NF EN 15804+A1 and the national supplement NF EN 15804/CN.

Any use, partial or total, of the information provided in this document must be accompanied at least by an explicit reference to the original PED and to the issuer of the PED, who must be able to provide a complete copy.

CEN standard EN 15804+A1 defines the Rules for the Definition of Product Categories (RCP).

## 3. Declared products

The results in this appendix are valid for the following functional unit:

- create 1 m<sup>2</sup> of floor space raised above the gross ground level for a reference life of 50 years.

The corresponding reference flow is 1 m<sup>2</sup> of LIGNA raised access floor, consisting of slabs, jacks and accessories, without covering and with an average slab thickness of 37.5 mm and an average density of 644.3 kg/m<sup>3</sup>. The total weight of the slab is 24.2 kg/m<sup>2</sup> plus 1.35 kg for the associated jacks (4 pieces per m<sup>2</sup> of raised access floor) with a weight of 0.337 kg per jack.

Not all floor coverings are taken into account in the life cycle analysis, as there is a wide variety of floor coverings such as parquet, linoleum, carpet, etc.

### Description of the reference lifetime

Parameter	Value
Reference lifetime	50
Declared product properties	Product with a load class complying with standard NF EN 12825
Theoretical application parameters	Product complies with standard NF EN 12825
Presumed quality of the work	Installation in accordance with NF DTU 57.1 - Raised floors
Outdoor environment	Not applicable, as it is used indoors

Parameter	Value
Indoor environment	The product must be installed in accordance with DTU 57.1, which sets out the installation requirements for freely accessible raised access floors made using removable slabs laid on a height-adjustable framework.
Terms and conditions of use	The product is intended for pedestrian traffic
Maintenance	no maintenance required

#### 4. LCA: Additional indicators

The two indicators "water pollution" and "air pollution" are calculated on the basis of a "critical volumes" approach in accordance with standard NF EN 15804/CN. The "energy exported in the form of process gas" indicator is a life cycle inventory indicator.

For more details on the limits of the system and other methodological aspects of LCA, please consult the relevant articles in the DEP.

#### 5. LCA: Scenarios and additional technical information

The scenarios applied for an EHDS application differ from DEP IBU to modules A4, A5, C2, C3 and D.

##### Transport to the A4 site

The average transport distance from the production site in Arnstorf (Germany) to Paris (France) is estimated at : 1000 km by truck.

Table 1: Transport to the site

Parameter	Unit (expressed per unit declared)
Diesel	0.44 l/1 m <sup>2</sup> product
Transport distance (to site)	1000 km
Capacity utilisation	70%
Density by volume of transported products	Not relevant
Volume capacity utilisation factor	1

##### A5 installation stage

The end-of-life scenario for the French market follows the default values for landfill, incineration and recycling share provided in the "Bilan National Du Recyclage 2005-2014".

Packaging disposal is modified under French framework conditions insofar as the respective life cycle inventories (LCIs) are available. The benefits of energy recovery from incineration processes are declared in module D with the LCIs for the French framework conditions.

Table 2: Installation of the product in the building

Parameter	Unit (expressed per unit declared)
Auxiliary inputs for installation (specified by material)	0 kg
Use of water	0 kg
Use of other resources	0 kg
Quantitative description of the type of energy (regional mix) and consumption during the installation process	0 MJ
Waste generated on the construction site prior to treatment of waste generated by the installation of the product (specified by type)	0 kg

Materials (specified by type) generated by the treatment of waste on the construction site, e.g. collection for recycling, energy recovery, disposal (specified by route) :	Pallets for incineration: 0.0188 kg Plastic for incineration: 0.0252 kg Plastic for landfill: 0.0023 kg Plastic for recycling: 0.0126 kg Cardboard/paper for recycling: 0.0857 kg Wood for recycling: 0.0188 kg Steel for recycling: 0.0001 kg
Direct emissions into ambient air, soil and water	0 kg

#### Life stage B1-B7

Modules B1 to B7 must be declared for the French declaration. During the use phase, there is no environmental impact to be detected. The product requires no maintenance and cleaning depends on the type of coating. As long as the product is used normally, there is no need for repair or exchange. Modules B1-B7 are therefore declared as 0.

#### End-of-life stage C1-C4

The product is removed and disassembled manually. The supports and the plate are then transported separately. The supports are melted down and transformed into new steel with a loss of 3%. The amount of secondary steel used in the production process is deducted.

The slab is recycled according to the *FCBA* scenario (Rapport D'Etude (2012)). 15.4% is fed directly into the waste incineration plant. 57.2% are transported a further 100 km to a sorting centre and then credited. 17.3% is landfilled. The remaining 10% is transported to a sorting centre and incinerated.

