ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	TAIM e.V.
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-TAI-20250174-IBC1-EN
Issue date	07.10.2025
Valid to	06.10.2030

Metal ceiling systems made of aluminium

TAIM e.V. - Verband Industrieller Metalldeckenhersteller

Institut Bauen und Umwelt e.V.

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TAIM

1. General Information

TAIM e.V. - Verband Industrieller Metalldeckenhersteller

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-TAI-20250174-IBC1-EN

This declaration is based on the product category rules:

Metal ceilings, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

07.10.2025

Valid to

06.10.2030

Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

Metal ceiling systems made of aluminium

Owner of the declaration

TAIM e.V.
Osloer Str. 100
13359 Berlin
Germany

Declared product / declared unit

The declared unit is 1 t metal ceiling system made of aluminum. The average weight per unit area is 4.94 kg/m2.

Scope:

This declaration applies to all production manufacturers of the following TAIM e.V. members. The data of this Life Cycle Assessment is based on annual data from 2022, which were collected at the factory.

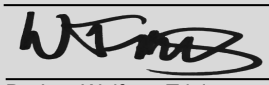
- durlum Group GmbH: www.durlum.com
- Fural Systeme in Metall GmbH: www.fural.com
- Geipel® GENEX- Vertrieb Ltd. & Co. KG: www.geipel-genex.de
- Georg Haag AG: www.georghaag.com
- Hunter Douglas Europe B.V.: www.hunterdouglasarchitectural.eu
- Lindner SE: www.Lindner-Group.com
- Nagelstutz und Eichler GmbH & Co. KG: www.ne-metalldecken.de

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+A2. 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 14025:2011
☐ internally ☒ externally



Dr.-Ing. Wolfram Trinius,
(Independent verifier)

TAIM

2. Product

2.1 Product description/Product definition

Aluminum ceiling systems are manufactured from folded or roll-formed and partially stamped aluminum as complete kits or as individual components. The kit consists of the top layer, e.g. a linear panel or panel ceiling, and the substructure for fastening the metal ceiling. The substructure is made of either aluminium or steel, can be attached directly to the bare ceiling or have different suspension heights and is designed according to the shape of its functional requirements and the weight of the ceiling layers. the production of the ceiling types has been standardized over many years and the processes and production steps of the companies for the individual ceiling systems are highly coordinated and comparable. The variance in the min/max surface weight is solely due to the different demands on strength and support; all product variants are manufactured and offered equally by all companies within the individual products. For the placing on the market of the product in the EU/EFTA (with the exception of Switzerland), Regulation (EU) No. /305/2011/ (CPR) applies. The products require a declaration of performance taking into consideration the harmonized /EN 13964/, Suspended ceilings - Requirements and test methods and, the CE-marking.
For the use and application of the product, the respective national provisions apply. Metal ceilings according to the technical regulations of the TAIM e.V. *THM* are fastened by hangers directly to the load-bearing component substructure or to the ceiling trim profile connected with a distance to the ceiling above.
Regulation (EU) *No. 305/2011* (CPR Construction Products Regulation) applies to the placing on the market in the European Union and EFTA (with the exception of Switzerland). The products require a declaration of performance taking into account the harmonized *EN 13964*, suspended ceilings - requirements and test methods and the CE marking.
The national regulations apply to the application. Metal ceilings in accordance with the technical regulations of *TAIM e.V.* are connected to the ceiling above by hangers or a substructure or ceiling end profile attached directly to the load-bearing component at a distance.

2.2 Application

The aluminum metal ceiling systems described here are mostly used in interior design as rectangular panels (but also as special formats), panel ceilings, square cassettes, expanded metal ceilings, grid ceilings, baffles or ceiling sails for ceiling cladding. The product is usually manufactured according to the requirements of the respective customer.

2.3 Technical Data

The following technical data apply to metal ceiling systems made of aluminium.

Constructional data

Name	Value	Unit
average Grammage	6,27	kg/m²
Durability class (EN 13964)	A	-
Cooling output (EN 14240)	not relevant	W/m²
Heating output (EN ISO 14037)	not relevant	W/m²
Sound absorption (EN ISO 354, EN ISO 11654)	not relevant	%
Airborne sound reduction (EN 20140-9, ISO 140-3)	not relevant	dB

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 13964:2014-08* Suspended ceilings - Requirements and test methods.

