

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)
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Valid to	06.10.2030

Metal ceiling systems made of steel as heating and cooling ceilings

**TAIM e.V. - Verband Industrieller
Metalldeckenhersteller**

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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-20250173-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 steel as heating and cooling ceilings

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 steel as a heating and cooling ceiling. The average weight per unit area is 10.52 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

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		
<input type="checkbox"/>	internally	<input checked="" type="checkbox"/> externally



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

2. Product

2.1 Product description/Product definition

Heating and cooling ceiling systems are manufactured from folded or roll-formed and partially punched steel as complete kits or as individual components. The kit consists of the top layer, e.g. linear tile or panel ceiling, including heating/cooling coil and the substructure for fastening the metal ceiling. The substructure is predominantly made of 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 requirements for 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.

2.2 Application

The metal ceiling systems made of steel as heating and cooling ceilings are used for indoor purposes as a rectangular panel (also as special shape), panel ceiling, square cassette, expanded metal ceiling, grid ceiling or canopy ceiling used for ceiling cladding. The product is manufactured in accordance with the respective customer's requirements.

2.3 Technical Data

The following technical data apply to metal ceiling systems made of steel as heating and cooling ceilings. The standard *EN 13964* applies. The standard for the cooling output *EN 14240*, the heating output in accordance with *EN 14037* applies.

Constructional data

Name	Value	Unit
Heating output (EN ISO 14037) 15 K	123	W/m ²
Cooling output (EN 14240) 10 K	120	W/m ²
Durability class (EN 13964)	A	-
Sound absorption (EN ISO 354, EN ISO 11654)	not relevant	%
Grammage	12	kg/m ²
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 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 steel as heating and cooling ceilings are:

Name	Value	Unit
Steel	71	%
Aluminium	15	%
copper pipe	14	%
Acoustic tissue	< 1	%

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.

This product/ at least one partial article contains substances listed in the candidate list (23.01.2024) exceeding 0.1 percentage by mass: no.

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

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.

2.6 Manufacture

The system components for metal ceilings are manufactured in a continuous manufacturing process. The steel sheets are mainly uncoiled, perforated (optional), stamped (optionally aligned), clipped and folded or pressed. If not made of precoated material, the top layers are usually provided after the cleaning process with a powder or wet coating. Subsequently, an acoustic fleece insert can be applied to the back by means of heat in a continuous process. By adding heat, a hot-melt adhesive applied to the fleece is activated, which creates the adhesion of the fleece to the back of the metalsheet. Stamped and perforated waste is gathered, collected by local disposal companies and sent to the recycling loop. All production steps are carried out in compliance with the requirements and test specifications according to *EN 13964* and the technical regulations of the TAIM e.V. *THM*.

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 make up 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 for 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

Manufacturing conditions do not require any special health and safety protection measures other than those provided by the authorities for the specific work area, e.g. safety vest, safety shoes, dust mask. The DFG Commission for the investigation of Chemical

Compounds in the Work Area – better known as MAK values (national regulations) are not exceeded at any point of the production process. Noise-intensive installations, such as punching and straightening systems are correspondingly insulated by structural measures.

The statutory health and safety regulations for metal and dry construction trades as well as the respective provisions of the construction industry, apply. The production-related exhaust air is cleaned in accordance with legal regulations.

Water/Ground: No contamination of water or soil occurs. All values determined inside and outside the production facilities are below the applicable national requirements for noise protection. *EN 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 membrane of the metal ceiling system is attached to a substructure. The installation is to be carried out by trained personnel, usually from the area of drywall construction. The manufacturer's instructions must be observed.

2.9 Packaging

The heating and cooling ceilings are palletized and/or packed in cardboard, protected with polystyrene and stabilized with PP straps. The packaging was recorded and is part of the balance sheet; the delivery and assembly is 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 easy to clean and does not require much maintenance. No general cleaning and maintenance recommendations can be given due to the different designs of the steel 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 the product, the environment and health. Volatile organic compounds (VOC) are below the valuation limit according to health-related Evaluation of Emissions of Volatile Organic Compounds from Building Products (AgBB) *AgBB evaluation 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 in accordance with the BBSR table 2017 assessment system for sustainable building.