Table 3: Product end-of-life

Parameter	Value/description
Quantity collected separately	-
Quantity collected with mixed construction waste	-
Quantity for energy recovery in a waste incineration plant	6.18 kg
Quantity for energy recovery in the cement plant (organic matter)	-
Quantity for recycling in cement works (inorganic material)	-
Product for final disposal	4.18 kg
Assumptions for developing scenarios	

#### Recycling/reuse/recovery potential D

Module D assumes that the base plate is incinerated, stored and recycled. A thermal and electrical credit is calculated for the incinerated portion. The reason for this calculation is the correspondingly high R-value of waste incineration plants ( $R > 0.6$ ).

As steel is a precious resource, it is assumed that 100% of the substrates are recycled. Using a net cash flow statement, the proportion of secondary materials used in production is eliminated. In this way, only the proportion of primary steel is credited.

The possible benefits of recycling particleboard are not taken into account when quantifying module D.

## 6. LCA: Results

DESCRIPTION OF SYSTEM BOUNDARIES (X = INCLUDED IN THE ACV; MND = MODULE NOT INCLUDED IN THE ACV)  
DECLARED; MNR = MODULE NOT RELEVANT)

PRODUCT PHASE			PHASE OF THE CONSTRUCTION PROCESS		USE PHASE							END-OF-LIFE PHASE				BENEFITS AND COSTS BEYOND THE SYSTEM'S BOUNDARIES
Supply of raw materials	Transport	Production	Transport from factory to site	Assembly	Use	Maintenance	Repair	Replacement <sup>(1)</sup>	Refurbishment <sup>(1)</sup>	Energy consumption in operation	Water consumption in operation	Deconstruction demolition	Transport	Waste treatment	Elimination	Potential for Reuse-Recovery-Recycling
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D

### LCA RESULTS - ENVIRONMENTAL IMPACT: <sup>1m2</sup> LIGNA raised access floor

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP	[kg CO <sub>2</sub> -Eq.]	-2,87E+01	1,26E+00	4,09E-02	0,00E+00	2,07E-01	3,05E+01	1,05E+01	-4,42E+00
ODP	[kg CFC11-Eq.]	6,73E-09	2,62E-12	3,35E-13	0,00E+00	6,76E-12	2,01E-09	1,12E-11	-4,72E-09
AP	[kg SO <sub>2</sub> -Eq.]	4,27E-02	2,88E-03	5,48E-06	0,00E+00	5,32E-04	4,03E-03	1,15E-03	-1,07E-02
EP	[kg (PO <sub>4</sub> )-Eq.] <sup>3</sup>	5,64E-03	7,18E-04	1,27E-06	0,00E+00	1,22E-04	9,48E-04	-5,64E-03	-1,02E-03
POCP	[kg ethene-eq.]	6,80E-03	-8,95E-04	4,57E-07	0,00E+00	-1,37E-04	2,80E-04	1,77E-03	-1,60E-03
ADPE	[kg Sb-Eq.]	9,92E-05	9,59E-08	8,06E-10	0,00E+00	1,62E-08	2,35E-08	5,84E-08	-3,66E-07
ADPF	[MJ]	1,90E+02	1,72E+01	1,10E-02	0,00E+00	2,82E+00	4,17E+00	4,28E+00	-5,84E+01
AirP	[m <sup>3</sup> ]	1,54E+03	3,61E+01	1,40E-01	0,00E+00	6,46E+00	3,45E+01	1,77E+02	-5,11E+02
WaterP	[m <sup>3</sup> ]	2,39E+00	1,40E-01	1,35E-02	0,00E+00	2,49E-02	1,99E-01	2,82E-01	-2,31E-01
legend	GWP = Global Warming Potential; ODP = Ozone Depletion Potential; AP = Soil and Water Acidification Potential; EP = Eutrophication Potential; POCP = Potential for the formation of photochemical oxidants of tropospheric ozone; ADPE = Abiotic Depletion Potential of non-fossil resources; ADPF = Abiotic Depletion Potential of fossil resources; AirP = Air pollution; WaterP = Water pollution;								

