ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	Hilti Aktiengesellschaft
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-HIL-20230140-IBA1-EN
Issue date	28.06.2023
Valid to	27.06.2028

HUS4-MAX and KHC

Hilti AG

Institut Bauen und Umwelt e.V.

www.ibu-epd.com | https://epd-online.com

ECO PLATFORM EPD VERIFIED

safe set

1. General Information

Hilti AG

Programme holder

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

Declaration number

EPD-HIL-20230140-IBA1-EN

This declaration is based on the product category rules:

Reaction resin products, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

28.06.2023

Valid to

27.06.2028

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

Dipl.-Ing. Hans Peters
(Managing Director Institut Bauen und Umwelt e.V.)

HUS4-MAX and KHC

Owner of the declaration

Hilti Aktiengesellschaft
Feldkircher Strasse 100
9494 Schaan
Liechtenstein

Declared product / declared unit

The
declared products are HILTI's HUS4-MAX and KHC adhesive capsules. The declared unit is one kilogram of reaction resin product in the mixing ratio of the two components necessary for processing. The packaging is also included in the calculation. The declared unit is stated in [kg].

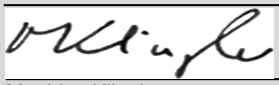
Scope:

This document refers to the adhesive capsules HUS4-MAX and KHC with their packaging. For the compilation of the life cycle assessment, specific data were collected from the factory in Kaufering, Germany, of the HILTI AG. For the compilation of the life
cycle assessment, specific data were collected from the factory in Kaufering, Germany, of the HILTI AG. Data from the years 2018 to 2021 are used, which correspond to the annual average.
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 declared products of HUS4-MAX and KHC adhesive capsules are two-component construction adhesives used in combination with mechanical screw anchors in Hilti's HUS4-MAX and Kwik-X Dual Anchor Action systems. Component A comprises a resin based on methacrylate as well as mineral filler. Component B comprises peroxide hardener, water and mineral filler.
During the setting of a mechanical screw anchor in a borehole containing the adhesive capsule, the capsule foil is pierced to allow mixing of the two individual components which subsequently enables the A component to polymerase via radicals released by the B component in a so-called chain reaction. As a result a homogeneously cured mortar with excellent proven mechanical properties, durability and bond strength arises over a very short curing time.
Composite foils are used for the HUS4-MAX and the KHC capsules. This kind of packaging serves the following purposes: waste volume reduction, easy storage and transport, less packaging material.
The reaction resins used in Hilti adhesive capsules contain no styrene, are practically odourless and have a considerably higher flash point, i.e. higher than 100° C. For the placing of the product on the market in the European Union European Free Trade Association EU/EFTA) (with the exception of Switzerland) the *Regulation (EU) No. 305/2011 (CPR)* applies. The product needs a declaration of performance taking into consideration the following European Technical Approval

ETA 18/1160

and the CE marking. For the application and use the respective national provisions apply.

2.2 Application

The Hilti HUS4-MAX and KHC adhesive capsules together with the Hilti mechanical anchors form the integrated Hilti HUS4-MAX / Kwik-X Dual Action Anchor system which is used for fastenings of steel fixtures and machinery in cracked and uncracked concrete. The adhesive capsules in the Dual Action Anchor system fill any voids around the screw anchor in the borehole which results in a better load transfer to the concrete base material and thus in higher tensile loads. The HUS4-MAX / Kwik-X Dual Action Anchor system with the HUS4-MAX / KHC capsule is ICC-ES approved for cracked and uncracked concrete and all seismic design categories A-F. The adhesive capsules are components of the Hilti SAFEset concept. It significantly improves the robustness of fastening and dramatically reduces the possibilities of error during installation. As part of SAFEset the HUS4-MAX / Kwik-X Dual Action Anchor system – comprising adhesive capsule and screw anchor - can be installed with approved Hilti Hollow Drill bits and vacuum cleaners that drill and clean the hole in one step for virtually dust-free installation. Alternatively, it can be installed in an uncleaned borehole if the drilling depth including a specified overdrilling as described in the Instructions for Use is adhered to. The preconfigured HUS4-MAX / KHC capsule assures that there is the right amount of adhesive used for the fastening point (no under- or over-fill), thus reducing under-filling-related risks and eliminating adhesive wastage.

