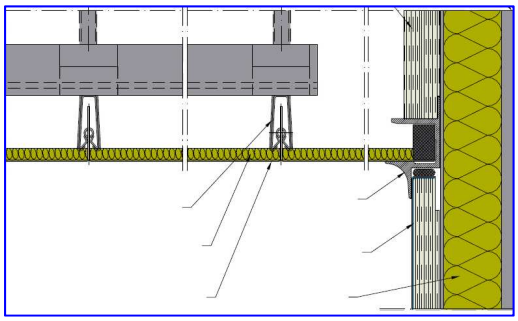
Environmental Product Declaration (EPD)

Declaration Code: EPD-HSD-GB-32.0



HT Labor + Hospital-technik GmbH

Ceiling

Modular ceiling for hygiene areas (galvanised, powder coated)

Basis:

DIN EN ISO 14025
EN15804

Company EPD **E**nvironmental **P**roduct **D**eclaration

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Environmental Product Declaration (EPD)

Declaration Code: EPD-HSD-GB-32.0

Programme operator	ift Rosenheim GmbH Theodor Gietl Straße 7-9 D-83026 Rosenheim		
Practitioner of the LCA	ift Rosenheim GmbH Theodor Gietl Straße 7-9 D-83026 Rosenheim		
Declaration holder	HT Labor + Hospitaltechnik GmbH Rambacher Str. 2 91180 Heideck		
Declaration code	EPD-HSD-GB-32.0		
Designation of declared product	Modular ceiling for hygiene areas (galvanised, powder coated)		
Scope	Modular ceiling system in critical areas of healthcare facilities, sanitation systems, sterile production, laboratories and research institutions.		
Basis	This EPD was prepared on the basis of EN ISO 14025:2011 and EN 15804:2012+A1:2013. In addition, the "Allgemeiner Leitfaden zur Erstellung von Typ II Umweltproduktdeklarationen" (Guidance on preparing Type III Environmental Product Declarations) applies. The Declaration is based on the PCR document “PCR Part A” PCR-A-0.1:2018 and “Metal ceiling” PCR-MD-0.1:2018.		
Validity	Publication date: 05.12.2018	Last revision: 20.06.2019	Next revision: 05.12.2023
	This verified Company Environmental Product Declaration (company EPD) applies solely to the specified products and is valid for a period of 5 years from the date of publication in accordance with DIN EN 15804.		
LCA basis	The LCA was prepared in accordance with DIN EN ISO 14040 and DIN EN ISO 14044. The base data includes both the data collected at the production site of HT Labor + Hospitaltechnik GmbH and the generic data derived from the "GaBi 8“ database. LCA calculations were carried out for the included “cradle to gate life cycle with options” (cradle to gate with options) including all upstream processes (e.g. raw material extraction, etc.).		
Notes	The “Conditions and Guidance on the Use of ift Test Documents” apply. The declaration holder assumes full liability for the underlying data, certificates and verifications.		

Prof. Ulrich Sieberath Director of Institute	Patrick Wortner External verifier

1 General product information

Product definition

The EPD relates to the product group Ceiling and applies to:

1 unit/m²/running metre/kg of modular ceiling for hygiene areas (galvanised, powder coated)
made by HT Labor + Hospitaltechnik GmbH.

Assessed product	Declared unit	Weight per m²
Modular ceiling	1 m²	8 kg/m²

The average unit is declared as follows:
Directly used material flows are determined using the average sizes of the reference product (0.84 m²) and and assigned to the declared unit. All other inputs and outputs in the production were scaled to the declared unit in their entirety since no direct assignment to the average size is possible. The reference period is the year 2017.

Product description

The ceiling panels match the ceiling and wall system grid dimensions and can be detached individually. The remaining areas are covered by adapter panels and location panels. The ceiling panels are made of galvanised sheet steel painted in white RAL 9010. The substructure comprises a lattice of support and cross profiles. Standard panels feature raised edges on four sides, wall connecting panels feature raised edges on either two or three sides. The ceiling panels are held in the clamping system by the support profile. The HT ceiling system ensures quick access to on-site installations such as HVAC, medical gases and electrics. The plastic coating guarantees an especially durable, scratch-resistant surface.

