ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A1*

Owner of the Declaration	Lindner SE
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-LIN-20210022-IBA1-EN
Issue date	28.07.2021
Valid to	11.05.2026

Lindner Group

Raised Floor System, Type NORTEC

Institut Bauen und Umwelt e.V.

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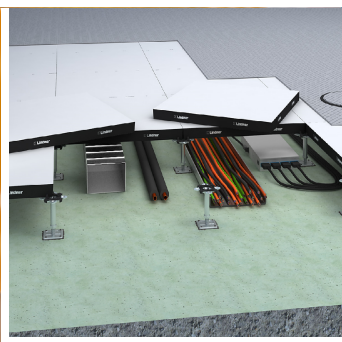


1. General Information

Lindner Group	Raised Floor System, Type NORTEC
Programme holder IBU – Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	**Owner of the declaration** Lindner Group Bahnhofstr. 29 94424 Arnstorf
Declaration number EPD-LIN-20210022-IBA1-EN	**Declared product / declared unit** 1 m² raised floor system, type NORTEC
This declaration is based on the product category rules: System floors, 12.2018 (PCR checked and approved by the SVR)	**Scope:** The EPD refers to the raised floor system, type NORTEC. The declared product is an average product of the manufacturer's whose two components are manufactured in two different Lindner SE plants. The calcium sulphate board is manufactured in the Dettelbach plant (Germany) and the raised floor pedestals are manufactured in the Arnstorf plant (Germany). The production data used is based on 2019. Based on plausible, transparent and comprehensible basic data, the Life Cycle Assessment fully represents the system product referred to.
Issue date 28.07.2021	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*.
Valid to 11.05.2026	**Verification** The standard *EN 15804* serves as the core PCR Independent verification of the declaration and data according to *ISO 14025:2010* ☐ internally ☒ externally
Dipl. Ing. Hans Peters (chairman of Institut Bauen und Umwelt e.V.)	
Dr. Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.))	Prof. Dr. Birgit Grahl (Independent verifier)

2. Product

2.1 Product description/Product definition

NORTEC raised floor systems are prefabricated modular components manufactured in the factory which form an installation space for accommodating all installations as well as supply and disposal lines and providing unhindered access at each point and at all times to this hollow space.

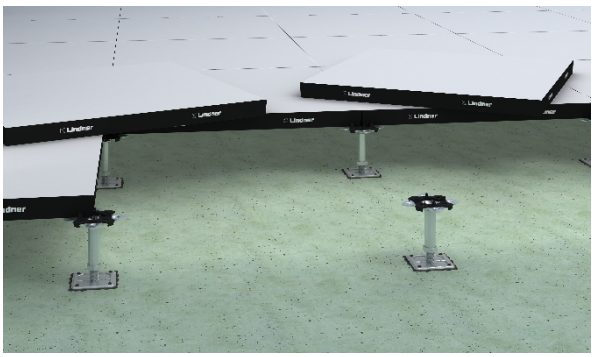
The raised floor system essentially comprises the raised floor panel and the substructure.

The average raised floor system product, type NORTEC, is manufactured from fibre-reinforced calcium sulphate boards. The raised floor systems are manufactured in a format of 600 x 600 mm as standard.

The bulk density can range between 1,280 and 1,680 kg/m³ and board thickness can vary between 20 and 44 mm.

Steel pedestals are used as the substructure which permit various finished floor heights (28– 2,000 mm).

Linking (installation in buildings) the individual components to form a surface area gives rise to the raised floor design. The board models (density and board thickness) and dimensions of the substructure are determined in accordance with the respective requirements.



(EU) Directive No. 305/2011 (CPR) applies for placing the product on the market in the EU/EFTA (with the exception of Switzerland). Raised floors display a form of verification in accordance with *EN 12825: 2002-04, Raised floors* and are certified to *EN 12825* in accordance with the application guideline.
Use is governed by the respective national guidelines, especially

- *EN 13501-1/-2*
- *DIN 4102-1/-2*

2.2 Application

The raised floor system comprising fibre-reinforced calcium sulphate boards and raised floor pedestals referred to in section 2.2 is primarily used in public, commercial and private buildings in order to create cavities / installation space. Raised floor systems can be laid using all standard floor coverings but must be coordinated to the various system variants.