### LCA RESULTS - RESOURCE USE: <sup>1m2</sup> LIGNA raised access floor

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	[MJ]	8,09E+01	1,17E+00	1,42E+00	0,00E+00	1,14E-01	1,21E+02	0,00E+00	-7,42E+00
PERM	[MJ]	1,88E+02	0,00E+00	-1,42E+00	0,00E+00	0,00E+00	-4,67E+01	0,00E+00	0,00E+00
PERT	[MJ]	2,69E+02	1,17E+00	1,63E-03	0,00E+00	1,14E-01	7,43E+01	0,00E+00	-7,42E+00
PENRE	[MJ]	2,05E+02	1,73E+01	1,35E-02	0,00E+00	1,75E+00	1,53E+01	4,45E+00	-1,29E+02
PENRM	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	2,05E+02	1,73E+01	1,35E-02	0,00E+00	1,75E+00	1,53E+01	4,45E+00	-1,29E+02
SM	[kg]	7,42E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m <sup>3</sup> ]	8,49E-02	1,77E-03	9,94E-05	0,00E+00	1,73E-04	6,73E-02	9,02E-01	-3,16E-02
legend	PERE = Use of renewable primary energy resources, excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy resources, excluding renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources, excluding renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water.								

### LCA RESULTS - OUTPUT FLOWS AND WASTE CATEGORIES: <sup>1m2</sup> LIGNA raised access floor

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	[kg]	2,16E-06	2,23E-06	4,29E-11	0,00E+00	2,17E-07	7,05E-09	2,53E-08	-4,84E-08
NHWD	[kg]	2,04E-01	2,14E-03	2,96E-03	0,00E+00	2,09E-04	6,15E-02	2,48E+00	-5,15E-02
RWD	[kg]	6,00E-03	2,34E-05	1,03E-06	0,00E+00	9,67E-06	2,95E-03	6,79E-05	-1,80E-02
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	1,34E-01	0,00E+00	8,80E-02	0,00E+00	0,00E+00	9,72E+00	0,00E+00	0,00E+00
SEA	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	1,01E+00	0,00E+00	5,89E-02	0,00E+00	0,00E+00	2,77E+01	0,00E+00	0,00E+00
EET	[MJ]	2,34E+00	0,00E+00	1,25E-01	0,00E+00	0,00E+00	6,45E+01	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
legend	HWD = Hazardous waste disposed of; NHWD = Non-hazardous waste disposed of; RWD = Radioactive waste disposed of; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Electrical energy exported; EET = Thermal energy exported; EEP = Process gas exported.								



## 7. LCA: Cumulative indicator values

	PRODUCT PHASE	PHASE OF THE PROCESS CONSTRUCTION	USE PHASE	END-OF-LIFE PHASE	TOTAL LIFE CYCLE
	A1-A3	A4-A5	B1-B7	C1-C4	A1-C4

### LCA RESULTS - ENVIRONMENTAL IMPACT: [<sup>1m<sup>2</sup></sup> LIGNA raised access floor].

Parameter	Unit	A1-A3	A4-A5	B1-B7	C1-C4	A1-C4
GWP	[kg CO <sub>2</sub> -Eq]	-2,87E+01	1,30E+00	0,00E+00	4,13E+01	1,38E+01
ODP	[kg CFC11-Eq.]	6,73E-09	2,96E-12	0,00E+00	2,02E-09	8,75E-09
AP	[kg SO <sub>2</sub> -Eq.]	4,27E-02	2,89E-03	0,00E+00	6,07E-03	5,16E-02
EP	[kg (PO <sub>4</sub> )-Eq.] <sup>3</sup>	5,64E-03	7,19E-04	0,00E+00	6,71E-03	1,31E-02
POCP	[kg ethene-eq.]	6,80E-03	-8,94E-04	0,00E+00	1,91E-03	7,82E-03
ADPE	[kg Sb-Eq.]	9,92E-05	9,67E-08	0,00E+00	3,09E-07	9,96E-05
ADPF	[MJ]	1,90E+02	1,72E+01	0,00E+00	1,13E+01	2,18E+02
AirP	[m <sup>3</sup> ]	1,54E+03	3,62E+01	0,00E+00	2,18E+02	1,79E+03
WaterP	[m <sup>3</sup> ]	2,39E+00	1,54E-01	0,00E+00	5,06E-01	3,05E+00

legend GWP = Global Warming Potential; ODP = Ozone Depletion Potential; AP = Potential for Acidification of Soil and Water; EP = Eutrophication Potential; POCP = Potential for the Formation of Photochemical Oxidants in the Ozone Layer. tropospheric ozone; ADPE = Abiotic Depletion Potential of non-fossil resources; ADPF = Abiotic Depletion Potential of fossil resources; AirP = Air pollution; WaterP = Water pollution;