2.4 Delivery status

The metal ceiling systems, kits and components are produced in both standard and customized sizes and can be supplied with or without a substructure. Packaging is usually palletized and/or in cardboard boxes with polystyrene and PP straps.

2.5 Base materials/Ancillary materials

The base material of metal ceilings made of aluminium are:

Name	Value	Unit
Aluminium	89	%
Steel for substructure	10	%
Acoustic tissue	< 1	%

A heavier panel is also associated with a more solid substructure. The ratio of material use and static requirements or strength of panels and substructure is proportional and comparable regardless of the ceiling type.

The product/at least one sub-product contains substances on the ECHA Candidate List (23.01.2024) above 0.1% by mass: no.

The product/at least one partial product contains other CMR substances of category 1A or 1B that are not on the candidate list, above 0.1% by mass in at least one partial product: no.

Biocidal products have been added to this construction product or it has been treated with biocidal products (it is therefore a treated product within the meaning of the Biocidal Products Regulation (EU) No. 528/2012): no.

2.6 Manufacture

The system parts for metal ceilings are manufactured in a continuous production process. The aluminum sheets are mainly unwound from the coil, perforated (optional), punched (optionally straightened), cut off and edged or pressed. If the cover layers are not made of pre-coated material, they are usually given a powder or wet coating after the cleaning process. Subsequently, or immediately after perforation, an acoustic fleece inlay can be applied to the back using a continuous heat application process. The addition of heat activates a hot-melt adhesive applied to the fleece, which bonds the fleece to the back of the panel. Punching and perforation waste is collected, taken away by local waste disposal companies and fed into the recycling cycle.
All production steps are carried out in compliance with the requirements and test specifications of *EN 13964* and the technical regulations of *TAIM e.V.*

For all ceiling types and manufacturers, the production-specific processes do not change, regardless of whether the weight per unit area is lower or higher. Panels and substructure each result in the end product for which the FU of 1 t is declared. All companies confirm that the higher the weight per unit area, the more resources and energy are required for the panels and substructure, and vice versa. Material use, distribution and energy use are proportional to the weight per unit area.
The influence of perforation is very small and not a significant factor in averaging. The energy input (current) remains the same regardless of which profile is roll-formed.

Whether the basis weights of the respective products or

manufacturers are at the minimum or maximum limit depends on which ceiling construction is selected and which functional properties the ceiling panels are to fulfill. You can choose between linear panels, sails, cassettes or slats. A heavier panel is also associated with a more solid substructure. The relationship between the material used and the static requirements or strength of the panels and substructure is proportional and comparable regardless of the ceiling type.

2.7 Environment and health during manufacturing

The manufacturing conditions do not require any special health protection measures other than those provided by the authorities for the specific work area, e.g. high-visibility vest, safety shoes, dust mask. The maximum workplace concentrations (MAK values) (national regulations) are not exceeded at any point in the production process. Noise-intensive systems, such as punching and straightening systems, are insulated accordingly by structural measures. The statutory occupational health and safety regulations for metal and dry construction trades and the relevant construction industry regulations apply. The exhaust air generated during production is cleaned in accordance with legal regulations.

Water/soil: There is no pollution of water or soil. All values determined inside and outside the production facilities are below the applicable national requirements. *ISO 14001* certificates and other manufacturer-specific documents on environmental and health protection can be requested from the manufacturer.

2.8 Product processing/Installation

The top layer of the metal ceiling system is connected to a substructure. Installation is carried out by trained personnel in accordance with the installation instructions specified by the manufacturer. The manufacturer's instructions must be observed.

2.9 Packaging

The aluminium covers are palletized and/or packed in cardboard, protected with polystyrene and stabilized with PP straps. The packaging was collected and is part of the balance sheet; delivery and assembly are not part of the balance sheet, whereby the disposal of the packaging takes place in module A5. The packaging of the preliminary products could not be collected and is therefore not part of the balance sheet.

2.10 Condition of use

The smooth surface of the metal ceilings is relatively low-maintenance and simple to clean. No general cleaning and maintenance recommendations can be given due to the different designs of the aluminum ceilings and the areas of application. Regular maintenance, care and servicing of the product are prerequisites for a long service life. The solid composition does not change over the period of use. There is no inherent dust or flying fibers. Documents can be requested from the respective metal ceiling system manufacturer.