2.3 Technical Data

Structural data

Name	Value	Unit
System construction overall, finished floor height)	148 - 164	mm
Layer thickness (from - to)	28 - 44	m
Substructure	~ 120	mm
Grammage / Systemweight	30 - 66	kg/m^2
Density Supporting layer density	1467	kg/m^3
Point load (/EN 12825/EN 13213/)*	2 - 5	kN
Fire protection (/EN 13501/DIN 4102/) Baustoffklasse*	A1, A2	-
Fire protection (/EN 13501/DIN 4102/) Baustoffklasse*	A1, A2	-
Electrostatics (/EN 1081/)	10^6	Ω
Noise protection (laboratory values; VDI 3762 must be observed)* Normalised flanking level difference D nfw	48-57	dB
Formaldehyde emissions according to EN 717-1	-	µg/m^3
Sound protection (laboratory values; VDI 3762 must be observed)* Sound reduction index Rw	62	dB
Sound protection (laboratory values; VDI 3762 must be observed)* Normalised flanking impact sound pressure level Lnfw	73-38**	dB
Sound protection (laboratory values; VDI 3762 must be observed)* Reduction in impact sound pressure level ΔLw	11-37**	dB

* = These values depict the entire test ranges of the NORTEC raised floor system. Values for the specific raised floor system are documented by individual test reports.
** = Taking consideration of a soft surface covering

Product performance values in terms of its characteristics following the relevant technical determination (no CE marking)

2.4 Delivery status

The fibre-reinforced calcium sulphate boards (600 x 600 mm as standard) are supplied stacked on individual or double pallets. The stacking height depends on the thickness of the boards and the possible covering application. Raised floor pedestals and the other individual components are packed in cardboard boxes and also stacked on wooden pallets.

2.5 Base materials/Ancillary materials

Name	Value	Unit
Calcium sulphate board (REA gypsum + cellulose fibres)	~ 95	%
Pedestals (galvanised steel)	~ 3,5	%
Hot-melt adhesive (EVA)	< 0,5	%
Edge trim (ABS)*	< 0,5	%
Pedestal adhesive (PU / SMP)*	< 0,5	%
Subfloor sealing (synthetic resin emulsion, epoxy resin)*	< 0,5	%
Gaskets (EVA)*	< 0,5	%
Locking glue (synthetic resin emulsion)*	< 0,5	%
Edge sealing (synthetic resin emulsion)*	< 0,5	%
Wall connection tape (PE foam)*	< 0,5	%

* = part of the raised floor system but not part of the Declaration

1) The product contains substances from the ECHA list of candidates of substances of very high concern (SVHC) (dated 31.03.2021) exceeding 0.1 percentage by mass: no

2) The product contains other CMR substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass in at least one partial product: no

3) Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): no

The calcium sulphate board comprises 90–96% gypsum binding agents and 4–10% cellulose fibres. Calcined REA gypsum and calcined grinding, milling and sawdust manufactured in-house are used as gypsum binding agents. The percentage of gypsum binding agents and cellulose recycled is 100% pre-consumer.

2.6 Manufacture

Manufacturing and processing the calcium sulphate panel:
Both of the REA gypsum and cellulose fibre raw materials are combined and after adding water, they are pressed under high pressure to form stable panels, then dried and milled to the requisite sizes.
The edge trims are processed in additional manufacturing steps.

Manufacturing the pedestals:
The pedestals are manufactured through resistance welding or pressing the individual pipe, threaded rod and sheet steel components. The dimensions of the individual components are based on technical specifications.
A zinc coating is applied to the supports by means of electroplating (electro-galvanising) in order to protect them from corrosion.

2.7 Environment and health during manufacturing

Fibre-reinforced calcium sulphate panels and raised floor pedestals are manufactured in plants which meet environmental protection specifications.
Where possible, the process water used is directed into a closed circuit.
Gypsum waste incurred is largely redirected to the material circuit within the plant.
The Lindner Group avails of an Energy Management System in accordance with *ISO 50001* and an Environmental Management System to *ISO 14001*.

