ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	Leviat GmbH
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-HAL-20230142-IBC1-EN
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Valid to	04.09.2028

HALFEN Iso-ElemenT HIT-HP/SP

Leviat GmbH

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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1. General Information

Leviat GmbH

Programme holder

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

Declaration number

EPD-HAL-20230142-IBC1-EN

This declaration is based on the product category rules:

Load-bearing thermal insulation elements, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

05.09.2023

Valid to

04.09.2028

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

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

HALFEN Iso-ElemenT HIT-HP/SP

Owner of the declaration

Leviat GmbH
Liebigstraße 14
40764 Langenfeld
Germany

Declared product / declared unit

The declared unit is one metre length of the element.
HALFEN Iso-ElemenT HIT-HP/SP depicted using the example of HALFEN Iso-ElemenT Type HIT-SP MVX-0805-20-100-cc.

Scope:

This EPD refers to the specific load-bearing thermally insulated connection element HALFEN Iso-ElemenT type HIT-SP MVX-0805-20-100-cc manufactured by Leviat.

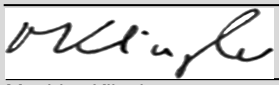
Some stainless steel components are produced at Leviat plant Artern / Germany.
Other components and assembled module units are produced at Leviat plant Kalisz / Poland. The final assembling of all module units is done at Leviat plant Artern / Germany or at Leviat plant Kalisz / Poland.

The results of this EPD and the annex can be applied to other products of the HALFEN Iso-ElemenT family.
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



Matthias Klingler,
(Independent verifier)

2. Product

2.1 Product description/Product definition

The HALFEN Iso-ElemenT HIT-HP/SP is a load bearing insulated connection element for thermal separation of reinforced concrete components such as e.g. balcony and ceiling slabs. It is used to prevent mould, to ensure increased building physical requirements and to avoid cracking due to temperature expansions. It consists of a sturdy casing box made of plastic, which is filled with mineral rock wool. In addition to the insulating effect, the mineral rock wool is used as fireproofing material so that all versions of the insulated connection element HIT-HP/SP are by default classified in the fire resistance class REI 120 according to /EN 13501-2/.

Depending on the element type the load bearings such as e.g. tension bars, compression bars or studs, shear bars and Compression-Shear-Bearings (CSB) form the statically bearing components of the system. They are arranged into the casing box in such a way that a shift in all three spatial directions can be excluded, so that the system has a high assembly security. The element type and the load-bearing level depend on the required load. The load-bearing elements and their numbers vary depending on the element type and load-bearing level.

The steel components are made of stainless steel or a combination of stainless steel and rebars. The Compression-Shear-Bearings consist of a fibre-reinforced high-performance mortar and are adapted with regard to the usage area, as well as mechanical and structural properties.

The HALFEN Iso-ElemenT HIT-HP/SP is available in the following variants:

- Joint widths: HP = 80 mm, SP = 120 mm
- Number and diameter of tension bars, compression bars / studs and shear bars
- Number of compression-shear-bearings
- Element height
- Element length
- Concrete cover

The respective variant of HALFEN Iso-ElemenT HIT is integrated in the product name and so clearly defined.
The declared product HIT-SP MVX-0805-20-100-cc in the EPD is thus characterized by:

- Joint widths: SP = 120 mm
- Number of tension bars: 8 Ø 12 mm
- Number of compression-shear-bearings: 5
- Element height: h = 20 cm
- Element length: l = 100 cm
- Concrete cover: cc ≥ 30 mm

Detailed information about HALFEN Iso-ElemenT HIT-SP MVX-0805-20-100-cc is included in the table in section 2.3. Various national and international approvals and assessments exist for products in the HALFEN Iso-ElemenT HIT-HP/SP product family, such as ETA 18/0189, Z-15.7-364; Z-15.7-336, ESR-3799, KOMO K65049 and UKTA-0836-22/6015.

The results of this EPD and the annexe can be applied to other products of the HALFEN Iso-ElemenT family.

2.2 Application

The HALFEN Iso-ElemenT HIT-HP/SP is used for static transfer of bending moments and/or shear forces and/or compression or tension forces. It is placed between the outer and inner reinforced concrete construction such that the heat flow is locally minimized, and the thermal bridges are reduced. The construction of the HALFEN Iso-ElemenTs, which is optimized for the respective application situation, ensures effective thermal insulation and impact sound reduction. This is shown with various characteristic values.