2.11 Environment and health during use

There are no known interactions between product, environment and health. Volatile organic compounds are below the assessment limit according to
AgBB scheme.

2.12 Reference service life

The reference service life of metal ceilings is over 50 years according to the service life of building components according to the *BBSR table 2017* assessment system for sustainable building. The product is not subject to physical ageing over its service life. When used as intended, no abrasion occurs during the service life or during maintenance work. The product is not subject to any physical ageing during its service life. If used as intended, no abrasion will occur during its service life or during maintenance work.

2.13 Extraordinary effects

Fire

The aluminum metal ceilings declared here correspond to building material class A2 - s1, d0 according to *EN 13501-1*. The fire behavior is 'non-combustible', there is 'no smoke' and 'no burning droplets/dripping'.

Fire protection

Name	Value
Building material class	A2
Smoke gas development	s1
Burning droplets	d0

Water

There are no known effects on the environment in the event of unforeseen ingress of water.

Mechanical destruction

In the case of mechanical destruction, all of the substances remain bound. It is to be assumed that in the case of coated ceilings, lacquer chippings occur in such a small amount that there are no negative impacts on the environment.

2.14 Re-use phase

The metal ceiling systems can be removed and re-used without damaging the product.

2.15 Disposal

If the dismantled metal ceiling is fed into the recycling process, the substitution potential (numerical values according to module D) is activated. This reduces the amount of raw materials required for new production. This process forms the closed loop in metal recycling.
In accordance with the Waste Classification Ordinance (AVV) and the European Waste List (EWL), the waste code is:
17 04 05 – Iron and steel.
17 04 02 – Aluminium.

2.16 Further information

- durlum GmbH: www.durlum.de
- Fural Systeme in Metall GmbH: www.fural.com
- Geipel® Genex-Vertrieb Ltd. & Co. KG: www.geipel-genex.de
- Georg Haag AG: www.georghaag.com
- Hunter Douglas Europe B.V.: www.hunterdouglasarchitectural.eu
- Lindner SE: www.Lindner-Group.com
- Nagelstutz und Eichler GmbH & Co. KG: www.ne-metalldecken.de

3. LCA: Calculation rules

3.1 Declared Unit

The declaration refers to the production of 1 t of metal ceiling made of aluminum; the basis weight was determined on a product-specific basis by the members of the TAIM association; in the course of data collection, the participating companies determined and specified their minimum, maximum and average basis weights for the appropriate EPD. The data is

based on the companies' own surveys and was used as the basis for calculating the average.

Declared unit

Name	Value	Unit
Grammage	4.94	kg/m^2
Gross density	2700	kg/m³
Declared unit	1	t
Conversion factor	0.00494	t/m²

The production of ceiling types has been standardized for many years and the processes and production steps of the companies for individual ceiling systems are highly coordinated and comparable. The variance in the min/max surface weight is solely due to the different requirements for strength and support; all product variants are manufactured and offered by all companies within the individual products in the same way. Perforation, edge cutting and shaping of the system ceilings are proportional to the basis weight in terms of energy, resources and expenditure and contribute a very small proportion of the energy expenditure overall. The main driver is the production and processing of the main material, aluminum.

A weighted weight per unit area was calculated for all participating companies per EPD; the LCA results can be scaled accordingly using a conversion factor of 1 t to 1 m2 .

The fluctuation range for the aluminum ceilings is 0.63 - 2.60. The effect on the results for 1 t aluminum ceilings is described in more detail in the Interpretation chapter.