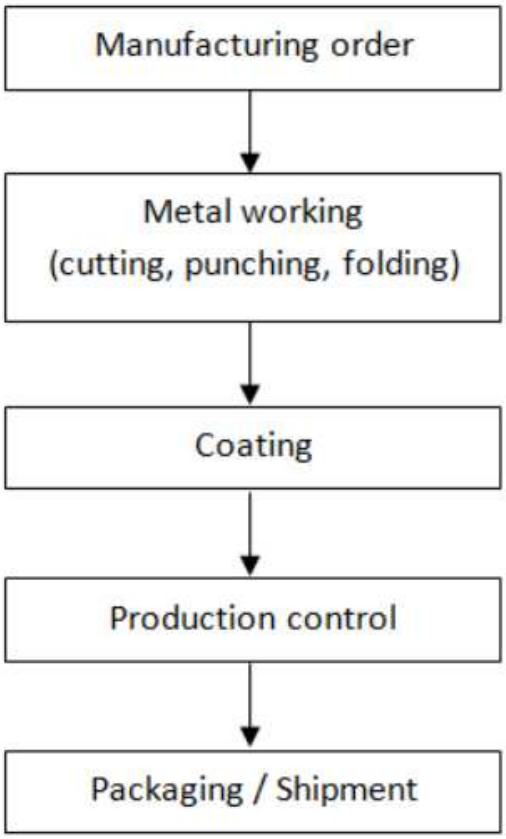
Module dimensions (L x W):	1,550 (1,250) mm x 625 mm
Clamping sides:	15/40 mm raised edge
Suspension height:	approx. 200–1,500 mm from bare ceiling

Ceiling panels

Material:	1 mm galvanised sheet steel
Paintwork:	white RAL 9010
Clamping sides:	standard panels with raised edges on four sides, wall connecting panels with raised edges on two or three sides
Foam rubber:	for sealing between the ceiling panels with complete protection against dust penetrtion

For a detailed product description refer to the manufacturer specifications at www.htgroup.de or the product specifications of the respective offer/quotation.

Product manufacture



Application

Modular ceiling system in critical areas of healthcare facilities, sanitation systems, sterile production, laboratories and research institutions.
The HT ceiling system ensures quick access to on-site installations such as HVAC, medical gases and electrics. The plastic coating guarantees an especially durable, scratch-resistant surface.
The construction of the ceiling system allows replacement of any of the ceiling panels at any time.

Management systems

The following management systems are in place:

- Quality management system to DIN EN ISO 9001:2015

Additional information

For additional verification of applicability or conformity refer to the CE marking and the documents accompanying the product, if applicable.

The modular ceiling for hygiene areas (galvanised, powder coated) meets the following performance characteristics (related to building physics):

- Antibacterial effect of the powder paint in accordance with JIS Z 2801

2 Materials used

Primary materials

The primary materials used are listed in the LCA (see Section 7).

Declarable substances

The product contains no substances from the REACH candidate list (declaration dated 02.11.20187).

All relevant safety data sheets are available from HT Labor + Hospitaltechnik GmbH .

3 Construction process stage

Processing recommendations Installation

Observe the instructions for assembly/installation, operation, service/maintenance and disassembly. For this, see www.htgroup.de

4 Use stage

Emissions to the environment

No emissions to indoor air, water and soil are known (if applicable, VOC emissions).

Reference service life (RSL)

The RSL information was provided by the manufacturer. The RSL shall refer to the declared technical and functional performance of the product within the building. It shall be established in accordance with specific rules set out in the European product standards and shall also take into account ISO 15686-1, -2, -7 and -8. Where European product standards provide guidance on determining RSL, such guidance shall have priority. If it is not possible to determine the service life as the RSL in accordance with ISO 15686, the table “Nutzungsdauern von Bauteilen zur Lebenszyklusanalyse nach BNB” (Service life of building components for life cycle analysis in accordance with the Sustainable Construction evaluation system) of the German Federal Institute for Research on Building, Urban Affairs and Spatial Development) can be used. For further information and explanations refer to www.nachhaltigesbauen.de.

For this EPD the following applies:
The reference service life (RSL) can be determined for a "cradle to gate - with options" EPD only if all of the modules A1- A3 and B1-B5 are specified;
The manufacturer states that the ceiling for hygiene areas (galvanised, powder coated) manufactured by HT Labor + Hospitaltechnik GmbH can be specified for a service life of 30 years.

The average was calculated from the data recorded and is therefore representative. The material and energy flows for 2017 were divided by the numbers of units manufactured to produce average figures for use in the LCA calculations. The service life is dependent on the characteristics of the product and in-use conditions. The characteristics described in the EPD are applicable, in particular the characteristics listed below:

- Outdoor environment: the elements are not for use outdoors. There are therefore no known impacts with a negative effect on the reference service life.
- Indoor environment: certain impacts (e.g. operation not conforming to the intended use) may have a negative effect on the service life.

The service life solely applies to the characteristics specified in this EPD or the corresponding references.

The reference service life (RSL) does not reflect the actual life span, which is usually determined by the service life and the refurbishment of a building. It does not give any information on the useful life, warranty referring to performance characteristics or guarantee.

5 End-of-life stage

Possible end-of-life stages

The modular ceiling for hygiene areas (galvanised, powder coated) is shipped to central collecting points. There the products are generally shredded and sorted into their original pure components. Specific portions of aluminium and steel are recycled. Residual fractions are disposed or partially thermally recycled.