2.3 Technical Data

Constructional data

Name	Value	Unit
Density (calculated value of uncured mortar (@ 20°)	1124	kg/m^3
Compressive strength (@23° C / 50 % humidity) acc. to EN ISO 604	90.5	N/mm^2
Compressive modulus (@23° C / 50 % humidity acc. to EN ISO 604	1240	N/mm^2

Hilti HUS4-MAX / KHC display the following characteristics:

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to

ETA 18/1160
ICC ESR-5065

Shelf life:
18 months
Substrate temperature at installation:
+5° C to +40° C / +41° F to 104° F

Curing time (base material temperature at installation):
-28° C to -10° C / -18° F to +14° F 24 h
> -10° C to +5° C / > 14° F to +41° F 30 min
> +5° C to +40° C / > +41° F to +104° F 0.5 min

2.4 Delivery status

The product Hilti HUS4-MAX is available in M10, M12, M14 and M16 foil capsules.
The product Hilti KHC is available in 3/8" SMALL, 3/8" LARGE, 1/2" SMALL, 1/2" LARGE, 3/4" SMALL, 3/4" LARGE, 5/8" SMALL, 5/8" LARGE foil capsules.

2.5 Base materials/Ancillary materials

Hilti HUS4-MAX and Hilti KHC are supplied in the form of capsules. Product curing commences directly after the components are mixed by drilling the capsule inside of the borehole.
The products reviewed in the EPD contain the following component values:

Component A:
Methacrylate resin mixture: 90 to 100 % by weight
Silica: 1 to 5 % by weight
Other: none

Component B:
Water: 70 to 80 % by weight
Dibenzoyl peroxide: 10 to 20 % by weight
Other: <5 % by weight

This product
article contains substances listed in the *candidate list* (date: 20.01.2023) exceeding 0.1 percentage by mass: no.

This product
The 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 *Regulation (EU) No. 528/2012* on biocidal products: no.

2.6 Manufacture

All raw materials are sourced in Europe or Asia. The transport is exclusively by truck for the European raw materials, and by truck and by ship for the others. Chemical mortars are usually two-component systems consisting of a binder and a hardener. One of the base components of the binder is the reactive resin which in the case of HUS4-MAx and KHC is produced in Kaufering.
The resin production process is a chemical reaction of the corresponding educts to a basic resin with subsequent mixing of the basic resin with different reactive diluents to a reactive resin. This process is controlled and monitored by process control technology.
The production of chemical mortars consists of a mixing process and a filling process of the respective single components (binder and hardener) and their subsequent union to a two-component system (packaging). Here as well process control technology is used to weigh and mix solid and liquid compounds according to the specification. In the next step both well-mixed components run through an
automized filling line in which each of the processed masses is filled into a tubular foil bag. Finally, the single components are combined in one packaging unit. The two-pack foil bags are packed into cardboard boxes and then finally shipped.

The manufacturing plant of HUS4-MAX and KHC, Hilti GmbH Industriegesellschaft für Befestigungstechnik, Hiltistr. 6, 86916 Kaufering, Germany, is certified according to *ISO 9001*. The guideline defines international standards for quality and process management.

2.7 Environment and health during manufacturing

The manufacturing plant of HUS4-MAX and KHC,Hilti GmbH Industriegesellschaft für Befestigungstechnik, Hiltistr. 6, 86916 Kaufering, Germany, is certified according to *ISO 14001* which defines international standards for sustainable environmental management.

The production site is also certified in accordance with *ISO 50001* Energy Management Systems.