3.2 System boundary

The Life Cycle Assessment considers the system boundaries "cradle to grave" and follows the modular construction system described by *EN 15804*. The LCA takes into account the following modules:

A1: Raw material extraction and processing, processing procedures and preparation of secondary materials: Coils/blanks and other preliminary products are transported to the factory
A2: Transport to the manufacturer: Transport of all raw materials and preliminary products to the manufacturing plant
A3: Manufacturing processes and expenses in the factory: Ceiling systems are produced according to the manufacturing description in section 2.6, metal offcuts are reused directly in the closed-loop in the production plant, offcuts of residual materials are disposed of and the products are prepared for shipment to the customer.
A5: Transportation to the installation site and installation are not part of this balance; however, the disposal of packaging quantities is modeled in A5.
C1: Dismantling of the ceiling systems after the use phase: no plausible and consistent data could be provided by the company for this; due to the numerous examples of use and the type of dismantling (demolition, dismantling, replacement), many scenarios are conceivable; a cross-association assumption was not made in C1.C2: Transport for waste management: The materials of the ceiling systems are separated into their individual components on the construction site or during the disposal phase; metal scrap is sent for high-quality material recycling; other residual materials are sent to the waste incineration plant for thermal disposal.
C3: Waste management for reuse, recovery and/or recycling: All secondary materials are listed here as no-burden, emission-free processes and the primary scrap is recycled accordingly. Due to the cut-off calculation method, the processing emissions of aluminum and steel scrap are not included in this balance and therefore no emissions are attributable to C3.
C4: Disposal: A processing loss of 5% is assumed (according to Worldsteel Method 2017); residual scrap and residual materials are collected and sent for disposal. D: Reuse, recovery or recycling potential as net flows and credits or loads: Thermal credits are given through the incineration of residual materials in the waste incineration plant with the corresponding LHV stored in the ecoinvent dataset, and material credits are awarded for the primary metal scrap, which can substitute primary material in the next product system.

3.3 Estimates and assumptions

All plant- and process-specific data was provided to the life cycle assessor by the participating TAIM companies. Missing data was supplemented by estimates based on comparable substitutes or data from secondary literature. Data sets missing from the database were modeled by the life cycle assessor.

3.4 Cut-off criteria

All energy consumption and material flows for the product could be allocated on the basis of measured production data or based on mass. The companies' operating data was associated. The cut-off approach was used in the end-of-life calculation, whereby no credits are given for the proportion of secondary materials used in production (inputs) for avoided loads in other product systems (system space expansion) at the end of life. In Module D, additional loads are awarded for the compensation of lost secondary material in the EoL (5%) in the previous product system.

3.5 Background data

The life cycle assessment is based upon plant-specific data collection including all energy sources and operating resources for one year (observation period January to December 2022). Background data for modelling and missing inventories of primary products are based on the LCIA database inventory *ecoinvent 3.10*. Modelling and impact assessment are carried out using *SimaPro* software (*version 9.6.0.1*).

3.6 Data quality

The foreground data relates to the financial year from January until December 2022.
The data collected was checked for representativeness in relation to previous years. Data sets for background data are based on the *ecoinvent 3.10* database. Missing specific data for preliminary products (such as external iron scrap) were modelled on the basis of generic data sets from *ecoinvent 3.10*, taking into account country-specific conditions. The data quality of all emission factors used in relation to DQ Geo, Tech and Time can be classified as good. Where data sets were not 100% suitable, the maximum approximation to the real process was used; the most up-to-date data sets from the ecoinvent database were always used. The impact on emissions in relation to approximated data sets can be considered low and has no significant effect on the results of the overall EPD.

3.7 Period under review

The quantities of raw materials, energy and waste used are based on the year 2022.
They correspond to the current state of the art and are therefore representative for the period under consideration.

3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Global

3.9 Allocation

All energy consumption and material flows for the product could be allocated on the basis of measured production data or based on mass. The companies' operating data was associated. The cut-off approach was used in the end-of-life

calculation, whereby no credits are given for the proportion of secondary materials used in production (inputs) for avoided loads in other product systems (system space expansion) at the end of life. In Module D, additional loads are awarded for the compensation of lost secondary material in the EoL (5%) in the previous product system.

3.10 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. A comparison or evaluation of EPD data is only possible of EPD data is only possible if all data sets to be compared have been created in accordance with *EN 15804* and the building context or the product-specific performance characteristics are taken into account. The background database *ecoinvent 3.10* was used.
The following evaluation methods were used:
- EF3.1 (adapted) V1.01 / EF 3.1 normalization and weighting set
- Cumulative Energy Demand (LHV) V1.01 / Cumulative energy demand
- EDIP 2003 V1.07 / Default
- Selected LCI results, additional V1.06

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon
The product contains less than 5 % biogenic carbon as a proportion of the total mass of the product, which is why it is not stated in this EPD.
Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2.