Disposal routes

The LCA includes the average disposal routes.

All life cycle scenarios are detailed in the Annex

6 Life Cycle Assessment (LCA)

Environmental product declarations are based on life cycle assessments (LCAs) which use material and energy flows for the calculation and subsequent representation of environmental impacts.

Such a life cycle assessment (LCA) was developed as the basis for the modular ceiling for hygiene areas (galvanised, powder coated). The LCA is in conformity with EN 15804 and the international standards DIN EN ISO 14040, DIN EN ISO 14044, ISO 21930 and EN ISO 14025.

The LCA is representative of the products presented in the Declaration and the specified reference period.

6.1 Definition of goal and scope

Goal

The goal of the LCA is to demonstrate the environmental impacts of 1 m² of modular ceiling for hygiene areas (galvanised, powder coated). In accordance with EN 15804, the environmental impacts covered by this Environmental Product Declaration are presented for the assessed product life cycle in the form of basic information. Apart from these, no other environmental impacts have been specified/presented.

Data quality, data availability and geographical and time-related system boundaries

The specific data originate exclusively from the fiscal year 2017. They were collected on-site at the plant located in Heideck and originate in parts from company records and partly from values directly obtained by measurement. Validity of the data was checked by the ift Rosenheim.

The generic data originate from the GaBi 8 software, "Professional Datenbank und Baustoff Datenbank" (professional data base and building materials data base). The last update of both databases was in 2018. Data from before this date originate also from this databases and are not more than 4 years old. No other generic data were used for the calculation.

Data gaps were either filled with comparable data or conservative assumptions, or the data were cut off in compliance with the 1 % rule.

The life cycle was modelled using the sustainability software tool "GaBi 8" for the development of life cycle assessments.

Scope / system boundaries

The system boundaries refer to the supply of raw materials and purchased parts, manufacture/production, use and end-of-life stage of modular ceiling for hygiene areas (galvanised, powder coated) (cradle to gate with options).
No additional data from pre-suppliers/subcontractors or other sites were taken into consideration.

Cut-off criteria

All company data collected, i.e. all commodities/input and raw materials used, the thermal energy and electricity consumption, were taken into consideration.

The boundaries cover only the product-relevant data. Building sections/parts of facilities that are not relevant to the manufacture of the products, were excluded.

The transport distances of the pre-products used were taken into consideration as a function of 100% of the mass of the modular. ceiling for hygiene areas (galvanised, powder coated) .

The criteria for the exclusion of inputs and outputs as set out in EN 15804 are fulfilled. It can be assumed that the total of negligible processes per life cycle stage does not exceed 1 percent of the mass/primary energy. This way the total of negligible processes does not exceed 5 percent of the energy and mass input. The life cycle calculation also includes material and energy flows that account for less than 1 percent.

6.2 Inventory analysis

Goal

All material and energy flows are described below. The processes covered are presented as input and output parameters and refer to the declared/functional units.

Life cycle stages

The Annex shows the entire life cycle of the modular ceiling for hygiene areas (galvanised, powder coated). Product stage "A1 – A3", construction process stage" A4 – A5", use stage "B2, B4 and B6, B7", end-of-life stage "C1 – C4" and the benefits and loads beyond the system boundaries "D" were taken into consideration.

Benefits

The below benefits have been defined as per EN 15804:

- Benefits from recycling
- Benefits (thermal and electrical) from incineration

Allocation procedures
Allocation of co-products

The manufacture of ceiling for hygiene areas (galvanised, powder coated) produced the allocations given below: Allocation is based on the manufacturing costs (economic value).

Allocations for re-use, recycling and recovery

If the modular ceiling for hygiene areas (galvanised, powder coated) is re-used/recycled and recovered during the product stage (rejects), the components are shredded and then sorted into their original pure components, if necessary. This is realised by various process plants, e.g. magnetic separators. The system boundaries of the modular ceiling for hygiene areas (galvanised, powder coated) were set following their disposal, with termination of their waste characteristics.

Allocations beyond life cycle boundaries

Use of recycled materials in the manufacturing process was based on the current market-specific situation. In parallel to this, a recycling potential was taken into consideration that reflects the economic value of the product after recycling (recyclate). The system boundary set for the recycled material refers to collection.

Secondary material

The use of secondary material in module A3 by the company HT Labor + Hospitaltechnik GmbH was not considered. Secondary material is not used.