2.8 Product processing/Installation

The product is delivered with Instructions for Use explaining the basic steps for installation:
1) For safe handling the precautionary measures described in the Safety Data Sheet (SDS) (e.g. hand and eye protection) must be adhered to
2) Select the correct capsule size based on the diameter of the screw anchor and the embedment depth
2) Insert the capsule into the borehole
3) Mixing the two components of the capsule by driving the screw anchor with a suitable impact wrench into
the borehole

After mixing the components of the HUS4-MAX / KHC capsule in the borehole partial load (not exceeding the load capacity of the screw anchor) can be applied immediately. The full load up to the capacity of the HUS4-MAX / Kwik-X Dual Action Anchor system can be applied after the curing time of the HUS4-MAX / KHC adhesive mentioned in the Instructions for Use.

2.9 Packaging

The Hilti HUS4-MAX / KHC adhesive foil capsules are installed and remain in the borehole. Thus, no waste is remaining after use on the construction site. The sales packaging consisting of a cardboard box designed according to the product size and packaging quantity and can be recycled. Packaging contaminated by the product must be disposed in a safe manner in accordance with local / national regulations.

2.10 Condition of use

During the installation the temperature of the concrete base material must be between -28° C (-18° F) and +40° C (+104° F). The temperature of the HUS4-MAX / KHC adhesive capsule should be between +5° C (+41° F) to +25°C (+77° F) during storage and +5° C (+41° F) to +40° C (+104° F) during installation. Hilti literature and official approvals must always be considered. The two components of HUS4-MAX / KHC are only for use in combination with the defined volume ratio and under the conditions mentioned above to build up a crosslinked duromer.

2.11 Environment and health during use

Refer to the Safety Data Sheet (SDS) for detailed information on handling, storage as well as first aid, firefighting and accidental release measures and disposal considerations. Following the given instructions help to minimize the risk to health and environment.

2.12 Reference service life

Hilti HUS4-MAX and KHC are exposed to a wide variety of environmental factors during the use phase. The anticipated Reference Service Life depends on the specific installation situation and the product exposure scenario. The main factors influencing the period of use involve weathering as well as mechanical loads and chemical exposure.
Description of the influences on the ageing of the product when applied in accordance with the rules of technology.

2.13 Extraordinary effects

Fire

Even without any special fire safety features HUS4-MAX and KHC comply with at least the requirements of the *DIN EN 13501-1* standard for fire classes E and Efl. As crosslinked methacrylate resins do not melt or drip, the resins do not contribute towards spreading fire. Apart from the common combustion that produces carbon monoxide and carbon dioxide, fire gases can contain traces of methyl methacrylate, esters, alcohol, and hydrocarbons. Due to the quantities used, they only have a subordinate influence on the fire characteristics of a building structure in which they have been installed.

Fire protection

Name	Value
Building material class	E/Efl
Burning droplets	No performance assessed
Smoke gas development	No performance assessed

Water

The cured products are chemically inert and insoluble in water. HUS4-MAX and KHC are certified for use as an anchoring adhesive in concrete for water treatment applications according to National Sanitation Foundation (US) *NSF*.

Mechanical destruction

It is recommended to use dust protection during the demolition of the cured chemical anchor.

2.14 Re-use phase

The product cannot be reused. After usage the product can be removed by demolition.

2.15 Disposal

Uncured Hilti HUS4-MAX and KHC can be disposed according to the *European waste code* 08 04 09* or 20 01 27*. The built-in cured anchor can be disposed as construction waste for which the *European waste code* 17 01 01 applies.

2.16 Further information

Further information is available on request under anchor.hse@hilti.com and on the Hilti website: www.hilti.group

3. LCA: Calculation rules

3.1 Declared Unit

The notified product is an injection mortar of HILTI AG with the designation HUS4-MAX 12 as a representative product from the HUS4-MAX and KHC portfolio, as only the packaging proportions change per 1 kilogram of injection mortar. The declared unit refers to 1 kg of reaction resin product in the mixing ratio of the two components required for processing. The packaging, related to 1 kg injection mortar, is additionally included in the calculation with 0.355 kg. The following table shows the data of the declared unit.