Appropriate maintenance of the water-bearing elements is necessary for a long service life > 50 years. 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 metal ceiling systems made of aluminium declared here correspond to the class A2 - s1, d0 of building products regarding their reaction to fire, according to *EN 13501-1*. The class of flaming droplets is d0 and the class for smoke density is pre-defined as s1.

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 without damage and simply reused for a second application.

2.15 Disposal

The metal ceiling can be sent for high-quality material recycling. Residual materials from the ceiling systems are disposed of and thermally recycled. Due to the large amount of recyclable metal scrap, the amount of raw material required for new production in the downstream system is reduced. Offcuts from production are returned directly to production in a closed loop and reused.

The waste codes are in accordance with the Waste Catalogue Ordinance (AVV) and the European Waste Catalogue (EWC):

17 04 05 - Iron and steel

17 04 02 - Aluminum

17 04 01 - Copper, bronze, brass

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

3. LCA: Calculation rules

3.1 Declared Unit

The declaration refers to the production of 1 t of metal ceiling as a heating and cooling ceiling; 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	10.52	kg/m ²
Gross density	7850	kg/m ³
Conversion factor to 1 m ²	0,01052	t/m ²
Declared unit	1	t

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 demands on 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 materials steel, aluminum and copper pipe.

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 heating and cooling ceilings is 0.8 - 1.41. The effect on the results for 1 t heating and cooling 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 assembly 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 in C1 was not made here
- 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; scrap metal 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 steel, aluminum and copper 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 the 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

Plant- and process-specific data was provided to the life cycle by the members of TAIM e.V.. Missing information was supplemented by estimates based on comparable substitutes or information from secondary literature. Data sets missing from the database were modelled by the life cycle assessor.

3.4 Cut-off criteria

All relevant data, i.e. all raw materials used in production as well as the energy and resources used in production, were taken from a data collection sheet following a previous comprehensive survey of the companies' operating data for the life cycle inventory analysis. For the inputs and outputs taken into account, the actual transport distances were used or estimated with the help of documented rules, and material and energy flows with a share of < 1 % were included. The sum of the neglected processes is less than 5% of the impact categories. The expenses for the provision of infrastructure (machinery, buildings, etc.) for the entire foreground system were not taken into account.

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: Europe

3.9 Allocation

Co-product allocation does not exist in the manufacturing process. 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

allocated. The end-of-life calculation was based on the cut-off approach, whereby no credits are awarded 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. 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% of the total mass less than 5 % biogenic carbon, which is why this information is not included in this EPD.
Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO₂.

The reference service life could not be determined in accordance with *ISO 15686*. The service life information is taken from the *BBSR 2017* table, Service life of building components for life cycle analyses according to the Assessment System for Sustainable Building (BNB). Appropriate maintenance is essential for a long service life of the water-bearing elements.

Reference service life

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

End of life (C1-C4)

Name	Value	Unit
Collected separately steel scrap	696	kg
Collected separately aluminium scrap	113	kg
Collected separately copper scrap	90	kg
Scrap for recycling (steel)	661	kg
Scrap for recycling (aluminium)	107	kg
Scrap for recycling (copper)	85	
Landfilling steel scrap 5%	35	kg
Landfilling aluminium scrap 5%	4	kg
Landfilling copper scrap 5%	2	kg

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

Name	Value	Unit
Net steel scrap	-130	
Net aluminium scrap	-20	
Net copper scrap	-10	

A recycling rate of 95% is assumed.

5. LCA: Results

The following table summarises the LCA results. The impact assessment results do not allow any conclusion as to the endpoints of the effect categories, exceedance of threshold values, safety margins, or risks. Long- term emissions (> 100 years) are not included in the impact assessment. The impact assessment uses the evaluation method according to EF3.1.