2.8 Product processing/Installation

The individual components delivered to the site are linked to form NORTEC system floors.
Other instructions can be found in the instruction guidelines for raised floors.
Installation must be carried out by trained personnel

2.9 Packaging

The stacked fibre-reinforced calcium sulphate boards are delivered on pallets, packed in boxes (paper/cardboard), bound by plastic hoops and possibly wrapped in plastic film.
Raised floor pedestals and other individual components are stacked or layered in cardboard boxes. The wooden pallets used are available as disposal pallets.

The packaging material is easily separable and can be reused or recycled as necessary. The waste fractions can be collected sorted by type and directed to regional recycling services. Residual materials must be disposed of in accordance with the respective national guidelines.

As a general rule, the packaging guidelines for all standard Lindner products are defined in packaging data sheets.

2.10 Condition of use

When used as designated, no material changes in composition are to be anticipated during the use phase.

2.11 Environment and health during use

There are no known interactions between the product, the environment and health. Possible content of harmful substances or emissions outside the tested values are not known. During the use phase, no hazardous substances are emitted which exceed the limit values of Eurofins Indoor Air Comfort® GOLD certification.

In accordance with the Indoor Air Comfort® GOLD test report, the AgBB/ABG (requirements on structural installations with regard to health protection, draft dated 31.08.2017/August 2018 (*AgBB*)) and VOC requirements are complied with during use.

2.12 Reference service life

The useful life of the raised floor system for interior applications reviewed here generally complies with the overall useful life of the building.
No reference service life was established in accordance with *ISO 15686-1*.
The service life is indicated in accordance with the “Service life of components for LCAs in accordance with the rating system for sustainable building (BNB)” table issued by the Federal Institute for Building, Urban Affairs and Regional Planning (*BBSR)*.
The service life indicated is subject to proper use, maintenance and care, e.g. avoiding overloading.

2.13 Extraordinary effects

Fire

Fibre-reinforced calcium sulphate boards are "non-flammable" and are classified as building material classes A1 and A2 on account of their fire performance in accordance with *EN 13501-1* and *DIN 4102-1*.

Depending on the substructure and board thickness, the declared raised floor system is classified in classes REI 30, REI 60 and F 30, F 60 in accordance with *EN 13501-2* and *DIN 4102-2*.

Fire protection

Name	Value	Unit
Building material class	A1/ A2	-
Smoke gas development	s 1	-
Burning droplets	d 0	-

Water

The Lindner NORTEC raised floor system is installed in interior areas and does not usually come into contact with water. Brief exposure to moisture does not damage the system as long as it is able to dry out in full afterwards. When the raised floor system is exposed to larger volumes of water over longer periods of time, no ingredients are washed out which could be hazardous to water. This can however impair the technical characteristics as Lindner raised floor systems are not waterproof and the panels tend to swell and the supports corrode in very humid or wet environments.

Mechanical destruction

Mechanical destruction impairs system durability and function. Depending on the size of the areas destroyed, they can be restored by replacement or new installation without impairing function.

2.14 Re-use phase

De-construction / Reuse:
The fibre-reinforced calcium sulphate boards can be de-constructed indestructibly and reused unchanged for the same application. Separation from other

building materials is recommended on the site for other methods of reuse/disposal.
Further use / Recycling
After treatment in recycling plants intended for gypsum waste and following crushing or additional removal of contaminants, fibre-reinforced calcium sulphate boards can be used as soil conditioners, fertiliser components or setting regulation agents for cement taking consideration of official specifications.
Furthermore, fibre-reinforced calcium sulphate boards can be directed to the manufacturing process as a raw material for new boards after the appropriate treatment, thereby closing the material circuit.

Raised floor pedestals can be directed in full to steel recycling.