Declared unit

Name	Value	Unit
Declared unit	1	kg
Conversion factor to 1 kg	1	

3.2 System boundary

Type of EPD:
cradle to gate with options.The following information modules are defined as system boundaries in this study:

Production stage (A1- A3):

• A1, raw material extraction,

• A2, transport to manufacturer,

• A3, manufacture.

End of life
(C1- C4):

• C1, dismantling/demolition,

• C2, transportation,

• C3, waste treatment,

• C4, elimination.

Reuse, recovery
and recycling potential (D)

In order to precisely record the indicators and environmental impacts of the declared unit, a total of 8 information modules are considered. The information modules A1 to A3 describe the provision of materials, the transport to the production site and the production processes of the product itself.

The primary products are sourced from the European Union and Asia .Transport is by truck and ship. The following flow charts illustrate the underlying production process.

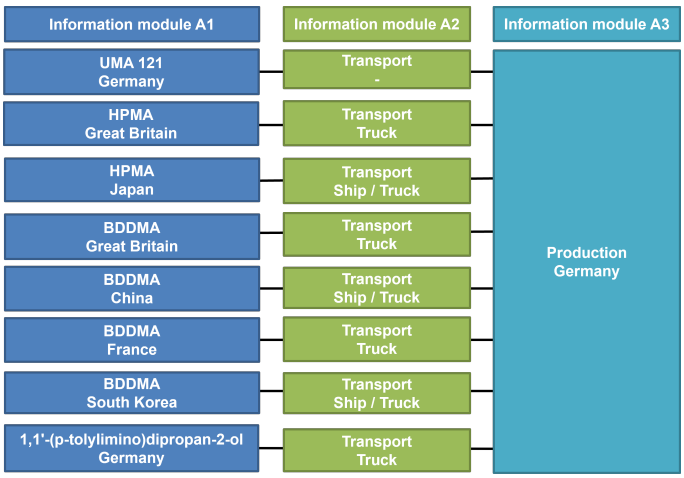


Illustration 1: Information module A1 to A3 of product (part 1)

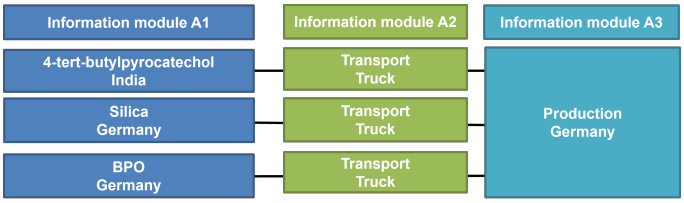


**Illustration 2:
Information module A1 to A3 of product (part 2)**

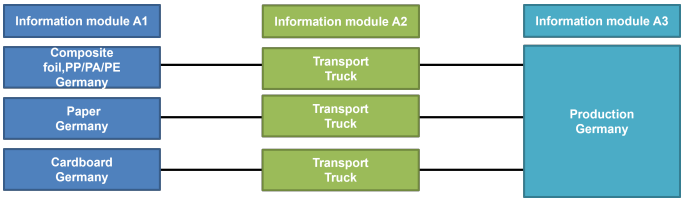


**Illustration 3:
Information module A1 to A3 of packaging**

In the information modules C1 to C4, the deconstruction or demolition from the building, the transport to waste disposal, the waste treatment and disposal of the product are recorded. Furthermore, reuse, recovery and recycling potentials are shown in information module D.

3.3 Estimates and assumptions

The electricity mixes and other background data are calculated country-specifically for the production processes.
No assumptions or restrictions were made for the recipe contents or processes.

3.4 Cut-off criteria

All energy and mass inputs were taken into account.The cut-off criterion according to EN *15804+A2* is not applied.