The reference service life according to *ISO 15686-1* could not have been determined. The declaration of the reference service life underlies the assessment system of the Federal Institute for Research on Building, Urban Affairs and Spatial Development *BBSR*.

In case a **reference service life** according to applicable ISO standards is declared then the assumptions and in-use conditions underlying the determined RSL shall be declared. In addition, it shall be stated that the RSL applies to the reference conditions only.

The same holds for a service life declared by the manufacturer. Corresponding information related to in-use conditions needs not be provided if a service life taken from the list of service life by *BNB* is declared.

Reference service life

Name	Value	Unit
Life Span (according to BBSR)	≥ 50	a

End of life (C1-C4)

Name	Value	Unit
Collected separately aluminium scrap	668	kg
Collected separately steel scrap	98	kg
Scrap for Recycling (steel) 95%	93	kg
Scrap for Recycling (aluminium) 95%	634	kg
Landfilling steel scrap 5%	5	kg
Landfilling aluminium	33	kg
Other residual materials (including acoustic fleece)	10	

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Name	Value	Unit
Net scrap steel	-10	kg
Net scrap aluminium	-40	kg

A recycling rate of 95% is assumed.

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5. LCA: Results

The following table summarizes the results of the life cycle assessment. The results of the impact assessment do not allow any statements to be made about the endpoints of the impact categories, exceedance of threshold values, safety margins or risks. Long-term emissions >100 years are not taken into account in the impact assessment. The impact assessment is based on *EN 15804*, *SimaPro 9.6.0.1.*

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR 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	MND	X	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 t metal ceiling systems made of aluminium

Parameter	Unit	A1-A3	A5	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	6.65E+03	3.79E-01	0	7.46E+00	0	3.25E+01	-5.04E+03
GWP-fossil	kg CO_2 eq	6.65E+03	3.79E-01	0	7.45E+00	0	3.25E+01	-5.03E+03
GWP-biogenic	kg CO_2 eq	2.12E+00	6.45E-05	0	1.23E-03	0	1.48E-03	-9.34E-01
GWP-luluc	kg CO_2 eq	1.14E+00	1.34E-04	0	2.55E-03	0	1.22E-03	-4.57E-01
ODP	kg CFC11 eq	5.49E-05	7.9E-09	0	1.5E-07	0	7.71E-08	-1.95E-05
AP	mol H^+ eq	4.09E+01	8.95E-04	0	2.41E-02	0	2.69E-02	-3.23E+01
EP-freshwater	kg P eq	1.36E+00	2.67E-05	0	5.07E-04	0	2.78E-03	-9.93E-01
EP-marine	kg N eq	6.92E+00	2.35E-04	0	8.18E-03	0	1.32E-02	-5.6E+00
EP-terrestrial	mol N eq	8.19E+01	2.54E-03	0	8.89E-02	0	1.22E-01	-5.94E+01
POCP	kg NMVOC eq	2.25E+01	1.55E-03	0	3.92E-02	0	3.58E-02	-1.75E+01
ADPE	kg Sb eq	1.64E-02	1.06E-06	0	2.01E-05	0	6.27E-06	-2.8E-03
ADPF	MJ	6.38E+04	5.69E+00	0	1.08E+02	0	5.39E+01	-4.36E+04
WDP	m^3 world eq deprived	8.76E+02	2.71E-02	0	5.15E-01	0	1.84E+00	-4.34E+02

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; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 t metal ceiling systems made of aluminium

Parameter	Unit	A1-A3	A5	C1	C2	C3	C4	D
PERE	MJ	3.8E+03	7.18E-02	0	1.36E+00	0	7.77E-01	0
PERM	MJ	0	0	0	0	0	0	0
PERT	MJ	3.8E+03	7.18E-02	0	1.36E+00	0	7.77E-01	0
PENRE	MJ	6.49E+04	5.71E+00	0	1.08E+02	0	5.41E+01	0
PENRM	MJ	0	0	0	0	0	0	0
PENRT	MJ	6.49E+04	5.71E+00	0	1.08E+02	0	5.41E+01	0
SM	kg	1.02E+03	0	0	0	0	0	-1.6E+02
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	3.22E+01	8.52E-04	0	1.62E-02	0	9.95E-02	-1.09E+01