2.15 Disposal
Disposal is in accordance with the waste codes: *(AVV):*
17 08 02 – Gypsum-based building materials with the exception of those covered by 17 08 01.
Gypsum-based building materials maintain the sediment conditions of Landfill Class 1 of the Landfill Regulation in the event of disposal.
17 04 05 Iron and steel

2.16 Further information
Additional product information available at:
www.Lindner-Group.com

3. LCA: Calculation rules

3.1 Declared Unit
The declared unit refers to 1 m² raised floor system, type NORTEC, with an average board thickness of 33.17 mm and an average density of 1,467 kg/m³. Four pedestals are required for installing the raised floor.
In the product family, the thickness varies between 20 and 44 mm, while density varies between 1,280 and 1,680 kg/m³.
The declared unit has an overall board weight of 48.66 kg/m² plus 1.34 kg for the respective pedestals. Accordingly, total weight is 50.00 kg.
Average board values are based on a weighted average calculated for an average board height and board thickness in relation to its percentage share of production. The pedestals which are sold most are declared for the steel pedestals: type M1, 120 mm, unit weight 0.33 kg.
Declaration class: 1c) Declaration of an average product from a manufacturer's plant

Declared unit

Name	Value	Unit
Declared unit	1	m^2
Grammage (incl. substructure)	~50	kg/m^2
Conversion factor to 1 kg	50	-

3.2 System boundary
Type of EPD: cradle-to-gate, with options. This Life Cycle Analysis considers the life cycle of product manufacturing through to landfilling. The product stage comprises Modules A1 (Raw material supply), A2 (Transport) and A3 (Production) (these are considered summarised as a module (A1–A3)), Transport to site and Assembly (A4–A5). During installation in the building, no other materials are considered; Module A5 comprises the environmental loads for the disposal of packaging.
The modules are declared as 0 for the use phase (B1-B2). During the use phase, the product does not cause any environmental pollution. The actual product does not require any maintenance; no repairs or replacements can be anticipated during normal use of the building.
Deconstruction and demolition of the product from the building (C1) and transport to the landfill site are considered for the EoL stage (C2).
At the end of life, the product is segregated into components and the most realistic scenario selected: a waste disposal company is remunerated for the sorted steel from pedestals. The steel pedestals achieve their end-of-waste characteristic in Module C3. The potential benefits and loads are indicated in Module D. The calcium sulphate board reaches its end-of-waste characteristic in Module C4 and is disposed of in a landfill for construction rubble.

3.3 Estimates and assumptions
Specific data inventories are not available for all materials and average data inventories are not available for one material.
Approximate data sets are applied for cellulose fibres and adhesive as well as certain chemicals within the framework of the raised floor pedestal electroplating process.

3.4 Cut-off criteria
Operating data was taken into consideration in the analysis. Substances whose percentage mass < 1% of the overall system and for which no appropriate background data is available are ignored. Less than 0.4% of the input data of the overall raised floor system has not been analysed.

3.5 Background data
GaBi 9.5 – the software system for comprehensive analysis developed by Sphera – was used for modelling the life cycle for the product under review. The data required for the upstream chain and for which no specific details are available is taken from the GaBi database /GaBi 9.5/.

3.6 Data quality
The primary data is based on a data survey at the production sites for both components in 2019. Since initial certification, neither the production processes nor the method of recording data have changed.
All other relevant background data sets were taken from the GaBi 9.5 software database and are less than 5 years old.

3.7 Period under review
The data for this Life Cycle Assessment is based on data sets from 2019. Current data was applied for calculating consumption.

3.8 Allocation
The production process does not result in any by-products. No allocation is therefore integrated in the software applied. Combustible production waste incurred is directed to energy utilisation. The ensuing

electrical and thermal energy is offset within Modules A1 – A3. Credits are gained through German mean data for electrical energy and thermal energy from natural gas.
Inventories from the GaBi database are used for die pollutants involved in manufacturing steel. These always include a percentage of steel scrap as there is no purely primary route for manufacturing steel. Scrap accounts for approx. 18%.
The semi-finished products procured for manufacturing the floor system are acquired from various suppliers which is why this average process is used.
During steel processing, max. 15% metal waste (chips, punchings, cuttings) is incurred. This scrap reaches its end-of-waste characteristic directly.
No environmental loads are considered for the initial volume of steel scrap. Likewise, production residue incurred also leaves the system without environmental loads or credits.
The scrap volume in the input contained in the data inventory is declared as secondary material. Both primary and secondary cellulose fibres are used in manufacturing the gypsum boards. No singular processes are available for manufacturing/processing the cellulose fibres. But the processes can be depicted via fully-aggregated processes for the manufacture of various paper qualities.