3.5 Background data

The database of the background data of the *LCA for Experts* and *ecoinvent 3.8* databases, to which this study also refers, is documented under the following link. (Sphera)

3.6 Data quality

For the preparation of the life cycle assessment, the annual average consumption of HILTI AG from the Kaufering plant in Germany was collected. The background data from the *LCA for Experts* database are from the year 2023 and are therefore highly relevant. The masses of the various components of the reaction resin mixture are taken from the recipe data. The data quality is rated as sufficient.

3.7 Period under review

The input and output flows used in this calculation are annual average consumptions from 2018 to 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: Germany

3.9 Allocation

Allocation of co-products takes place in the information modules A1-A3. The production waste of the injection-moulded components is thermally recovered. The electrical and thermal energy credits resulting therefrom are completely charged in modules A1-A3. No further allocations are made.

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 database with background data from the *LCA for Experts* and *ecoinvent 3.8* databases, to which this study also refers

4. LCA: Scenarios and additional technical information

Characteristic product properties biogenic carbon

No renewable raw materials are used in the product. Therefore, the biogenic carbon is shown as zero. The following raw materials contain biogenic carbon in the packaging.

Information on describing the biogenic Carbon Content at factury gate

Name	Value	Unit
Packaging Cardboard Box	0,081	kg C
Packaging Paper	0,027	kg C

Information on packaging

Name	Value	Unit
Composite foil PP/PA/PE	0,1017	kg
Paper	0,0639	kg
Cardboard box	0,1902	kg

End of life (C1-C4)

The product is demolished using an electric chisel. The electrical energy consumption for the tool is assumed to be 0.05 MJ for the declared unit. The electricity consumption is calculated with a European electricity mix. The construction waste is transported by truck 50 km to the waste treatment plant. The construction waste is shredded in the waste treatment plant and then dumped.

Name	Value	Unit
Collected as mixed construction waste	1	kg
Crushing in the shredder	1	kg
Landfilling	1	kg

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

In this calculation there are no reuse, recovery and recycling potentials. Therefore, the information module D is declared and shown as zero.

Name	Value	Unit
Reuse, recovery and recycling potentials	0	kg

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

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 kg HILTI HUS4-MAX 12

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Global Warming Potential total (GWP-total)	kg CO_2 eq	6.21E+00	5.12E-03	3.76E-03	2.68E-03	1.49E-02	0
Global Warming Potential fossil fuels (GWP-fossil)	kg CO_2 eq	6.21E+00	5.12E-03	3.74E-03	2.67E-03	1.49E-02	0
Global Warming Potential biogenic (GWP-biogenic)	kg CO_2 eq	0	0	0	0	0	0
Global Warming Potential luluc (GWP-luluc)	kg CO_2 eq	3.71E-03	1.08E-06	2.07E-05	1.23E-05	2.75E-05	0
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	1.59E-07	7.5E-14	2.22E-16	3.97E-15	3.51E-14	0
Acidification potential of land and water (AP)	mol H^+ eq	2.86E-02	1.12E-05	1.17E-05	1.38E-05	1.06E-04	0
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	8.81E-04	1.49E-08	1.11E-08	7.66E-09	2.53E-08	0
Eutrophication potential aquatic marine (EP-marine)	kg N eq	5.92E-03	2.52E-06	5.37E-06	6.29E-06	2.71E-05	0
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	5.42E-02	2.65E-05	6.01E-05	6.95E-05	2.97E-04	0
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	1.75E-02	6.82E-06	1.05E-05	1.71E-05	8.22E-05	0
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	8.85E-05	1.4E-09	3.1E-10	2.96E-09	1.53E-09	0
Abiotic depletion potential for fossil resources (ADPF)	MJ	1.18E+02	9.29E-02	4.96E-02	5.21E-02	1.95E-01	0
Water use (WDP)	m^3 world eq deprived	2.69E+00	1.17E-03	3.33E-05	5.15E-04	1.64E-03	0