### LCA RESULTS - RESOURCE USE: <sup>1m<sup>2</sup></sup> LIGNA raised access floor

Parameter	Unit	A1-A3	A4-A5	B1-B7	C1-C4	A1-C4
PERE	[MJ]	8,09E+01	2,60E+00	0,00E+00	1,21E+02	2,04E+02
PERM	[MJ]	1,88E+02	-1,42E+00	0,00E+00	-4,67E+01	1,40E+02
PERT	[MJ]	2,69E+02	1,18E+00	0,00E+00	7,44E+01	3,45E+02
PENRE	[MJ]	2,05E+02	1,73E+01	0,00E+00	2,15E+01	2,44E+02
PENRM	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	[MJ]	2,05E+02	1,73E+01	0,00E+00	2,15E+01	2,44E+02
SM	[kg]	7,42E+00	0,00E+00	0,00E+00	0,00E+00	7,42E+00
RSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	[m <sup>3</sup> ]	8,49E-02	1,87E-03	0,00E+00	9,70E-01	1,06E+00

legend PERE = Use of renewable primary energy resources excluding renewable primary energy resources used as feedstock; PERM = Use of renewable primary energy resources used as feedstock; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy resources excluding renewable primary energy resources used as feedstock; PENRM = Use of renewable primary energy resources excluding renewable primary energy resources used as feedstock. = PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water.

### LCA RESULTS - OUTPUT FLOWS AND WASTE CATEGORIES: <sup>1m<sup>2</sup></sup> LIGNA raised access floor

Parameter	Unit	A1-A3	A4-A5	B1-B7	C1-C4	A1-C4
HWD	[kg]	2,16E-06	2,23E-06	0,00E+00	3,86E-07	4,77E-06
NHWD	[kg]	2,04E-01	5,09E-03	0,00E+00	2,51E+00	2,72E+00
RWD	[kg]	6,00E-03	2,44E-05	0,00E+00	4,39E-03	1,04E-02
CRU	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	[kg]	1,34E-01	8,80E-02	0,00E+00	9,72E+00	9,94E+00
SEA	[kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	[MJ]	1,01E+00	5,89E-02	0,00E+00	2,77E+01	2,88E+01
EET	[MJ]	2,34E+00	1,25E-01	0,00E+00	6,45E+01	6,69E+01
EEP	[MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

legend HWD = Hazardous waste disposed of; NHWD = Non-hazardous waste disposed of; RWD = Radioactive waste disposed of; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Electrical energy exported; EEE = Thermal energy exported; EEP = Process gas exported.

## 8. Additional information on the release of hazardous substances into the air, soil and water during use

### 8.1 Air inside buildings

#### *Volatile organic compounds (VOCs) and formaldehyde*

The product is not generally affected because it does not come into contact with indoor air.

When the product is in contact with indoor air, it is classified A+ in accordance with Decree no. 2011-321 of 23 March 2011 on the labelling of construction products, wall or floor coverings, paints and varnishes with respect to their emissions of volatile pollutants by the MINISTRY FOR ECOLOGY, SUSTAINABLE DEVELOPMENT, TRANSPORT AND HOUSING (source: Report no. 392-2018-00244003\_A\_FR).



#### *Viable particles, including micro-organisms*

Not applicable, no tests have been carried out.

#### *Fibres and particles*

Not applicable, no tests have been carried out.

#### *Natural radioactivity*

Not applicable, no tests have been carried out.

### 8.2 Soil and water

Not applicable as the product is not in contact with water intended for human consumption, run-off water, seepage water, groundwater or surface water.

No tests were carried out.

## 9. The product's contribution to quality of life inside buildings

### 9.1 Hygrothermal comfort

The product does not claim any thermal performance.

### 9.2 Acoustic comfort

The product does not claim any acoustic performance.

### 9.3 Visual comfort

The product claims no visual performance, as it is not visible during use.

### 9.4 Olfactory comfort

The product does not claim any performance in terms of olfactory comfort.

## 10. References

### **NF EN 15804+A1**

NF EN 15804+A1:2014-04, Contribution of construction works to sustainable development - Environmental product declarations - Rules for construction product categories.

### **NF EN 15804/CN**

NF EN 15804/CN : 2016-06, Contribution of construction works to sustainable development - Environmental product declarations - Rules for construction product groups - National supplement to NF EN 15804+A1.

### **FCBA - Technological Institute**

Rapport D'Etude (2012) - Volet 2 - Prise en compte de la fin de vie des produits bois. Phase 1: State of the art on end-of-life scenarios for wood products.

### **Order of 23 December 2013**

Arrêté du 23 décembre 2013 relatif à la déclaration environnementale des produits de construction et de décoration destinés à un usage dans les ouvrages de bâtiment, Version consolidée au 23 juin 2016.

### **Bilan National Du Recyclage 2005-2014**

Recycling trends in France for a range of materials: ferrous and non-ferrous metals, paper and cardboard, glass, plastics, construction inerts and wood.





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