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-20240045-CBA2-EN
Issue date	04.06.2024
Valid to	03.06.2029

HST4-R Wedge anchor

HILTI AG

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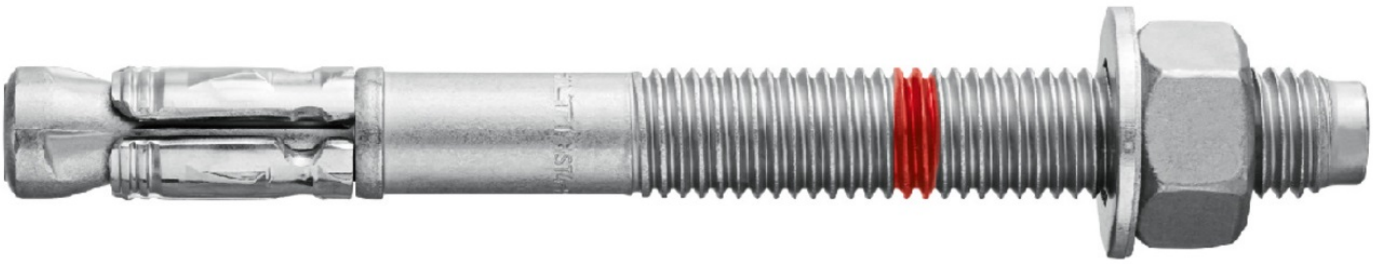

General Information

HILTI AG

Programme holder

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

Declaration number

EPD-HIL-20240045-CBA2-EN

This declaration is based on the product category rules:

Screws, 01.06.2023
(PCR checked and approved by the SVR)

Issue date

04.06.2024

Valid to

03.06.2029

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

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

HST4-R Wedge anchor

Owner of the declaration

Hilti Aktiengesellschaft
Feldkircher Strasse 100
9494 Schaan
Liechtenstein

Declared product / declared unit

HST4-R / 1kg

Scope:

The document relates to the stainless steel HST4-R portfolio as a leading Hilti wedge anchor product group. The HST4 wedge anchors portfolio consists of a diameter range from M8 - M20 and a standard length portfolio of 50mm-260mm. The declared product for this specific EPD is the HST4-R M10x90, which represents one of the most commonly used and produced items in the stainless steel portfolio.
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)

Product

Product description/Product definition

HST4 is a performance concrete wedge expansion anchor used to resist static and seismic structural loads in the construction industry (residential, industrial, infrastructure, etc.).The HST4 stainless steel variant of the HST4 family is described further in this report.
For the placing of the product on the market in the European Union European Free Trade Association EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration the following European Technical Approval ETA-21/0878 assessed based on EAD 330232-01-0601-v03 'Mechanical fasteners with variable embedment depth for use in concrete'. For the application and use the respective national provisions apply
The Hilti HST4-R anchor is a torque-controlled expansion anchor made of stainless steel which is installed into a drilled hole and anchored by torque-controlled expansion