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+A2: 1 t metal ceiling systems made of aluminium

Parameter	Unit	A1-A3	A5	C1	C2	C3	C4	D
HWD	kg	2.91E-01	3.74E-05	0	7.09E-04	0	4.18E-04	-7.91E-02
NHWD	kg	2.11E+02	4.86E-01	0	9.23E+00	0	2.29E+02	0
RWD	kg	3.29E-02	1.71E-06	0	3.25E-05	0	1.77E-05	-5.88E-03
CRU	kg	0	0	0	0	0	0	0
MFR	kg	0	6.1E+01	0	0	9.4E+02	0	0

MER	kg	0	0	0	0	0	6E+01	0
EEE	MJ	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	9.14E+02	0

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; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:
1 t metal ceiling systems made of aluminium

Parameter	Unit	A1-A3	A5	C1	C2	C3	C4	D
PM	Disease incidence	5.59E-04	3.69E-08	0	7.41E-07	0	3.77E-07	-4.65E-04
IR	kBq U235 eq	1.25E+02	6.91E-03	0	1.31E-01	0	7E-02	-2.5E+01
ETP-fw	CTUe	3.21E+04	0	1.35E+00	0	2.56E+01	0	1.18E+02
HTP-c	CTUh	1.46E-05	2.42E-09	0	4.61E-08	0	3.61E-08	-7.86E-06
HTP-nc	CTUh	7.64E-05	3.65E-09	0	6.96E-08	0	3.51E-07	-3.15E-05
SQP	SQP	1.61E+04	5.72E+00	0	1.09E+02	0	7.56E+01	-9.53E+03

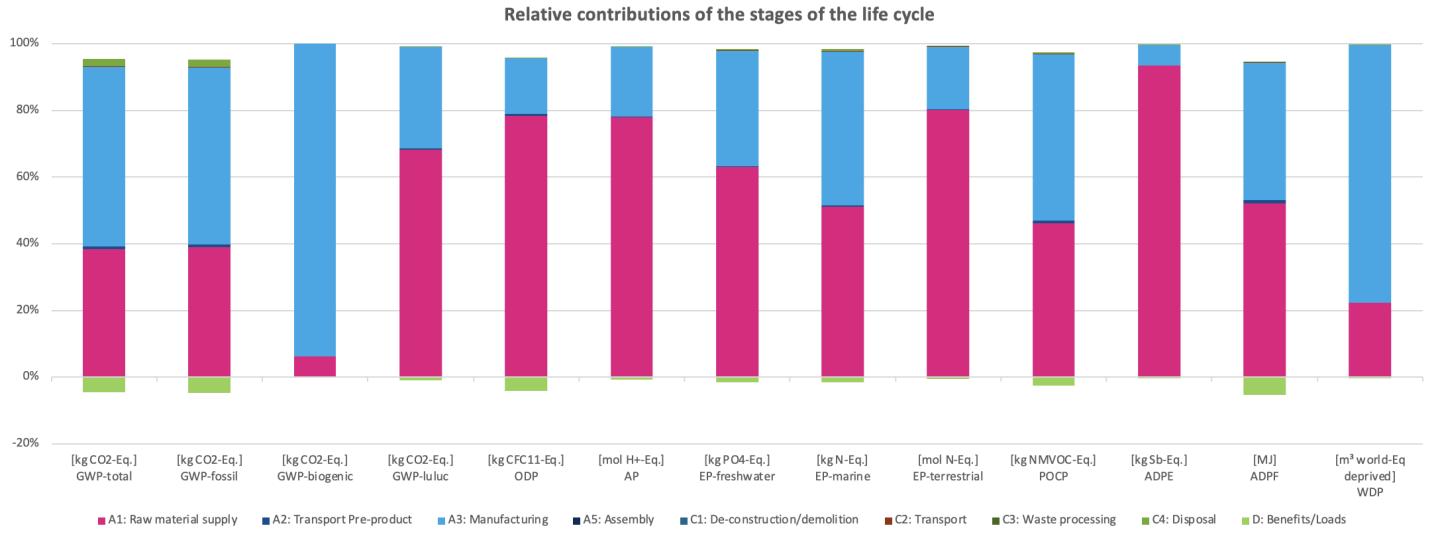
PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

*MND: Module not declared
**MDR: Module not relevant
Qualifier 1 –applies to the indicator 'potential effect through human exposition to U235'. This effect category mainly covers the potential impact of low-dosage ionising radiation on human health in the nuclear fuel cycle. It does not account for effects caused by possible nuclear accidents and occupational exposure nor for the disposal of radioactive waste in subterranean installations. This indicator also does not cover the potential ionising radiation emitted by the ground, radon, andcertain construction materials.