2.3 Technical Data

The detailed technical information of the individual HALFEN Iso-ElemenTs HIT-HP/SP depends on the load capacity as well as the element type and can be found in the related technical information on the website www.halfen.com.

Constructional data HIT-SP MVX-0805-20-100-cc

Name	Value	Unit
Insulation thickness type SP	120	mm
Concrete covering (cc) according to national and international standards	≥ 30	mm
Height of the element	200	mm
Length of the element	1000	mm
Fire resistance class according to EN 13501-2/	REI 120	-
Thermal conductivity of the insulation material	0.035	W/(mK)
number of tension bars (diameter 12 mm)	8	pieces / m
number of Compression-Shear-Bearing	5	pieces / m

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to e.g. ETA 18/0189, Z-15.7-364; Z-15.7-336, ESR-3799, KOMO K65049 or UKTA-0836-22/6015.

2.4 Delivery status

The declared product HALFEN Iso-ElemenT HIT-SP MVX-0805-20-100-cc is manufactured to a length of 100 cm and a height of 20 cm (further Information available in section 2.10).

2.5 Base materials/Ancillary materials

Name	Value	Unit
Tension Bars: reinforcing steel B500	41.2	%
Tension Bars: stainless steel	8.8	%
CSB: High Performance Mortar	20.2	%
CSB: End Caps – Polymers (PP)	2.3	%
Thermal insulation and fire protection material (mineral rock wool)	9.5	%
Casing box - Polymers (PVC-R, PVC)	18.0	%

The product weight with respect to the declared unit HIT-SP MVX-0805-20-100-cc is 21.42 kg.
This product / at least one partial article contains substances listed in the candidate list (17.01.2023) exceeding 0.1 percentage by mass: no.
This product / at least one partial article contains other carcinogenic, mutagenic, reprotoxic (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 materials needed for the final assembly of the HALFEN Iso-ElemenT HIT-HP/SP are manufactured in-house or purchased from qualified vendors.

The Halfen Iso-ElemenT HIT-HP/SP is constructed from a modular system of plastic enclosures with integrated heat-

insulating fire protection material. To be protected against moisture, the heat-insulating fire protection material is enclosed in the housing box from all sides.

Welded joints are made using recognised and certified welding procedures, mostly with automatic welding machines. Necessary bends, such as for the shear bars, are realised with automatic bending machines. The compression-shear bearings made of high-performance mortar are manufactured in the Leviat plant in Kalisz / Poland. A large part of the stainless steel sections of the tension and compression bars are manufactured in the Leviat plant in Artern / Germany.

The components, processed casing boxes and assembled module units are produced at Leviat plant in Kalisz / Poland.

The final assembling of all module units is done at Leviat plant in Artern / Germany, Leviat plant in Kalisz / Poland or directly by selected customers.

2.7 Environment and health during manufacturing

The criteria for environmental and energy management and the requirements for the Health and Safety at work follow all statutory requirements and Leviat standards.

Leviat GmbH has been certified according to DIN EN ISO 9001:2015, DIN EN ISO 50001:2018, DIN EN ISO 14001:2015 and DIN ISO 45001:2018 by the SWEDAC Certification Institute International GmbH.

The continuous production and product quality according the product specifications and approval specifications of HALFEN Iso-ElemenT HIT-HP/SP are ensured by an in-process quality control by Leviat and by regularly third party quality inspections by e.g. /MPA NRW/, /KIWA/ and /ICC ES certified bodies.

All types of waste such as stainless steel, reinforcing steel, mineral rock wool, plastics and wood (wood pallets and wood trimmings) that are incurred in the production of the product or remain as excess material will be separated according to type and recycled.

2.8 Product processing/Installation

The HALFEN Iso-ElemenT HIT-HP/SP is supplied as a ready to install insulated connection element. If required, the element can be cut to the required length by using of a conventional hand saw. The element is positioned in the building shell or in the precast concrete plant during or alternatively after the reinforcement installation without the use of lifting equipment. The Iso-Element has to be secured in position e.g. with existing site reinforcement and secured against slippage during subsequent concreting. No special environmental protection measures need to be taken while processing HALFEN Iso-ElemenT HIT-HP/SP.

Precast plants can buy several modules independently of a project and produce the required elements by simply assembling the boxes. All work steps in the plant are identical and at the customer's site only the boxes are assembled.