Markt item number	Product name (Specification, including size)	Number of items per sales pa	Packaging Materials			Total weight [kg]	specific weigth without packaging	specific weigth with packaging [kg/pce]
2329093	HST4-R M8x50 5	100	Sales box	0.081	Cardboard	2.3374	0.0226	0.0234
2329094	HST4-R M8x65 5-20	100	Sales box	0.081	Cardboard	2.7304	0.0265	0.0273
2329095	HST4-R M8x75 5-30	100	Sales box	0.081	Cardboard	3.0104	0.0293	0.0301
2329096	HST4-R M8x95 5-50	100	Sales box	0.081	Cardboard	3.5704	0.0349	0.0357
2329097	HST4-R M8x115 5-70	100	Sales box	0.081	Cardboard	4.2854	0.0420	0.0429
2329127	HST4-R M8x75 5-30 BW	100	Sales box	0.081	Cardboard	3.4314	0.0335	0.0343
2329098	HST4-R M10x60 5-10	72	Sales box	0.081	Cardboard	3.3214	0.0450	0.0461
2329099	HST4-R M10x70 5-20	72	Sales box	0.081	Cardboard	3.6641	0.0498	0.0509
2329100	HST4-R M10x80 5-30	72	Sales box	0.081	Cardboard	4.0061	0.0545	0.0556
2329101	HST4-R M10x90 5-40	72	Sales box	0.081	Cardboard	4.3488	0.0593	0.0604
2329102	HST4-R M10x100 5-50	60	Sales box	0.081	Cardboard	3.9232	0.0640	0.0654
2329103	HST4-R M10x110 5-60	60	Sales box	0.081	Cardboard	4.2100	0.0688	0.0702
2329104	HST4-R M10x130 5-80	40	Sales box	0.081	Cardboard	3.2134	0.0783	0.0803
2329105	HST4-R M10x160 5-110	40	Sales box	0.081	Cardboard	3.7842	0.0926	0.0946
2329106	HST4-R M10x180 5-130	40	Sales box	0.081	Cardboard	4.1646	0.1021	0.1041
2329128	HST4-R M10x100 5-50 BW	40	Sales box	0.081	Cardboard	3.0086	0.0732	0.0752
2329132	HST4-R M10x90 5-40 DN	50	Sales box	0.086	Cardboard	3.9545	0.0774	0.0791
2329133	HST4-R M10x100 5-50 DN	50	Sales box	0.086	Cardboard	4.1925	0.0821	0.0839
2329107	HST4-R M12x75 5-10	40	Sales box	0.081	Cardboard	3.0942	0.0753	0.0774
2329108	HST4-R M12x85 5-20	40	Sales box	0.081	Cardboard	3.3782	0.0824	0.0845
2408286	HST4-R M12x95 5-30	40	Sales box	0.081	Cardboard	3.6622	0.0895	0.0916
2329109	HST4-R M12x105 5-40	40	Sales box	0.081	Cardboard	3.9462	0.0966	0.0987
2329110	HST4-R M12x115 5-50	40	Sales box	0.081	Cardboard	4.2342	0.1038	0.1059
2329111	HST4-R M12x125 5-60	32	Sales box	0.081	Cardboard	3.6308	0.1109	0.1135
2329112	HST4-R M12x135 5-70	32	Sales box	0.081	Cardboard	3.8580	0.1180	0.1206
2329113	HST4-R M12x145 5-80	32	Sales box	0.081	Cardboard	4.0852	0.1251	0.1277
2329114	HST4-R M12x165 5-100	20	Sales box	0.081	Cardboard	2.8678	0.1393	0.1434
2329115	HST4-R M12x180 5-115	20	Sales box	0.081	Cardboard	3.0798	0.1499	0.1540
2329116	HST4-R M12x200 5-135	20	Sales box	0.081	Cardboard	3.3398	0.1629	0.1670
2329129	HST4-R M12x115 5-50 BW	20	Sales box	0.081	Cardboard	2.4404	0.1180	0.1220
2329134	HST4-R M12x105 5-40 DN	25	Sales box	0.086	Cardboard	3.0465	0.1184	0.1219
2329135	HST4-R M12x115 5-50 DN	25	Sales box	0.086	Cardboard	3.2265	0.1256	0.1291
2329117	HST4-R M16x115 5-15	20	Sales box	0.081	Cardboard	3.8870	0.1903	0.1944
2329118	HST4-R M16x125 5-25	20	Sales box	0.081	Cardboard	4.1490	0.2034	0.2075
2329119	HST4-R M16x135 5-35	20	Sales box	0.081	Cardboard	4.4110	0.2165	0.2206
2329121	HST4-R M16x170 5-70	12	Sales box	0.081	Cardboard	3.2294	0.2623	0.2691
2329122	HST4-R M16x190 5-90	12	Sales box	0.081	Cardboard	3.5438	0.2885	0.2953
2329123	HST4-R M16x220 5-120	12	Sales box	0.106	Cardboard	4.0294	0.3270	0.3358
2329124	HST4-R M16x260 5-160	12	Sales box	0.106	Cardboard	4.6606	0.3796	0.3884
2329130	HST4-R M16x145 5-45 BW	12	Sales box	0.081	Cardboard	3.1617	0.2567	0.2635
2329125	HST4-R M20x170 5-30	5	Sales box	0.061	Cardboard	2.2063	0.4291	0.4413
2329126	HST4-R M20x200 5-60	5	Sales box	0.061	Cardboard	2.5613	0.5001	0.5123

Application

The core use of the product is in various construction sites including but not limited to commercial, residential, industrial and infrastructure. The main applications for the HST4 wedge anchor is in the structural connection of baseplates to concrete base materials, in instances like Structural Steel members, Handrails and Balustrades, Façade connections and MEP/services connections.