Inputs

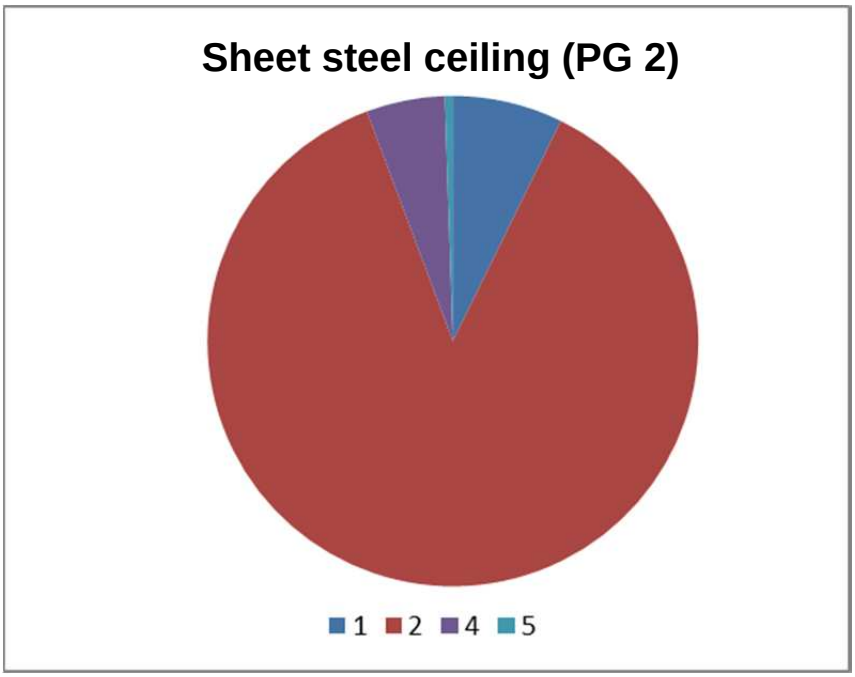
The LCA includes the following production-relevant inputs:

Energy
The electricity mix is based on “Strommix Europa” (Europe electricity mix).
Fuel oil is based on “Heizöl EL Europa” (EL Europe fuel oil).

A portion of the process heat is used for space heating at the production site. This can however not be quantified, hence a “worst case” figure was taken into account for the product.

Water
No water is consumed by the individual process steps for the manufacture of modular ceiling for hygiene areas (galvanised, powder coated).
The consumption of fresh water specified in Section 6.3 originates (among others) from the upstream processes of the pre-products.

Raw material/pre-products
The chart below shows the share of raw materials/pre-products in %.



No.	Material	Mass in %
1	Aluminium	7.3
2	Galvanised steel	87.0
5	Powder paint	0.5

Ancillary materials and consumables
11.59 g ancillary materials and consumables are required for 1 m² of modular ceiling for hygiene areas (galvanised, powder coated).

Product packaging
The amounts used for product packaging are as follows:

No.	Material	Mass in kg
1	Wood	0.839
2	Cardboard	0.040
3	Film/foil	0.000
4	Styrene	0.004

Outputs

The LCA includes the production-relevant outputs per 1 m² of modular ceiling for hygiene areas (galvanised, powder coated):

Waste
Secondary raw materials were included in the benefits.
See Section 6.3 Impact assessment.

Waste water
No waste water is produced for the manufacture of the modular ceiling for hygiene areas (galvanised, powder coated).

6.3 Impact assessment

Goal

The impact assessment covers both inputs and outputs. The impact categories applied are named below:

Impact categories

The models for impact assessment were applied as described in EN 15804-A1.
The impact categories presented in the EPD are as follows:

- Depletion of abiotic resources (fossil fuels);
- Depletion of abiotic resources (elements);
- Acidification of soil and water;
- Ozone depletion;
- Global warming;
- Eutrophication;
- Photochemical ozone creation.

Waste

The waste generated during the production of 1 m² of modular ceiling for hygiene areas (galvanised, powder coated) is evaluated and shown separately for the fractions trade wastes, special wastes and radioactive wastes. Since waste handling is modelled within the system boundaries, the amounts shown refer to the deposited wastes. A portion of the waste indicated is generated during the manufacture of the pre-products.