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 kg HILTI HUS4-MAX 12

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier (PERE)	MJ	1.19E+01	5.16E-02	2.82E-03	4.19E-03	2.93E-02	0
Renewable primary energy resources as material utilization (PERM)	MJ	3.81E+00	0	0	0	0	0
Total use of renewable primary energy resources (PERT)	MJ	1.57E+01	5.16E-02	2.82E-03	4.19E-03	2.93E-02	0
Non renewable primary energy as energy carrier (PENRE)	MJ	1.06E+02	9.3E-02	4.97E-02	5.23E-02	1.96E-01	0
Non renewable primary energy as material utilization (PENRM)	MJ	1.24E+01	0	0	0	0	0
Total use of non renewable primary energy resources (PENRT)	MJ	1.18E+02	9.3E-02	4.97E-02	5.23E-02	1.96E-01	0
Use of secondary material (SM)	kg	2.8E-01	0	0	0	0	0
Use of renewable secondary fuels (RSF)	MJ	0	0	0	0	0	0
Use of non renewable secondary fuels (NRSF)	MJ	0	0	0	0	0	0
Use of net fresh water (FW)	m^3	7.03E-02	4.92E-05	3.19E-06	1.46E-05	4.97E-05	0

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 kg HILTI HUS4-MAX 12

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	8.28E-08	8.04E-12	2.38E-13	6.53E-13	1.01E-11	0
Non hazardous waste disposed (NHWD)	kg	4.43E-02	7E-05	7.13E-06	1.39E-05	1E+00	0
Radioactive waste disposed (RWD)	kg	1.09E-03	1.49E-05	6.13E-08	6.88E-07	2.18E-06	0
Components for re-use (CRU)	kg	0	0	0	0	0	0
Materials for recycling (MFR)	kg	0	0	0	0	0	0
Materials for energy recovery (MER)	kg	0	0	0	0	0	0
Exported electrical energy (EEE)	MJ	0	0	0	0	0	0
Exported thermal energy (EET)	MJ	0	0	0	0	0	0

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 kg HILTI HUS4-MAX 12

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Incidence of disease due to PM emissions (PM)	Disease incidence	ND	ND	ND	ND	ND	ND
Human exposure efficiency relative to U235 (IR)	kBq U235 eq	ND	ND	ND	ND	ND	ND
Comparative toxic unit for ecosystems (ETP-fw)	CTUe	ND	ND	ND	ND	ND	ND
Comparative toxic unit for humans (carcinogenic) (HTP-c)	CTUh	ND	ND	ND	ND	ND	ND
Comparative toxic unit for humans (noncarcinogenic) (HTP-nc)	CTUh	ND	ND	ND	ND	ND	ND

Soil quality index (SQP)	SQP	ND	ND	ND	ND	ND	ND

The secondary material (SM) used leads from paper production.

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 or as there is limited experienced with the indicator.

6. LCA: Interpretation

Dominance analysis All modules

The dominance analysis shows that the main causes of environmental impacts and indicators are to be found in information module A1. This can be seen in the total global warming potential for material supply with approx. 93%, related to all information modules. For the total non-renewable primary energy, the value is approx. 96%. Modules C1 to C4 are negligible in this analysis, accounting for approx. 1% of the total global warming potential.

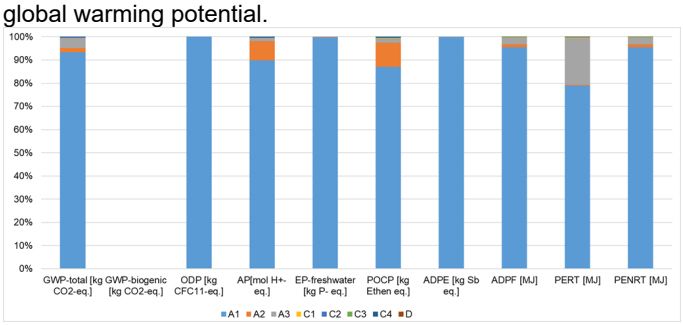


Illustration:Dominance analysis A1- A3

Dominance analysis A1

If we look at the material supply of the reaction resin mixture and the packaging in detail, it becomes clear which raw materials contribute decisively to the respective environmental impacts and indicators.