2.9 Packaging

The HALFEN Iso-ElemenT HIT-HP/SP is delivered by default stacked on wooden pallets with lateral wooden slats, secured in position with packing tape. Any use of protective foil is omitted by default. This is used only on customer request. The individual packaging materials should be separated according to their type and recycled.

2.10 Condition of use

All supplied materials are protected in the installed condition against external influences and designed for the service life of the respective construction. No risks can arise to water, air and soil if the products are used as designated.

2.11 Environment and health during use

When used as designated, there is no impact on the environment or health.

2.12 Reference service life

A service life of at least 50 years confirmed by approval test scenarios and approval procedures is applicable for HALFEN Iso-ElemenT HIT-HP/SP which are in line with the safety concepts outlined in the Eurocode or ACI. The practical service life can however be considerably longer. A further condition for the service life is that the HALFEN Iso-ElemenT HIT-HP/SP is used in accordance with the designed application.
This service life refers to a static design approach and not to a reference service life according to /ISO 15686/.
Description of the influences on the ageing of the product when applied in accordance with the rules of technology.

2.13 Extraordinary effects

Fire

All versions of HALFEN insulated connections HIT-HP/SP are classified as standard according to various approvals with a fire resistance duration of 120 minutes and are classified in accordance with /EN 13501/ in the fire resistance class REI120. HALFEN Iso-ElemenTs HIT-HP/SP are not allocated to any building material class.

Water

By regulation-conforming use of stainless steel with the corresponding bond length in the connected concrete structures and in accordance with the designed concrete cover the risk of corrosion of steel materials for the HALFEN Iso-ElemenT HIT-HP/SP is ruled out. The materials used in HIT elements do not exhibit any chemical reaction with water, are not soluble in water, and do not release any substances which may pollute water.

Mechanical destruction

In the event of unintentional mechanical destruction, there is no risk for users or the environment if the product has been installed correctly.

2.14 Re-use phase

HALFEN Iso-Element HIT-HP/SP can not be re-used but material recycling is possible.

All components of the described product can be returned and recycled into the material cycle.
In view of an efficient recycling process, it should be ensured that a separation of materials during decommissioning is possible.

2.15 Disposal

The disposal of non-recycled parts of HALFEN Iso-ElemenT HIT-HP/SP can be disposed of at any waste disposal site with the appropriate waste number /EWC 191001/ (for steel components) or /EWC 170904/ (for other components) according to the European Waste Code of the European Waste Catalogue.

2.16 Further information

Other information on the product is available at www.halfen.com.

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is 1 m length of load bearing thermal insulation element HALFEN Iso-ElemenT Type HIT-SP MVX-0805-20-100-cc.
The calculation of the average of two production sites is based on actual production volumes.

Declared unit

Name	Value	Unit
Declared unit	1	m
linear density	21.42	kg/m

3.2 System boundary

Type of the EPD: cradle-to-gate - with options, modules C1-C4 and module D (A1-A3 + C + D and additional modules: A4, A5).
Production Stage (A1-A3): The Product stage includes:

- A1 Raw material supply and processing (mainly steel and PVC-parts),
- A2 Transport of raw materials to the manufacturer,
- A3 Production of HIT-HP/SP in the factory, (incl. energy provision, water provision, treatment of production waste, production of packaging materials)

Construction stage (A4-A5): The construction process stage includes:

- A4 transport to the construction site 100km by truck,
- A5 Disposal of the packaging after installation of the HIT-HP/SP

End-of-life stage (C1-C4): The end-of-life stage includes:

- C1 machine-assisted de- construction (demolition excavator - diesel-powered)
- C2 transport to waste processing; 50 km by truck. Transport distance can be adjusted at building level if necessary (e.g., for 100 km actual transport distance: multiply LCA values by factor 2).
- C3 waste processing for incineration of plastic components, recycling of metals
- C4 disposal of inert material (except metals)

Benefits and loads beyond the System Boundary (D):
Module D includes:
Material recovery potentials from metal recycling and energy recovery potentials from the thermal recycling of the mixed plastic waste.

3.3 Estimates and assumptions

Assumptions are made considering the following processes:
The steel fibres of the high-performance mortar are estimated with reinforcement steel.
The recycling process of PVC production waste is approximated with the recycling process of PET.

Crystal Water corresponds to 10% of mineral inputs in Mortar.