Results per 1 m² of modular ceiling											
Environmental impacts	**Unit**	**A1-A3**	**A4**	**A5**	**B2**	**B4**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2-equiv.	54.87	0.17	1.55	74.66	56.94	0.21	4.48E-02	5.76E-02	0.04	-28.93
Depletion potential of stratospheric ozone layer	kg R11-equiv.	5.00E-07	4.75E-15	1.67E-14	4.11E-09	5.00E-07	9.47E-13	1.22E-15	2.56E-13	8.25E-15	-1.31E-11
Acidification potential of soil and water	kg SO_2-equiv.	0.20	2.34E-04	1.86E-04	0.11	0.20	6.05E-04	6.19E-05	1.64E-04	2.15E-04	-8.14E-02
Eutrophication potential	kg PO_4^{3-}-equiv.	1.24E-02	5.73E-05	4.08E-05	1.80E-02	1.26E-02	5.67E-05	1.52E-05	1.53E-05	2.97E-05	-6.72E-03
Formation potential of tropospheric ozone	kg C_2H_4-equiv.	2.27E-02	-4.79E-05	1.24E-05	2.80E-02	2.27E-02	3.79E-05	-1.32E-05	1.02E-05	1.67E-05	-7.96E-03
Depletion of abiotic resources (ADP elements)	kg Sb equiv.	9.36E-04	1.43E-08	2.14E-08	1.59E-05	9.36E-04	1.13E-07	3.68E-09	3.06E-08	1.40E-08	-1.23E-03
Depletion of abiotic resources (ADP fossil fuels)	MJ	609.67	2.37	0.33	2310.86	616.33	2.27	0.61	0.61	0.47	-279.41
Use of resources	**Unit**	**A1-A3**	**A4**	**A5**	**B2**	**B4**	**C1**	**C2**	**C3**	**C4**	**D**
Renewable primary energy as energy source	MJ	86.22	0.13	14.13	62.90	102.43	1.46	3.37E-02	0.40	6.04E-02	-51.90
Renewable primary energy for material use	MJ	14.06	0.00	-14.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total use of renewable primary energy	MJ	100.28	0.13	6.57E-02	62.90	102.43	1.46	3.37E-02	0.40	6.04E-02	-51.90
Non-renewable primary energy as energy source	MJ	660.42	2.37	0.44	2339.73	671.33	3.89	0.61	1.05	2.54	-302.59
Non-renewable primary energy for material use	MJ	2.13	0.00	-0.08	0.00	0.00	0.00	0.00	0.00	-2.05	0.00
Total use of non-renewable primary energy	MJ	662.55	2.37	0.36	2339.73	671.33	3.89	0.61	1.05	0.49	-302.59
Use of secondary materials	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renewable secondary fuels	MJ	1.39E-10	1.28E-29	7.77E-24	1.78E-21	1.39E-10	0.00	3.30E-30	0.00	7.39E-24	-6.46E-11
Non-renewable secondary fuels	MJ	1.64E-09	1.94E-28	9.13E-23	2.09E-20	1.64E-09	5.78E-30	5.01E-29	1.56E-30	8.68E-23	-7.58E-10
Use of fresh water resources	m^3	0.21	2.41E-04	3.75E-03	0.41	0.22	1.99E-03	6.21E-05	5.39E-04	9.31E-05	-9.97E-02
Waste categories and output material flows	**Unit**	**A1-A3**	**A4**	**A5**	**B2**	**B4**	**C1**	**C2**	**C3**	**C4**	**D**
Disposed hazardous waste	kg	6.74E-07	1.37E-07	3.14E-10	1.06E-03	8.58E-07	1.83E-09	3.53E-08	4.94E-10	8.39E-09	-2.06E-07
Disposed non-hazardous waste	kg	3.98	1.99E-04	4.97E-03	0.39	6.27	2.74E-03	5.12E-05	7.42E-04	2.29	-2.17
Radioactive waste	kg	2.02E-02	3.25E-06	1.44E-05	1.14E-02	2.11E-02	6.44E-04	8.37E-07	1.74E-04	7.07E-06	-9.18E-03
Components for further use	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for recycling	kg	0.00	0.00	0.00	0.00	16.20	0.00	0.00	16.20	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported electrical energy	MJ	6.07E-02	0.00	1.90	0.00	1.96	0.00	0.00	0.00	0.00	0.00
Exported thermal energy	MJ	0.14	0.00	4.41	0.00	4.54	0.00	0.00	0.00	0.00	0.00