Qualifier 2 – applies to the indicators: 'abiotic resource depletion potential – non-fossil resources', 'abiotic resource depletion potential – fossil fuels', 'water deprivation potential (user)', 'potential toxicity reference unit for ecosystems', 'potential toxicity reference unit forhumans – carcinogenic effect', 'potential toxicity reference unit for humans – non-carcinogenic effect', and 'potential soil quality index'. Diligence must be applied when using the results of the environmental impact indicator because they are fraught with highuncertainties or experience with the indicator is limited.

6. LCA: Interpretation

The following figure shows the relative contributions of different life cycle phases in the form of a dominance analysis for each impact category.



The environmental impacts within Modules A1-A3 are dominated by raw materials by at least 78%, regardless of the impact category; production plays a further role alongside the supply of raw materials. At < 1 %, transportation makes almost no contribution to the total emissions; the credits in Module D are explained by the avoided environmental impacts in other product systems and arise from the recycling of scrap metal.

The total primary energy requirement within production (A1-3) is divided between approx. 94 % from non-renewable energy sources and 6 % from renewable energies. When considering the total non-renewable primary energy requirement (PENRT), 92 % is contributed by the raw materials; the manufacturing phase contributes 7 %. The contributions from transportation are negligible.

When looking at the total renewable primary energy requirement (PERT), 63 % of PE is caused by the provision of raw materials; just under 37 % by production.

As part of the LCA study, various product variants and company data were averaged as part of the TAIM-EPD. Although the products considered are very similar in terms of production and

material composition and the production steps are identical, there may be fluctuations in the results due to different variants in the impact assessment. To determine the possible ranges of fluctuation, a calculation of the extremes based on a minimum and maximum product configuration was therefore carried out in addition to the average annual production.
Overall, the fluctuation ranges within the EPD are within a plausible and normal range. Since the averaging is a weighted average based on the net production data of the individual companies, participation in the EPD and annual production in 2022 play a significant role and influence the average. If the companies that are more significant as a result have indicated a greater fluctuation in their min/max values, this also results in a greater fluctuation range for the overall average. In principle, however, the same products are manufactured using the same production processes; the basis weights depend on the strength and stability requirements of the ceiling system, which are subject to variation according to the company-specific view. Accordingly, the companies can independently classify where they lie and to what extent the LCA results apply to their specific product according to their known basis weight and the assumed average in the EPD. As an approximation, deviating basis weights can be allocated proportionally to the GWP result.

Based on the reference product, there are calculated fluctuations in the environmental impact results of 0.63 - 2.60 in the individual impact categories. Overall, the significance of the results of the average product is of limited representativeness for individual products, as they sometimes exhibit larger fluctuation ranges.

7. Requisite evidence

VOC emissions
For the declared product the test procedure according to /AgBB-scheme/ was carried out by the measuring agency eco-INSTITUT GmbH on 05.12.2013. The results of the laboratory report (test No. 4244-001 (II) were provided by the member company durlum GmbH as a reference for the TAIM e.V.

The test report is based on the "Assessment basis for the health assessment of VOC and SVOC of construction products (as of 2010) of the Committee for the Health Assessment of Construction Products AgBB". The summary assessment of the test procedure yields the result that the product meets the emission requirements of the /AgBB evaluation scheme/.