The share accounted for by secondary cellulose fibres is included in the system without any environmental loads. The carbon content in paper is taken into consideration via a mathematical auxiliary process as a value which is inherent to the material, both when it enters the product and when production waste is incurred through absorption or emission of CO2.
The volume of waste paper for manufacturing secondary cellulose fibres is declared as a secondary material.

An allocation was avoided for the provision of REA gypsum.

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 the software system developed by Sphera and its database for comprehensive analysis, *GaBi 9.5.*

4. LCA: Scenarios and additional technical information

Detailed technical information concerning application forms the basis for developing specific scenarios within the context of a building analysis.

Transport from manufacturer to site (A4)

Name	Value	Unit
Litres of fuel	0.085668	l/100km
Transport distance	500	km
Capacity utilisation (including empty runs)	75	%
Gross density of products transported	1280 - 1680	kg/m³
Capacity utilisation volume factor	75	-

Construction installation process (A5)

Name	Value	Unit
Auxiliary	n.r.	kg
Water consumption	0	m³
Output substances following waste treatment on site	1.32	kg

Use (B1), please refer to 2.12 “Use”

Name	Value	Unit
Gewicht Doppelbodenplatte	48,7	kg
Gewicht Stützen (4x)	1,34	kg

The modules are declared as 0 for the use phase B1 – B2. This does not lead to any environmental loads when used as recommended by the manufacturer.

Maintenance (B2)

Name	Value	Unit
Information on maintenance	0	-
Maintenance cycle	0	Number/RSL
Water consumption	0	m³
Auxiliary	0	kg
Other resources	0	kg
Electricity consumption	0	kWh
Other energy carriers	0	MJ
Material loss	0	kg

The product itself does not require any maintenance; cleaning of the floors is always dependent on the surface covering and wear. No repairs or replacements can be anticipated during normal use of the building.

Reference Service Life

Name	Value	Unit
Life Span (acc. to BBSR)	50	a

End of Life (C1-C4)

Name	Value	Unit
Recycling raised floor pedestals	1.34	kg
Landfilling raised floor pedestals	48.7	kg

Reuse, recovery and recycling potential (D), relevant scenario information

The product is recycled in the same composition as the declared unit at the end-of-life stage. The components are separated from each other. Landfilling in a landfill for construction rubble is assumed for the calcium sulphate boards. It is assumed that the product is transported 100 km by truck from the construction site to the nearest recycling depot.

The steel pedestals are recycled; losses incurred during the recycling process are considered during this process. The environmental loads avoided by the ensuing secondary steel are indicated in Module D in accordance with their input compilation.

5. LCA: Results

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

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	X	X	X	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1 m² NORTEC raised floor systems

Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2	C3	C4	D
GWP	[kg CO_2-Eq.]	1.26E+1	1.63E+0	2.03E-1	0.00E+0	0.00E+0	0.00E+0	3.18E-1	0.00E+0	1.20E+1	-2.58E+0
ODP	[kg CFC11-Eq.]	1.93E-7	5.46E-16	-3.86E-15	0.00E+0	0.00E+0	0.00E+0	1.06E-16	0.00E+0	3.69E-15	-2.78E-15
AP	[kg SO_2-Eq.]	3.03E-2	3.63E-3	1.14E-4	0.00E+0	0.00E+0	0.00E+0	7.06E-4	0.00E+0	4.62E-3	-5.96E-3
EP	[kg $(PO_4)^{3-}$-Eq.]	5.58E-3	9.02E-4	-2.29E-5	0.00E+0	0.00E+0	0.00E+0	1.76E-4	0.00E+0	4.80E-4	-5.57E-4
POCP	[kg ethene-Eq.]	2.81E-3	-1.34E-3	-1.22E-5	0.00E+0	0.00E+0	0.00E+0	-1.22E-5	0.00E+0	3.20E-4	-8.91E-4
ADPE	[kg Sb-Eq.]	1.14E-5	1.50E-7	1.89E-8	0.00E+0	0.00E+0	0.00E+0	2.61E-8	0.00E+0	3.20E-4	-6.26E-9
ADPF	[MJ]	2.63E+2	2.19E+1	-2.23E+0	0.00E+0	0.00E+0	0.00E+0	4.26E+0	0.00E+0	9.42E+0	-2.16E+1

Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A1: 1 m² NORTEC raised floor systems

Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2	C3	C4	D
PERE	[MJ]	1.64E+2	1.18E+0	2.56E-2	0.00E+0	0.00E+0	0.00E+0	2.29E-1	0.00E+0	1.17E+0	-1.56E+0
PERM	[MJ]	1.49E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-1.49E-2	-1.48E+1
PERT	[MJ]	1.64E+2	1.18E+0	2.56E-2	0.00E+0	0.00E+0	0.00E+0	2.29E-1	0.00E+0	1.16E+0	-1.64E+1
PENRE	[MJ]	2.92E+2	2.02E+1	1.11E-1	0.00E+0	0.00E+0	0.00E+0	3.93E+0	0.00E+0	8.90E+0	-2.34E+1
PENRM	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	[MJ]	2.92E+2	2.02E+1	1.11E-1	0.00E+0	0.00E+0	0.00E+0	3.93E+0	0.00E+0	8.90E+0	-2.34E+1
SM	[kg]	6.52E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.01E+0
RSF	[MJ]	3.66E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	[m³]	6.50E+0	2.71E-1	1.81E-3	0.00E+0	0.00E+0	0.00E+0	5.43E-2	0.00E+0	1.06E-1	-1.51E-1

Caption	PERE = Use of renewable primary energy 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 excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A1: 1 m² NORTEC raised floor systems

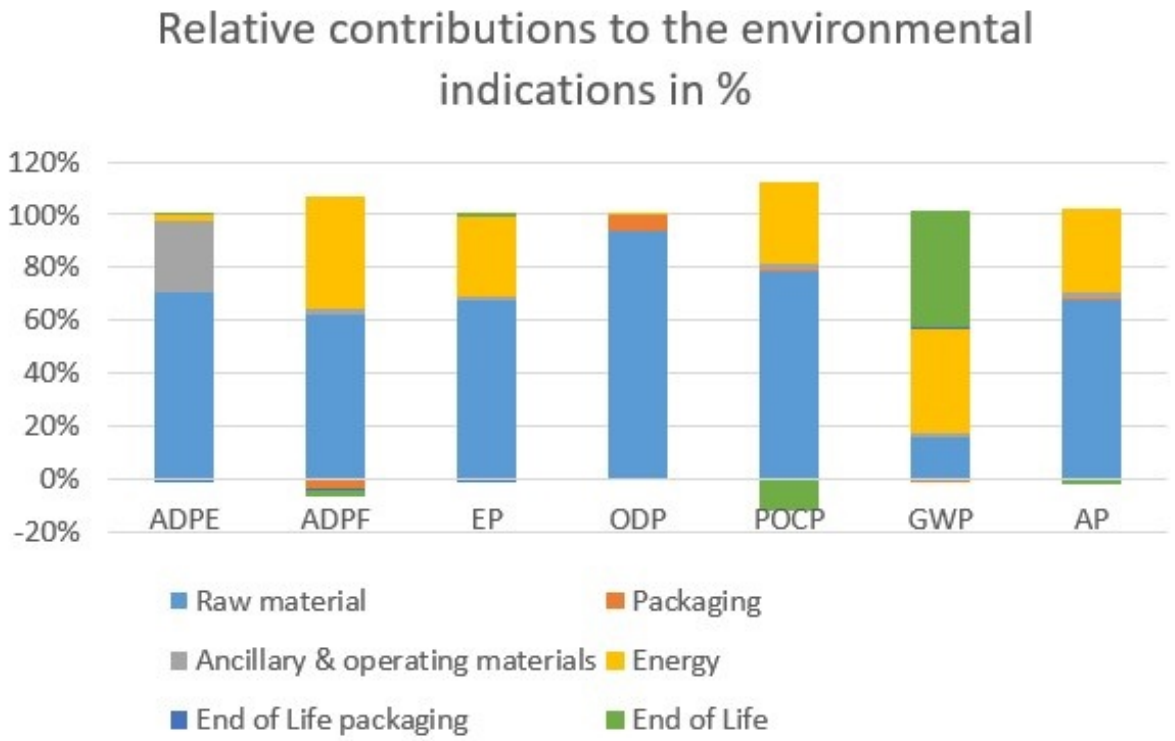
Parameter	Unit	A1-A3	A4	A5	B1	B2	C1	C2	C3	C4	D
HWD	[kg]	2.44E-6	7.54E-7	2.86E-10	0.00E+0	0.00E+0	0.00E+0	1.47E-7	0.00E+0	1.36E-7	-1.78E-8
NHWD	[kg]	1.62E+0	3.54E-3	1.64E-2	0.00E+0	0.00E+0	0.00E+0	6.89E-4	0.00E+0	4.47E+1	-3.00E-2
RWD	[kg]	9.26E-3	2.14E-5	5.02E-6	0.00E+0	0.00E+0	0.00E+0	4.17E-6	0.00E+0	9.98E-5	-2.06E-4
CRU	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	[kg]	1.43E-1	0.00E+0	3.28E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.28E+0
MER	[kg]	0.00E+0	0.00E+0	1.11E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	3.31E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	5.35E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