Technical Data

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *ETA-21/0878* and the relevant product technical data sheets.

Base materials/Ancillary materials

Designation	Material
HST4-R Corrosion resistance class III according *EN 1993-1-4:2006+A1:2015*	
Expansion sleeve	Stainless steel A4 according to *EN 10088-1:2014*
Bolt	Stainless steel A4 according to *EN 10088-1:2014*, cone coated (transparent), Rupture elongation (l_0 = 5d) > 8 %
Washer	Stainless steel A4 according to *DIN EN ISO 3506-1:2020*
Hexagon nut Dome nut	Stainless steel A4 according to *DIN EN ISO 3506-2:2020*, coated

Reference service life

The lifetime of the HST4-R mechanical fastener is defined by the *EAD 330232-01-0601-v03* and described in the *ETA-21/0878* as referenced further.

The provisions made in this European technical assessment are based on an assumed working life of the anchor of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

LCA: Calculation rules

Declared Unit

The declared product is the HST4-R M10x90 5-40 from HILTI AG. The declared unit refers to 1 kg of bolt anchor. Packaging is also included in the calculation, as Hilti sells the product with packaging. The declared unit is stated in [kg].

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	kg
Gross density	7930	kg/m^3

System boundary

Type of EPD: cradle to factory 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 the manufacturer,
- A3, production.

End of life (C1- C4):
- C1, dismantling/demolition,
- C2, transport,
- C3, waste treatment ,
- C4, disposal.

Reuse, recovery and recycling potential (D)

In order to accurately 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, transport to the production site and the production processes of the product itself.

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

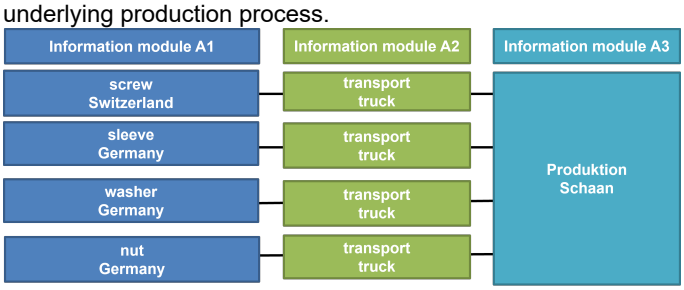

Illustration 1: Information module A1 to A3 of product

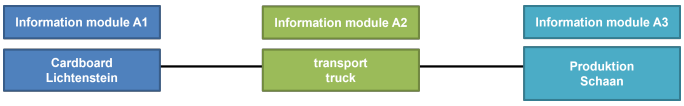

Illustration 2: Information module A1 to A3 of packaging

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 arereported in information module D.

Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: EU-27 Member States

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 referred to in this study is *LCA for Experts by Sphera*.

LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The declared product does not contain any biogenic Carbon.

Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in accompanying packaging	0.0002	kg C

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO2

End of life (C1-C4)

The demolition of the bolt anchor from the building is calculated in information module C1.The demolition is carried out using an electric chisel. The electrical energy consumption for the tool is assumed to be 0.5 MJ for the declared unit. The electricity consumption is calculated using a European electricity mix.

Name	Value	Unit
Collected separately waste type waste type	1	kg
Recycling	0.85	kg
Landfilling	0.15	kg

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

In Module D, a recycling rate of 85% is assumed (world steel association).