6.4 Interpretation, LCA presentation and critical review

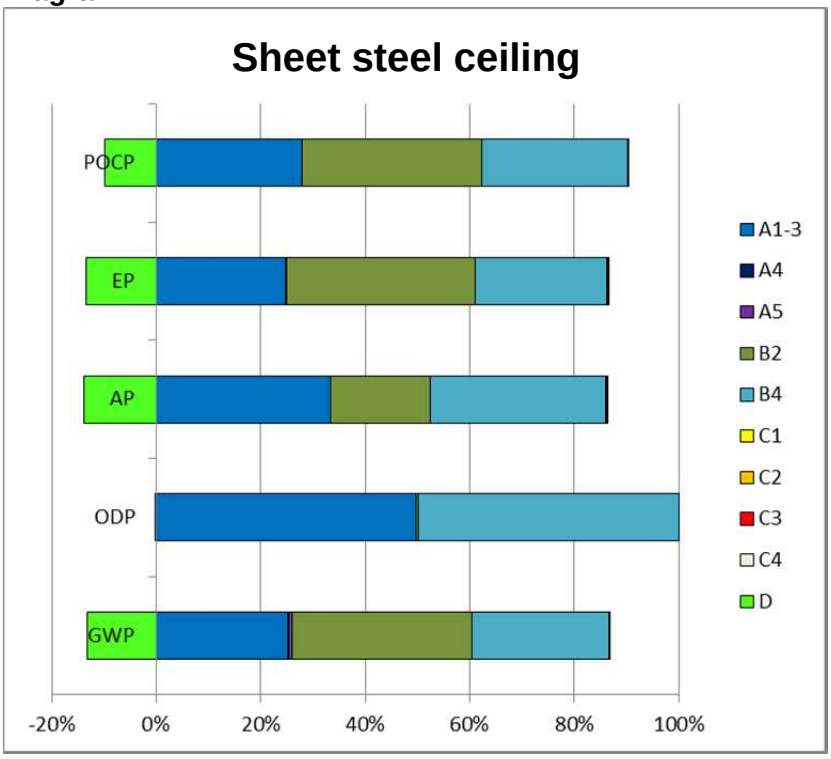
Evaluation

The environmental impacts during the manufacture of the modular ceiling for hygiene areas (galvanised, powder coated) result mainly from the use of steel / its upstream processes.
The cleaning operations using the VAH listed surface disinfectants (VAH - Association for Applied Hygiene) during the 50 year use stage also play a major role in environmental impacts. Additional important parameters in the use stage come from the replacement of reference products over the period of 50 years.

For scenario C4 only marginal consumptions arising from the physical pre-treatment and management of the disposal site are expected. Allocation to specific products is almost impossible for site disposal.
When recycling the modular ceiling for hygiene areas (galvanised, powder coated), for metals only a little over 50% of the environmental impacts arising during manufacture can be assigned as benefits to scenario D.

The values obtained from the LCA calculation are suitable for the certification of buildings, as necessary.

Diagram



Report

The LCA underlying this EPD was developed according to the requirements set out in DIN EN ISO 14040 and DIN EN ISO 14044 as well as EN 15804 and EN ISO 14025. For reasons of confidentiality, it is not addressed to third parties. It is deposited with the ift Rosenheim. The results and conclusions reported to the target

group are complete, correct, without bias and transparent. The results of the study are not designed to be used for comparative statements intended for publication.

Critical review

The critical review of the LCA and of the report took place in the course of verification of the EPD and was carried out by Patrick Wortner, an external verifier.

7 General information regarding the EPD

Comparability

This EPD was prepared in accordance with EN 15804 and is therefore only comparable to those EPDs that also comply with the requirements set out in EN 15804.
Any comparison must refer to the building context and the same boundary conditions of the various life cycle stages.
For comparing EPDs of construction products, the rules set out in EN 15804 (Clause 5.3) apply.

Communication

The communications format of this EPD meets the requirements of EN 15942:2011 and is therefore the basis for B2B communication. Only the nomenclature has been changed according to EN 15804.

Verification

Verification of the Environmental Product Declaration is documented in accordance with the ift "Richtlinie zur Erstellung von Typ III Umweltproduktdeklarationen" (Guidance on preparing Type III Environmental Product Declarations) in accordance with the requirements set out in EN ISO 14025.

This Declaration is based on the PCR document “PCR Part A” PCR-A-0.1:2018 and “Metal ceiling” PCR-MD-0.1:2018.

The European standard EN 15804 serves as the core PCR [a)]
Independent verification of the declaration and statement according to EN ISO 14025:2010 ☐ internal ☒ external
Independent third party verifier: [b)] Patrick Wortner
[a)] Product category rules [b)] Optional for business-to-business communication, Mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Revisions of this document

No.	Date	Note:	Practitioner of the LCA	Verifier
1	04.12.2018	External Verification	Zwick	Wortner
2	19.06.2019	Review	Zwick	Wortner

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[26] Bundesimmissionsschutzgesetz – BImSchG (Federal Immission Law)
Gesetz zum Schutz vor schädlichen Umwelteinwirkungen durch Luftverunreinigungen, Geräusche, Erschütterungen und ähnlichen Vorgängen (Law on harmful environmental impacts by air contamination, noise, vibrations and similar processes), 2017 (BGBl. I p. 3830)

[27] Chemikaliengesetz – ChemG (Chemicals Act)
Gesetz zum Schutz vor gefährlichen Stoffen (Law on protection against hazardous substances)
Unterteilt sich in Chemikaliengesetzt und eine Reihe von Verordnungen; hier relevant (subdivided into Chemicals Law and a series of regulations; of relevance here: Gesetz zum Schutz vor gefährlichen Stoffen Stoffen (Law on protection against hazardous substances), 2017 (BGBl. I p. 1146)

[28] Chemikalien-Verbotsverordnung – ChemVerbotsV (Chemicals Prohibition Regulation)
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8 Annex

Description of life cycle scenarios for 1 m² of modular ceiling for hygiene areas (galvanised, powder coated)

Product stage			Con-struction stage		Use stage							End-of-life stage				Benefits and loads from beyond the system boundaries
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material supply	Transport	Manufacture	Transport	Construction/Installation	Use	Inspection, maintenance, clean-ing	Repair	Exchange / Replacement	Improvement / Modernisation	Operational energy use	Operational water use	Deconstruction	Transport	Waste management	Disposal	Re-use Recovery Recycling potential
✓	✓	✓	✓	✓	—	✓	—	✓	—	✓	✓	✓	✓	✓	✓	✓

Calculation of the scenarios was based on a building service life of 50 years (in accordance with RSL of Section 4 Use stage).