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 steel as heating and cooling ceilings

Parameter	Unit	A1-A3	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq	3.03E+03	1.31E-01	0	7.46E+00	0	2.61E+01	-1.15E+03
GWP-fossil	kg CO ₂ eq	3.02E+03	1.3E-01	0	7.45E+00	0	2.61E+01	-1.14E+03
GWP-biogenic	kg CO ₂ eq	7.25E+00	2.22E-05	0	1.23E-03	0	1.09E-03	-8.89E-01
GWP-luluc	kg CO ₂ eq	2.46E+00	4.63E-05	0	2.55E-03	0	7.48E-04	-3.35E-01
ODP	kg CFC11 eq	1.22E-04	2.72E-09	0	1.5E-07	0	4.91E-08	-1.83E-05
AP	mol H ⁺ eq	1.1E+02	3.08E-04	0	2.41E-02	0	1.86E-02	-3.19E+01
EP-freshwater	kg P eq	1.11E+01	9.19E-06	0	5.07E-04	0	2.23E-03	-3.28E+00
EP-marine	kg N eq	6.86E+00	8.09E-05	0	8.18E-03	0	9.49E-03	-2.26E+00
EP-terrestrial	mol N eq	1.36E+02	8.75E-04	0	8.89E-02	0	8.53E-02	-2.89E+01
POCP	kg NMVOC eq	2.4E+01	5.35E-04	0	3.92E-02	0	2.42E-02	-8.04E+00
ADPE	kg Sb eq	5.4E-01	3.65E-07	0	2.01E-05	0	4.38E-06	-1.51E-01
ADPF	MJ	3.79E+04	1.96E+00	0	1.08E+02	0	3.22E+01	-1.07E+04
WDP	m ³ world eq deprived	1.33E+03	9.33E-03	0	5.15E-01	0	9.84E-01	-2.46E+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 steel as heating and cooling ceilings

Parameter	Unit	A1-A3	A5	C1	C2	C3	C4	D
PERE	MJ	4.8E+03	2.47E-02	0	1.36E+00	0	5.54E-01	0
PERM	MJ	0	0	0	0	0	0	0
PERT	MJ	4.8E+03	2.47E-02	0	1.36E+00	0	5.54E-01	0
PENRE	MJ	3.98E+04	1.96E+00	0	1.08E+02	0	3.24E+01	0
PENRM	MJ	0	0	0	0	0	0	0
PENRT	MJ	3.98E+04	1.96E+00	0	1.08E+02	0	3.24E+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	4.61E+01	2.93E-04	0	1.62E-02	0	6.91E-02	-6.98E+00

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 steel as heating and cooling ceilings

Parameter	Unit	A1-A3	A5	C1	C2	C3	C4	D
HWD	kg	8.55E-01	1.29E-05	0	7.09E-04	0	2.67E-04	-3.28E-02
NHWD	kg	5.86E+02	1.67E-01	0	9.23E+00	0	1.1E+02	0
RWD	kg	1.02E-01	5.89E-07	0	3.25E-05	0	1.26E-05	-7.91E-03
CRU	kg	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	8.54E+02	0	0

MER	kg	0	0	0	0	0	4.91E+01	0
EEE	MJ	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	7.48E+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 steel as heating and cooling ceilings

Parameter	Unit	A1-A3	A5	C1	C2	C3	C4	D
PM	Disease incidence	4.86E-04	1.27E-08	0	7.41E-07	0	2.3E-07	-1.41E-04
IR	kBq U235 eq	3.21E+02	2.38E-03	0	1.31E-01	0	4.97E-02	-2.06E+01
ETP-fw	CTUe	1.75E+05	0	4.64E-01	0	2.56E+01	0	9.47E+01
HTP-c	CTUh	2.33E-05	8.35E-10	0	4.61E-08	0	2.74E-08	-7.86E-06
HTP-nc	CTUh	1.26E-03	1.26E-09	0	6.96E-08	0	2.85E-07	-3.06E-04
SQP	SQP	2.53E+04	1.97E+00	0	1.09E+02	0	3.85E+01	-5.21E+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 (carcinogenic); HTP-nc = Potential comparative Toxic Unit for humans (not carcinogenic); SQP = Potential soil quality index