Name	Value	Unit
Recycling	0,85	kg

LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2:

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Global Warming Potential total (GWP-total)	kg CO_2 eq	3.95E+00	5.86E-02	5.08E-03	2.58E-03	2.2E-03	-2.71E+00
Global Warming Potential fossil fuels (GWP-fossil)	kg CO_2 eq	3.95E+00	5.86E-02	5.03E-03	2.56E-03	2.19E-03	-2.71E+00
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	2.14E-03	5.36E-06	4.62E-05	1.92E-05	6.79E-06	-1.3E-03
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	1.91E-11	5.76E-13	4.37E-16	4.28E-15	5.56E-15	-1.47E-11
Acidification potential of land and water (AP)	mol H^+ eq	2.48E-02	8.92E-05	7.15E-06	1.34E-05	1.55E-05	-1.99E-02
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	5.74E-06	5.79E-08	1.82E-08	8.71E-09	4.4E-09	-4.59E-06
Eutrophication potential aquatic marine (EP-marine)	kg N eq	2.64E-03	2.52E-05	2.63E-06	6.13E-06	4.01E-06	-1.96E-03
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	2.93E-02	2.66E-04	3.12E-05	6.77E-05	4.41E-05	-2.17E-02
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	8.18E-03	6.95E-05	6.26E-06	1.66E-05	1.21E-05	-6.13E-03
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	1.32E-04	2.84E-09	3.22E-10	2.74E-09	1.01E-10	-1.13E-04
Abiotic depletion potential for fossil resources (ADPF)	MJ	5.32E+01	1.29E+00	6.78E-02	5.04E-02	2.91E-02	-3.42E+01
Water use (WDP)	m^3 world eq deprived	6.34E-01	4.92E-03	5.75E-05	4.98E-04	2.4E-04	-4.96E-01

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2:

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier (PERE)	MJ	1.09E+01	1.76E-01	4.8E-03	4.68E-03	4.74E-03	-8.66E+00
Renewable primary energy resources as material utilization (PERM)	MJ	2.9E-01	0	0	0	0	0
Total use of renewable primary energy resources (PERT)	MJ	1.12E+01	1.76E-01	4.8E-03	4.68E-03	4.74E-03	-8.66E+00
Non renewable primary energy as energy carrier (PENRE)	MJ	5.32E+01	1.29E+00	6.8E-02	5.05E-02	2.91E-02	-3.42E+01
Non renewable primary energy as material utilization (PENRM)	MJ	0	0	0	0	0	0
Total use of non renewable primary energy resources (PENRT)	MJ	5.32E+01	1.29E+00	6.8E-02	5.05E-02	2.91E-02	-3.42E+01
Use of secondary material (SM)	kg	5.77E-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	2E-02	2.95E-04	5.29E-06	1.44E-05	7.35E-06	-1.38E-02

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2:

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	9.16E-10	7.46E-11	2.52E-13	1.31E-13	6.34E-13	-1.84E-10
Non hazardous waste disposed (NHWD)	kg	4.33E-01	2.84E-04	9.8E-06	1.33E-05	1.46E-01	-3.66E-01
Radioactive waste disposed (RWD)	kg	2.37E-03	2.01E-04	8.79E-08	6.77E-07	3.31E-07	-7.78E-04
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:

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

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.

References

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

ISO 14025
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IBU 2021
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Berlin: Institut Bauen und Umwelt e.V., 2021
www.ibu-epd.de

PCR Part A
Institut Bauen und Umwelt e.V, Berlin (pub.): Product CategoryRules for Construction Products from the range ofEnvironmental Product Declarations for Institut Bauen undUmwelt (IBU), Part A: Calculation Rules for the Life CycleAssessment and Requirements on the Project Report accordingto EN 15804+A2:2019, 202108

PCR Part B
Screws, 01.06.2023

Sphera
LCA for Experts: Ganzheitliche Bilanzierung Leinfelden-Echterdingen; Sphera Solution GmbH (Hrsg.)
www.gabi-software.com/deutsch/index/
(07.11.2023)

EAD330232-01-0601-v03
European Assessment Document - Mechanical fasteners for use in concrete

EN 10088-1:2014
stainless steels - part 1: list of stainless steels

DIN EN ISO 3506-1:2020 Fasteners - Mechanical properties of corrosion-resistant stainless steel fasteners

EN1993-1-4:2008+A1:2015
Eurocode 3: Design of steel structures - Part 1-4: General rules - Supplementary rules for stainless steels; German version EN 1993-1-4:2006 + A1:2015

ETA-21/0878
European Technical Assessment - Hilti HST4-R

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