The scenarios were based on information provided by the manufacturer. The scenarios were furthermore based on the research project “EPDs for transparent building components” [32].

Note: The standard scenarios selected are presented in bold type. They were also used for calculating the indicators in the summary table.

- ✓ Included in the LCA
- — Not included in the LCA

A4 Transport to the construction site

No.	Scenario	Description
A4	Direct shipment to construction site/branch	34-40 t truck (Euro 0-6 Mix), 27 t payload, 90 percent capacity used, approx. 200 km to domestic construction site

Since only one scenario is used, the results are shown in the summary table.

A5 Construction/Installation

No.	Scenario	Description
A5	Manual	According to the manufacturer, the modular ceiling for hygiene areas (galvanised, powder coated) is installed without additional lifting and auxiliary devices.

In case of deviating consumption during installation/assembly of the products which forms part of the site management, they are covered at the building level.

In the chosen scenarios environmental impacts result from the use of packaging materials.

It is assumed that the packaging material in the module construction / installation is allocated to waste handling.Waste is only thermally recycled or disposed in line with the conservative approach. Styrene, films/foils / protective covers, wood and cardboard in waste incineration plants.
Benefits from A5 are allocated to D.

Transport to the recycling plants is not taken into consideration.

Since only one scenario is used, the results are shown in the summary table.

B2 Inspection, Maintenance, Cleaning

B2.1 Cleaning

No.	Scenario	Description
B2.1.1	**Frequently manually, wetted**	**Manually using VAH listed surface disinfectants (without chloride) 25 ml/m² per cleaning operation** **Wall panels: daily, approx. 365 cleaning operations annually (456.25 l / 50 yr)** **Ceiling: every 4 weeks, approx. 52 cleaning operations annually (65 l / 50 yr)** **Floor: after each OP, approx. 1,857 cleaning operations annually (2,321.25 l / 50 yr)**
B2.1.2	Frequently manually, maximum dosage	Manually using VAH listed surface disinfectants (without chloride) 50 ml/m² per cleaning operation Wall panels: daily, approx. 365 cleaning operations annually (456.25 l / 50 yr) Ceiling: every 4 weeks, approx. 52 cleaning operations annually (65 l / 50 yr) Floor: after each OP, approx. 1,857 cleaning operations annually (2,321.25 l / 50 yr)

Ancillary materials, consumables, energy use and waste as well as transport distances during cleaning are negligible.

B2.1 Cleaning			
Environmental impacts	**Unit**	**B2.1.1**	B2.1.2
Global warming potential	kg CO_2-equiv.	**70.74**	141.49
Depletion potential of stratospheric ozone layer	kg R11-equiv.	**8.58E-12**	1.72E-11
Acidification potential of soil and water	kg SO_2-equiv.	**9.04E-2**	0.18
Eutrophication potential	kg PO_4^{3-}-equiv.	**1.22E-2**	2.45E-2
Formation potential of tropospheric ozone	kg C_2H_4-equiv.	**2.63E-2**	5.26E-2
Depletion of abiotic resources (ADP elements)	kg Sb equiv.	**1.43E-5**	2.87E-5
Depletion of abiotic resources (ADP fossil fuels)	MJ	**2,202.36**	4,404.73
Use of resources	**Unit**	**B2.1.1**	B2.1.2
Renewable primary energy as energy source	MJ	**32.02**	64.05
Renewable primary energy for material use	MJ	**0.00**	0.00
Total use of renewable primary energy	MJ	**32.02**	64.05
Non-renewable primary energy as energy source	MJ	**2,221.99**	4,443.98
Renewable primary energy for material use	MJ	**0.00**	0.00
Total use of non-renewable primary energy	MJ	**2,221.99**	4,443.98

Use of secondary materials	kg	**0.00**	0.00
Renewable secondary fuels	MJ	**1.74E-21**	3.48E-21
Non-renewable secondary fuels	MJ	**2.04E-20**	4.09E-20
Use of fresh water resources	m^3	**0.36**	0.73
Waste categories and output material flows	**Unit**	**B2.1.1**	B2.1.2
Disposed hazardous waste	kg	**5.59E-7**	1.12E-6
Disposed non-hazardous waste	kg	**0.29**	0.57
Radioactive waste	kg	**7.77E-3**	5.53E-2
Components for further use	kg	**0.00**	0.00
Materials for recycling	kg	**0.00**	0.00
Materials for energy recovery	kg	**0.00**	0.00
Exported electrical energy	MJ	**0.00**	0.00
Exported thermal energy	MJ	**0.00**	0.00