The reaction resin mixture itself accounts for 92% of the total global warming potential in information module A1. The cardboard box accounts for approx. 3% and the composite foil for approx. 3%.

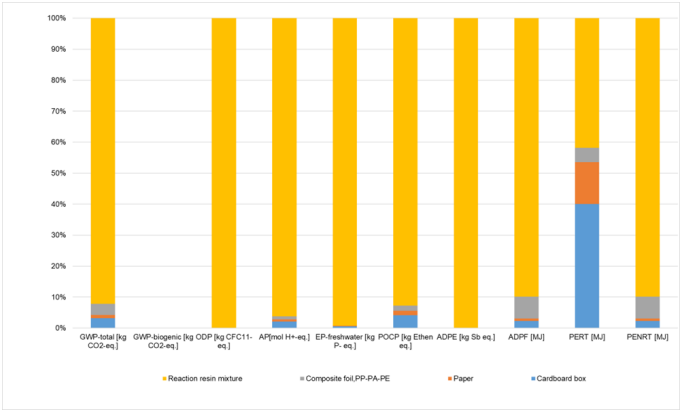


Illustration:Dominance analysis A1

Dominance analysis A1, reaction resin mixture

Within the reaction resin mixture itself, the material supply of the Butanedioldimethacrylate (BDDMA) generates approx. 75% of the total global warming potential and approx. 72% of the total non-renewable primary energy. The UMA 121 has a share of approx. 15% of the total greenhouse gas emissions and approx. 18% of the total non-renewable primary energy.

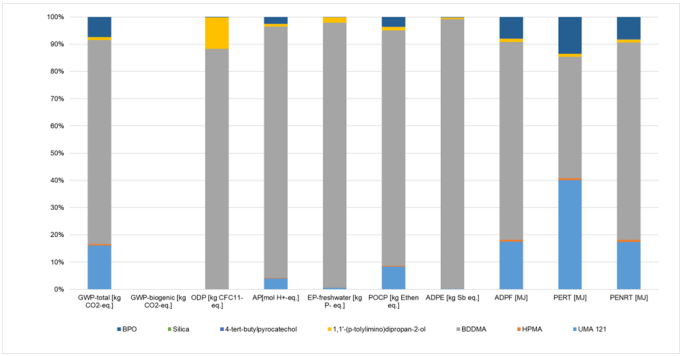


Illustration:Dominance analysis A1, reaction resin mixture

As this is a representative product for a portfolio, the environmental impact of the packaging may change. The environmental impact of the reaction resin on 1kg does not change.

7. Requisite evidence

Hilti HUS4-MAX complies with the requirements of

· *DIBt (2010)* in combination with the NIK values from *AgBB (2021)* for applications in interior areas,

· emission class A+ outlined in the *French VOC Directives (2019)* in accordance with the *Eurofins attestation*,

· *CDPH/EHLB* Standard Method V 1.2 (2017) in accordance with *Eurofins test report, No. 392-2021-00413604_CA_EN*, *Eurofins test report, No. 392-2021-00413604_E_EN* and *Eurofins test report, No. 392-2021-00413602_H_EN* respectively.

Hilti KHC complies with the requirements of
· *CDPH/EHLB* Standard Method V 1.2 (2017) in accordance with *Eurofins test report, No. 392-2021-00413602_H_EN*.