6. LCA: Interpretation

The following results are valid for the average product of 1m² raised floor system, type NORTEC, with its 4 steel pedestals. The calcium sulphate board is 33.17 mm thick and has an average density of 1,467 kg/m³. The board weighs 48.66 kg and the pedestals each weigh 0.33 kg, i.e. 1.34 kg in total. Weight varies

considerably within the NORTEC product family. If the weight of the product under review deviates by more than 20% from the calculated average, the results of the LCA must be requested from the manufacturer.



Abiotic Depletion of Resources (elementary) (ADPE)
Accounting for 70%, the consumption of elementary abiotic resources is dominated by the raw material supply for calcium sulphate (68% of which is accounted for by alpha-semihydrate) and the galvanised steel components in the steel pedestals accounting for approx. 25%.

Abiotic Depletion of Resources (fossil) (ADPF)
The consumption of abiotic resources is caused by the raw material supply (cellulose 15%) and the energy used during the manufacturing phase (37%). 4% of the credit issued is generated from packaging and the end of life.

Eutrophication Potential (EP)
The eutrophication potential is primarily incurred by raw material supply, i.e. cellulose (26%), and energy consumption in the board manufacturing phase (27%).

Ozone Depletion Potential (ODP)
87% of the ODP is incurred by the raw materials used for manufacturing the board. The greatest nominal drivers are alpha- and beta-semihydrate, accounting for 21% and 66%, respectively.

Photochemical Ozone Creation Potential (POCP)
The POCP is dominated by the raw material used (beta-semihydrate 41%) and the energy used in the manufacturing phase (25%).

Global Warming Potential (GWP)
The calcium sulphate board accounts for approx. 94% of total emissions of CO2 equivalents. The greatest driver of emissions is the energy used during the manufacturing phase. The electrical energy used accounts for approx. 22% and the thermal energy used contributes approx. 13% to total GWP.

Acidification Potential (AP)
Approx. 27% of the acidification potential is incurred by the electrical and thermal energy used during the manufacturing phase. Other drivers include primary cellulose (13%) and beta-gypsum accounting for 11%.

7. Requisite evidence

7.1 VOC emissions

Test report no. 392-2019-00277901 dated 30 October 2019 is available for the NORTEC raised floor system. The institute carrying out this test was *Eurofins* Eurofins Product Testing A/S, Smedeskovvej 38, 84464 Galten, Denmark).
Result:
The product under review complies with the requirements of Indoor Air Comfort® GOLD certification, among others.