B2.2 Maintenance

No.	Scenario	Description
B2.2	Normal use (e.g. hospital and laboratory)	Annual cleaning using VAH listed surface disinfectants (without chloride) 25 ml/m² (1.25 l / 50 yr), metal cleaner 2.5 ml/m² (0.125 l / 50 yr), stainless steel care products 2.5 ml/m² (0.125 l / 50 yr) and two rinsing operations using clear water each of 25 ml/m² (1.25 l / 50 yr) as well as annual visual inspection and repair, as necessary.

Ancillary materials, consumables and waste materials as well as transport distances during maintenance are negligible. Fresh water and energy are not used for maintenance.

Since only one scenario is used, the results are shown in the summary table.

B4 Exchange / Replacement

No.	Scenario	Description
B4	Normal use and heavy use	According to the manufacturer, one replacement is planned within 50 years: complete replacement (including substructure)

The statements made in this EPD are only for information to allow evaluation at the building level.

It is assumed that one replacement will be necessary during the 30 year service life and the 50 year building service life. The environmental impacts of the selected scenario originate from the product, construction and disposal phases. Energy use, material loss and transport distances are taken into consideration.

For updated information refer to the respective instructions for assembly/installation, operation and maintenance for the modular ceiling for hygiene areas (galvanised, powder coated) at www.htgroup.de.

Since only one scenario is used, the results are shown in the summary table.

B6 Operational energy use (not relevant)

No.	Scenario	Description
B6	Hand-operated	No energy consumed when used

There is no energy used during normal use.

B7 Operational water use (not relevant)
No water consumption when used as intended. Water consumption for cleaning is specified in module B2.1.

C1 Deconstruction

No.	Scenario	Description
C1	Deconstruction	Approx. 100% of the modular systems can be reversibly deconstructed. It is conservatively assumed that 5 % of the material remains as residue in the building (disposal site).

No relevant inputs or outputs apply to the scenario selected. The energy consumed for deconstruction is negligible. Any arising consumption is marginal.

In case of deviating consumption the removal of the products forms part of the site management and is covered at the building level.

Since only one scenario is used, the results are shown in the summary table.

C2 Transport

No.	Scenario	Description
C2	Transport	Transport to collection point using 34-40 t truck (Euro 0-6 Mix), 27 t payload, 80 percent capacity used, approx. 50 km

Since only one scenario is used, the results are shown in the summary table.

C3 Waste management

No.	Scenario	Description
C3	Disposal	Share for recirculation of materials: • Steel 98 % • Aluminium 97 % • Recyclable plastics 66 % thermal recycling • Recyclable plastics 34 % material recycling • Glass 30 % • Gypsum plasterboard 25 % • Ceramic tiles 1.4 % • Remainder to disposal site

Since only one scenario is used, the results are shown in the summary table.

The below table presents the disposal processes and their percentage by mass/weight. The calculation is based on the above mentioned shares in percent related to the declared unit of the product system.

C3 Disposal	Unit	Sheet steel ceiling
Collection process, collected separately	kg	17.556
Collection process, collected as mixed construction waste	kg	0.924
Recovery system, for re-use	kg	0.000
Recovery system, for recycling	kg	16.197
Recovery system, for energy recovery	kg	0.000
Disposal	kg	2.283

C4 Disposal

No.	Scenario	Description
C4	Disposal	The non-measurable quantities and losses of the re-use/recycling chain (C1 and C3) are modelled as "disposed".

The consumption of scenario C4 results from physical pre-treatment, waste recycling and management of the disposal site. The benefits obtained here from the substitution of primary material production are allocated to module D, e.g. electricity and heat from waste incineration.

Since only one scenario is used, the results are shown in the summary table.

D Benefits and loads from beyond the system boundaries

No.	Scenario	Description
D	Recycling potential	Aluminium recyclate, excluding the recyclate used in A3 replaces 60 % of sheet aluminium Steel scrap from C3.1 excluding the scrap used in A3 replaces 60 % of sheet steel; Glass recyclate from C3.1 excluding the glass shards used in A3 replaces 60 % of container glass; Plastic recyclate from C3.1 excluding the silicone used in A3 replaces 60 % of polyethylene granules Gypsum plasterboard recyclate from C3.1 excluding the gypsum boards used in A3 replaces 60 % of gypsum boards; Ceramic recyclate from C3.1 excluding the tiles used in A3 replaces 60 % of ceramic tiles Benefits from waste incinerator: electricity replaces European electricity mix; thermal energy replaces thermal energy from European natural gas

The values in module D result from de-construction at the end of service life.

Imprint

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Notes
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