AgBB overview of results (28 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	<1000	µg/m^3
Sum SVOC (C16 - C22)	<100	µg/m^3
R (dimensionless)	<1	-
VOC without NIK	<100	µg/m^3
Carcinogenic Substances	<1	µg/m^3

8. References

EN ISO 604
EN ISO 604: 2003-12, Kunststoffe - Bestimmung von Druckeigenschaften

EN 13501-1
EN 13501-1: 2019-05, Klassifizierung von Bauprodukten und Bauarten zu ihrem Brandverhalten - Teil 1: Klassifizierung mit den Ergebnissen aus den Prüfungen zum Brandverhalten von Bauprodukten

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

ISO 14001
ISO 14001: 2015-09, Umweltmanagementsysteme - Anforderungen mit Anleitung zur Anwendung

ISO 14025
DIN EN /ISO 14025:2011-10/, Environmental labels and declarations — Type III environmental declarations — Principles and procedures

ISO 50001
ISO 50001: 2018-08, Energiemanagementsysteme - Anforderungen mit Anleitung zur Anwendung

ISO 9001
ISO 9001: 2015-11, Qualitätsmanagementsysteme - Anforderungen

AgBB (2021)
Vorgehensweise bei der gesundheitlichen Bewertung der Emissionen von flüchtigen organischen Verbindungen (VVOC, VOC und SVOC) aus Bauprodukten (2021)

Candidate List of substances of very high concern for Authorisation
European Cheminals Agency (ECHA), in accordance with Article 50(10) of the REACH regulation

CDPH/EHLB/Standard Method V1.2
California CDPH Standard Method is a US standard for evaluating and restricting VOC emissions to indoor air. Developed in California as "Section 01350" Specification, several systems in the US refer to CDPH Standard Method

Calculation rules: PCR - Part A
Institut Bauen und Umwelt e.V. (IBU), 2022. Product Category Rules for Building-Related Products and Services. Part A: Calculation rules for the life cycle assessment and requirements on the project report. Version 1.3 (08.2022)

DIBt (2010)
Grundsätze zur gesundheitlichen Bewertung von Bauprodukten in Innenräumen (Oktober 2010)

ecoinvent 3.8
Backgroun data: ecoinvent 3.8
Zürich:
ecoinvent
http://www.ecoinvent.org
(10.05.2023)

ETA 18/1160
European Technical Approval Hilti HUS4

Eurofins test report, No. 392-2021-00413604_CA_EN
VOC test report for verification of compliance with DIBt(2010)/AgBB(2021)

Eurofins test report, No. 392-2021-00413604_E_EN
VOC test report for verification of compliance with the French directive from 2010

Eurofins test report, No. 392-2021-00413602_H_EN
VOC test report for verification of compliance with CDPH/EHLB/Standard Method V1.2 from 2017

European Waste code
in accordance with the European Waste Catalogue (EWC) (EWC 2014/955/EU) Commission Decision amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council

French VOC Directives
Décret no 2011321 du 23 mars 2011 relatif à l'étiquetage des produits de construction ou de revêtement de mur ou de sol et des peintures et vernis sur leurs émissions de polluants volatils Arrêté du 19 avril 2011 relatif à l'étiquetage des produits de construction ou de revêtement de mur ou de sol et des peintures et vernis sur leurs émissions de polluants volatils

IBU 2021
General Instructions for the EPD programme of Institut Bauen und Umwelt e.V. Version 2.0,
Berlin: Institut Bauen und Umwelt e.V.,2021
www.ibu-epd.de

ICC ESR-5065
International code council (ICC), Evaluation report ESR-5065 HILTI KWIK-X (December 2022)

Product category rules for construction products – Part B
Reaction resin products, 04.2023

Regulation (EU) No. 305/2011 (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

Regulation (EU) No. 528/2012
REGULATION (EU) No 528/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 May

2012concerning the making available on the market and use of biocidal products Text with EEA relevance

Sphera

LCA for Experts, Leinfelden-Echterdingen; Sphera Solution GmbH, https://gabi.sphera.com/databases/gabi-data-search/ (10.05.2023)

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

FIT-Umwelttechnik GmbH
Westerstr. 13
38442 Wolfsburg
Germany

05362 72 69 474
bertram@fit-umwelttechnik.de
www.fit-umwelttechnik.com

Owner of the Declaration

Hilti Aktiengesellschaft
Feldkircher Strasse 100
9494 Schaan
Liechtenstein

+423 234 2111
HAGHSE@hilti.com
www.hilti.com