3.4 Cut-off criteria

In this assessment all data for the production process is considered. This includes input flows with a contribution of less than 1 % of mass or energy. The transport expenditure for all raw materials is considered. Impacts relating to the production of machines and facilities required during production are outside the scope of this assessment. The impacts arising from the dismantling of the products from the building structure (separating concrete, metal and other building materials) are not considered. The impacts are estimated to contribute less than 1% to the overall result.
Production of capital equipment, facilities and infrastructure required for manufacture are outside the scope of this assessment.
Transport processes for the packaging materials are neglected.

The impacts are estimated to contribute less than 1% to the overall result.

3.5 Background data

For modelling the life cycle of the declared product, the Life Cycle Assessment software GaBi developed by Sphera GmbH is used.
The underlying database is GaBi 2022, version 2022.2

3.6 Data quality

The data quality can be described as good. The primary data collection was done thoroughly, all flows were considered. Technological, geographical and temporal representativeness is given. Primary data refers to the year 2021. The background data have been taken from the GaBi databases. The last update of the databases has taken place in 2022.

3.7 Period under review

The period under review is the year 2021.

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

Information about the allocation procedure of single datasets is documented in https://gabi.sphera.com/databases/gabi-data-search/

Allocation in the foreground data: The production process does not deliver any co-products. The applied software model does not contain any allocation.

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 used database is GaBi 2022, version 2022.2.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	0.277	kg C

Information on describing the biogenic Carbon Content at factory gate

Transport from the gate to the site (A4)

Name	Value	Unit
Transport distance	100	km

Assembly (A5)

Module A5 includes the treatment and disposal of packaging material.
Credits for potential avoided burdens due to energy substitution of electricity and thermal energy generation are declared in module D and affect only the rate of primary material (no secondary materials).

Name	Value	Unit
Output substances following waste treatment on site (pallets and carton)	0.6	kg

End of life (C1-C4)

The product dismantling from the building is done with a machine.

Name	Value	Unit
Recycling (Steel)	10.7	kg
Energy recovery	4.34	kg
Landfilling	6.38	kg
Transport distance	50	km

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

Collection rate is 100%

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5. LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = 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	X	X	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1m HIT-SP MVX-0805-20-100-cc, based on the declared components in the public annex of the EPD, other product variations can be calculated.

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	2.88E+01	1.44E-01	1.03E+00	1.4E-02	7.29E-02	1.15E+01	9.26E-02	-6.18E+00
GWP-fossil	kg CO_2 eq	2.98E+01	1.43E-01	1.55E-02	1.39E-02	7.13E-02	1.15E+01	9.52E-02	-6.2E+00
GWP-biogenic	kg CO_2 eq	-8.91E-01	4.64E-04	1.02E+00	0	1.16E-03	1.51E-03	-2.82E-03	1.62E-02
GWP-luluc	kg CO_2 eq	1.8E-02	9.63E-04	2.06E-06	9.01E-05	4.82E-04	7.76E-04	1.76E-04	-3.72E-03
ODP	kg CFC11 eq	7.05E-10	1.4E-14	8.15E-14	1.31E-15	7.02E-15	9.66E-12	2.24E-13	-2.3E-11
AP	mol H^+ eq	1.01E-01	1.6E-04	1.54E-04	6.73E-05	8.02E-05	2.7E-03	6.75E-04	-3.07E-02
EP-freshwater	kg P eq	5.25E-05	5.11E-07	1.94E-08	4.78E-08	2.55E-07	2.46E-06	1.61E-07	-3.09E-06
EP-marine	kg N eq	1.7E-02	5.18E-05	5.03E-05	3.15E-05	2.59E-05	8.67E-04	1.73E-04	-3.71E-03
EP-terrestrial	mol N eq	2.26E-01	6.2E-04	7.31E-04	3.49E-04	3.1E-04	1.11E-02	1.9E-03	-4.3E-02
POCP	kg NMVOC eq	6.21E-02	1.38E-04	1.36E-04	8.8E-05	6.9E-05	2.51E-03	5.25E-04	-1.07E-02
ADPE	kg Sb eq	2.61E-04	1.44E-08	1.99E-09	1.35E-09	7.21E-09	2.37E-07	9.76E-09	-1.34E-04
ADPF	MJ	5.15E+02	1.88E+00	2.25E-01	1.76E-01	9.38E-01	1.8E+01	1.25E+00	-1.03E+02
WDP	m^3 world eq deprived	3.29E+00	1.6E-03	1.13E-01	1.5E-04	8E-04	9.13E-01	1.04E-02	-1.48E+00

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: 1m HIT-SP MVX-0805-20-100-cc, based on the declared components in the public annex of the EPD, other product variations can be calculated.