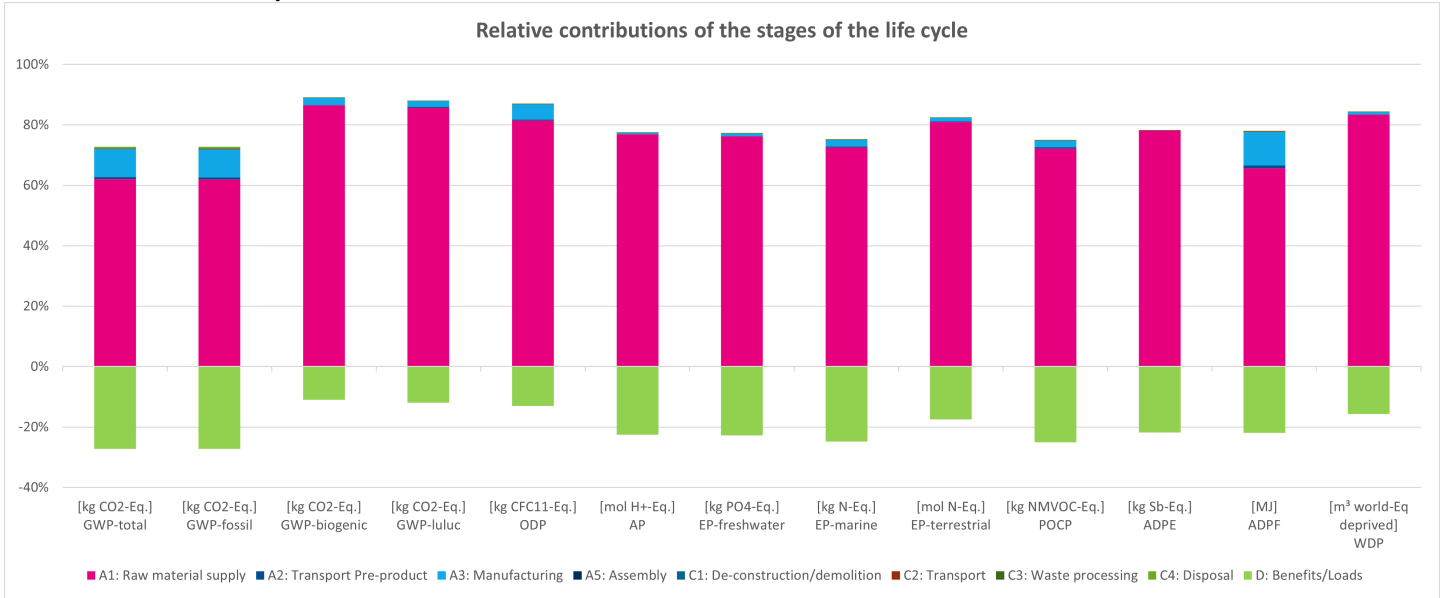
*MND: Module not declared
**MDR: Module not relevant

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, and certain 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 for humans – 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 high uncertainties or experience with the indicator is limited.

6. LCA: Interpretation

The following figure shows the relative contributions of different Life Cycle processes and the primary energy demand in the form of a dominance analysis.



The environmental impacts within Modules A1-A3 are dominated by raw materials by at least 85%, regardless of the impact category ; production plays a further role in the supply of raw materials. Transportation plays a negligible role (< 1 %). The credits in Module D are explained by the avoided environmental impacts in other product systems and arise from the recycling of metal scrap.

The total primary energy requirement within production (A1-3) is divided between approx. 89 % from non-renewable energy sources and 11 % from renewable energies. 85 % of the total non-renewable primary energy requirement (PENRT) is contributed by the raw materials; 14 % is contributed by the manufacturing phase. The contributions from transportation are negligible. When considering the total renewable primary energy requirement (PERT), 79 % of PE is

contributed by the production phase raw material provision within Module A1-A3.

As part of the LCA study, various product variants and company data were averaged as part of the TAIM-EPD. Although the products under consideration 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 fluctuation ranges, a calculation of the extremes based on a minimum and maximum product configuration was therefore carried out in addition to the averaged annual production.

Overall, the fluctuation ranges within the EPD are within a plausible and normal range. As the average is a weighted average based on the net production data of the individual companies, the participation in the EPD and the annual production in 2022 play a significant role and have an influence on the average.
If the companies that are more significant as a result have

indicated a greater fluctuation in their min/max values, this also has a correspondingly 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 0.8 - 1.41 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.

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.

EN 15804

EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

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

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com



Programme holder

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

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com



Author of the Life Cycle Assessment

myclimate Deutschland gGmbH
Kurrerstr. 40/3
72762 Reutlingen
Germany

+49 7121 9223 50
kontakt@myclimate.de
www.myclimate.de



Owner of the Declaration

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

+49 (0)211 955 93 27
taim.mail@t-online.de
www.taim.info