AgBB overview of results (28 days)

Name	Value	Unit
TVOC (C6 - C16) TVOC (EN 16526)	15	µg/m³

Sum SVOC (C16 - C22)	< 5	µg/m³	VOC without NIK	< 5	µg/m³
R (dimensionless)	0.027	-	Carcinogenic Substances	< 1	µg/m³

8. References

AgBB
Procedure for health-related evaluation of the emissions of volatile organic compounds (VVOC, VOC and SVOC) from construction products (2015), German-Committee for health-related evaluation of building products

ABG
"Requirements on structural installations with regard to health protection (ABG)" (2017), (Annex 8)
Annexes concerning health protection

BBSR
Service lives of components for Life Cycle Assessments in accordance with the evaluation system for sustainable building (BNB) (2017), Federal Institute for Building, Urban Affairs and Regional Planning

EN 1081
DIN EN 1081:1998-04, Resilient floor coverings – Determination of the electrical resistance

DIN 4102
DIN 4102-1:1998, Fire behaviour of building materials and building components – Part 1: Building materials; concepts, requirements and tests

DIN 4102-2:1977-09, Fire behaviour of building materials and building components – Part 2: Building materials, concepts, requirements and tests

Eurofins
Test report no. 392-2019-00277901 dated 30 October 2019, Eurofins Product Testing A/S, Smedeskovvej 38, 8464 Galten, Denmark

DIN EN 13501
DIN EN 13501-1:2007+A1:2009, Classification of construction products and methods by reaction to fire – Part 1: Classification with the results of tests on reaction to fire of construction products

DIN EN 13501-2:2010-02, Classification of Construction Products and Methods by Reaction to Fire – Part 2: Classification using data from fire resistance tests, excluding ventilation services

EN 12825
EN 12825:2001, Raised access floors

EN 717
DIN EN 717-1:2004, Wood-based panels – Determination of formaldehyde release – Part 1: Formaldehyde emission by the chamber method

GaBi 9.5
Sphera thinkstep; GaBi 9.5: software system and database for comprehensive analysis; copyright, TM Stuttgart, Echterdingen, 1992-2020

GaBi 9.5 2020 D
GaBi 9.5: GaBi 9.5 documentation: data sets in the database for comprehensive analysis; copyright, TM Stuttgart, Echterdingen, 1992-2020; http://www.gabi-software.com/deutsch/my-gabi/gabi-documentation/gabi-database-2020-lci-documentation/

ISO 14001
DIN EN ISO 14001:2004, Environmental management systems – Requirements with guidance for use

ISO 50001
DIN EN ISO 50001:2011, Energy management systems – Requirements with guidance for use

PCR: System floors
Product category rules for building-related products and services, Part B: Requirements on the Environmental Product Declaration for system floors, version 1.0; Berlin: Institut Bauen und Umwelt e.V. (pub.), 11.12.2018

VDI 3762
VDI 3762:2012-01: Sound insulation by means of raised access floors and hollow floors

AVV
Ordinance on the List of Wastes (AVV) dated 10 December 2001 (BGBl. I p. 3379), last amended by Article 2 of the Directive dated 17 July 2017 (BGBl. I, p. 2644)

ISO 15686-1
ISO 15686-1:2011-05, Buildings and constructed assets – Service life planning – Part 1: General principles and requirements

Publisher
Institut Bauen und Umwelt e.V.
Panoramastr. 1
10178 Berlin
Germany

Tel +49 (0)30 3087748- 0
Fax +49 (0)30 3087748- 29
Mail info@ibu-epd.com
Web **www.ibu-epd.com**

Programme holder
Institut Bauen und Umwelt e.V.
Panoramastr 1
10178 Berlin
Germany

Tel +49 (0)30 - 3087748- 0
Fax +49 (0)30 – 3087748 - 29
Mail info@ibu-epd.com
Web **www.ibu-epd.com**

Author of the Life Cycle Assessment
Lindner Group
Bahnhofstraße 5
94424 Arnstorf
Germany

Tel +49 872320 3199
Fax +49 872320 2323
Mail green.building@lindner-group.com
Web **www.lindner-group.com**

Owner of the Declaration
Lindner Group
Bahnhofstraße 5
94424 Arnstorf
Germany

Tel +49 872320 3199
Fax +49 872320 2323
Mail green.building@lindner-group.com
Web **www.lindner-group.com**