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	8.93E+01	1.3E-01	1E+01	1.22E-02	6.5E-02	4.78E+00	1.87E-01	-1.56E+01
PERM	MJ	9.98E+00	0	-9.98E+00	0	0	0	0	0
PERT	MJ	9.93E+01	1.3E-01	2E-02	1.22E-02	6.5E-02	4.78E+00	1.87E-01	-1.56E+01
PENRE	MJ	3.89E+02	1.88E+00	2.25E-01	1.76E-01	9.42E-01	1.45E+02	1.25E+00	-1.04E+02
PENRM	MJ	1.27E+02	0	0	0	0	-1.27E+02	0	0
PENRT	MJ	5.16E+02	1.88E+00	2.25E-01	1.76E-01	9.42E-01	1.8E+01	1.25E+00	-1.04E+02
SM	kg	1.14E+01	0	0	0	0	0	0	-6.53E-01
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	1.38E-01	1.5E-04	2.64E-03	1.41E-05	7.51E-05	2.35E-02	3.17E-04	-5.53E-02

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: 1m HIT-SP MVX-0805-20-100-cc, based on the declared components in the public annex of the EPD, other product variations can be calculated.

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	3E-04	9.97E-12	2.17E-11	9.33E-13	4.99E-12	1.4E-09	6.41E-11	-9.86E-09
NHWD	kg	1.68E+00	3.07E-04	7.8E-03	2.87E-05	1.53E-04	6.13E+00	6.39E+00	-7.64E-01
RWD	kg	2.21E-02	3.5E-06	1.33E-05	3.27E-07	1.75E-06	5.72E-04	1.39E-05	-6.27E-03
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	6.17E-03	0	0	0	0	1.07E+01	0	0

MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	0	1.57E+00	0	0	1.33E+01	0	0
EET	MJ	0	0	2.82E+00	0	0	2.42E+01	0	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:
1m HIT-SP MVX-0805-20-100-cc, based on the declared components in the public annex of the EPD, other product variations can be calculated.

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	1.3E-06	1.1E-09	7.55E-10	7.64E-10	5.5E-10	6.67E-08	8.31E-09	-4.64E-07
IR	kBq U235 eq	3.12E+00	5.28E-04	2.18E-03	4.94E-05	2.64E-04	6.37E-02	1.54E-03	-9.79E-01
ETP-fw	CTUe	2.44E+02	1.33E+00	9.92E-02	1.24E-01	6.65E-01	1.5E+01	6.99E-01	-4.78E+01
HTP-c	CTUh	2.79E-06	2.74E-11	6.76E-12	2.56E-12	1.37E-11	6.05E-10	1.07E-10	-8.68E-09
HTP-nc	CTUh	9.55E-07	1.48E-09	2.36E-10	1.61E-10	7.42E-10	6.38E-08	1.18E-08	-1.46E-08
SQP	SQP	3.53E+02	7.94E-01	6.66E-02	7.43E-02	3.97E-01	4.13E+00	2.59E-01	-9.84E+00

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

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

6. LCA: Interpretation

The most important life cycle phase for HALFEN Iso-ElemenT HIT-HP/SP is the manufacturing phase. With regard to the manufacturing phase, the upstream processes of PVC-UR and reinforcing steel dominate all the indicators. Reinforcing steel has a relevant influence on resource use, minerals and metals impact category. PVC-UR has a significant influence on ozone depletion. The biogenic global warming potential shows the absorption of atmospheric carbon dioxide during plant growth in connection with packaging (wooden pallets and wooden packaging).

7. Requisite evidence

No evidence required.

8. References

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Publisher

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

thinkstep AG
Hauptstrasse 111- 113
70771 Leinfelden-Echterdingen
Germany

+49 711 341817-0
info@thinkstep.com
www.thinkstep.com

Sphera Solutions GmbH
Hauptstraße 111- 113
70771 Leinfelden-Echterdingen
Germany

+49 (0)711 341817-0
info@sphera.com
www.sphera.com

Owner of the Declaration

Leviat GmbH
Liebigstraße 14
40764 Langenfeld
Germany

+49 2173 970-0
info.de@leviat.com
https://www.leviat.com/