	Testing after 3 days [µg/m³]		Testing after 7 days [µg/m³]	
	Results	Requirement	Results	Requirement
Sum VOC (C6C16)	16	≤ 10000	12	≤ 1000
Sum SVOC (C16-C22)	< 1	-	< 1	100
R (dimensionsless)	0,01	-	0	≤ 1
Sum VOC o. LCI	9	-	8	≤ 100
Sum carcinogenic substances (EU- Kat 1 und 2)	< 1	≤ 10	< 1	≤ 1

7.1 VOC emissions
For products used in indoor applications.
Test method in accordance with the AgBB scheme indicating the measuring agency, date and results as a range of values. At least the following must be declared:

8. References

Standards

Committee for Healt-related Evaluation of Building Products (AgBB)
Evaluation procedure for VOC emissions from building products, 2015.

eco-INSTITUT
GmbH: Prüfbericht Nr. 42344-001 (II), 2013.

BBSR
Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR): Service lives of construction components. Service lives of construction components for Life Cycle Assessments according to the assessment system for sustainable construction (BNB), in: Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (ed.), 2017.

Ecoinvent 3.10
ecoinvent V 3.10 (2025): Ecoinventory database version 3.10 of the Swiss Centre for Life Cycle Inventories, Dübendorf.www.ecoinvent.ch

IBU PCR A
Institute Construction and Environment e.V. (ed.): Product category rules for building-related products and service. Part A: Calculation rules for Life Cycle Assessment and requirements on the project report, version 1.7, 2018.

IBU PCR B
Institute Construction and Environment e.V. (ed.): PCR Guidance-Texts for Building-Related Products and Services. Part B: Requirements on the EPD for www.ibu-epd.com Metal ceilings, version 1.6, 2017.

Technisches Handbuch Metalldecken (THM)
TAIM e.V. (Hrsg.), Oktober 2018.

Waste Classification Ordinance (AVV)/ European Waste List (EWL)
Waste Classification. Disposal Code 17 04 05 iron and steel, 2002.

ECHA candidate list

Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency (ECHA), European Union Regulation No 1907/2006, January 2020.

EN 520
DIN EN 520: Gypsum plasterboards - Definitions, requirements and test methods; German version EN 520:2004+A1:2009.

DIN 4102-2
DIN 4102-2: Fire Behaviour of Building Materials and Building Components; Building Components; Definitions, Requirements and Tests.

EN 14240
DIN EN 14240: Ventilation for buildings - Chilled ceilings - Testing and rating.

EN 14037-1
DIN EN 14037-1: Free hanging heating and cooling surfaces for water with a temperature below 120 °C - Part 1: Pre-fabricated ceiling mounted radiant panels for space heating - Technical specifications and requirements.

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

EN 15501
DIN EN 15501: Thermal insulation products for building equipment and industrial installations - Factory made expanded perlite (EP) and exfoliated vermiculite (EV) products - Specification.

EN 13501-2
DIN EN 13501-2: Fire classification of construction products and building elements - Part 2: Classification using data from fire resistance and/or smoke control tests, excluding ventilation services.

EN 13964
EN 13964: 2014: Suspended ceilings - Requirements and test methods.

ISO 15686-1
ISO 15686-1: 2015: Buildings and constructed assets - Service life planning - Part 1: General principles and framework.

ISO 14001
DIN EN ISO 14001: Environmental management systems - Requirements with guidance for use (ISO 14001:2015).

ISO 14025
DIN EN ISO 14025: Environmental labels and declarations - Type III environmental declarations - Principles and procedures (ISO 14025:2006).

ISO 14040
DIN EN ISO 14040: Environmental management - Life cycle assessment - Principles and framework (ISO 14040:2006 + Amd 1:2020).

ISO 14044
DIN EN ISO 14044: Environmental management - Life cycle assessment - Requirements and guidelines (ISO 14044:2006 + Amd 1:2017 + Amd 2:2020).

EN 15501
DIN EN 15501:Thermal insulation products for building equipment and industrial installations - Factory made expanded perlite (EP) and exfoliated vermiculite (EV) products - Specification.

ISO 50001
DIN EN ISO 50001: Energy management systems - Requirements with guidance for use (ISO 50001:2018).

Construction Procut Regulation (CPR):
Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing
Council Directive 89/106/EEC (Text with EEA relevance), in: Official Journal of the European Union, 2011.
The literature referred to in the Environmental Product Declaration must be listed in full.Standards already fully quoted in the EPD do not need to be listed here again.
The current version of PCR Part A and PCR Part B of the PCR document on which they are based must be referenced.

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