Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

GROUND SCREWS

EPD of Multiple Products:
Based on the representative product: SGC 76x865

from

STOPDIGGING!

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
Regional Programme:	EPD Australasia, www.epd-australasia.com
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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

General information

Programme:	**The International EPD® System, www.environdec.com**
EPD Owner:	**StopDigging NZ Limited** 5C Beatrice Tinsley Crescent, Rosedale, Auckland 0632, New Zealand **www.stopdigging.co.nz | info@stopdigging.co.nz**
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Third-party verifier: Mamoru Yanagisawa	**International EPD Approved Individual Verifier** 1-22-2 Toro Saitama-City Saitama, Japan m.yanagisawa@epa-jp.com
Approved by: The International EPD® System	

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): CONSTRUCTION PRODUCTS, PCR 2019:14, VERSION 1.3.4
PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.

Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by an individual verifier Third-party verifier: *Mamoru Yanagisawa*      Approved by: EPD Australasia
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No [Procedure for follow-up the validity of the EPD is at minimum required once a year with the aim of confirming whether the information in the EPD remains valid or if the EPD needs to be updated during its validity period. The follow-up can be organized entirely by the EPD owner or together with the original verifier via an agreement between the two parties. In both approaches, the EPD owner is responsible for the procedure being carried out. If a change that requires an update is identified, the EPD shall be re-verified by a verifier]

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Since 2012, StopDigging, a Swedish company founded by Kim Olsson and Håkan Liljekvist, has offered a clean, cost-effective, long-lasting alternative to conventional concrete foundations. They shared a vision of a simpler and smarter way of using helical ground screws to replace concrete underpinning for many structures. Based in Helsingborg, but working worldwide, StopDigging has grown from strength to strength to be the market leader in delivering and installing ground screws.
StopDigging's approach, combining both innovative design with professional installers, saves you work, time and money. Our employees are driven to deliver the very best service and install a strong, stable, and secure foundation for your construction project. StopDigging takes full responsibility in fulfilling your project's foundation requirements, from concept to completion, and we make sure you have everything you need throughout the process.

Product-related or management system-related certifications:

Geometric data (tolerance for dimension/shape	Geometric data (tolerance for dimension/shape
Weldability	GB/T 700: Q235B. EN 10025-2: S235JR
Fracture/impact strength	Fracture/impact strength
Durability	P1, according to EN8501-3. Entire product HDG according to EN ISO 1461, Fe/Zn 165
Radioactive emissions	NPD
Material	ISO 630 FE 360A
Product	EN 1090
Galvanization	EN 1461
Manufacturing process	ISO 9001:2015
Installation process	ISO 9001:2015

Name and location of production site(s):

Name	Component	Address
Tianjin Baolai Steel Pipe Co., Ltd	Manufactures the metal pipe and plate, steel coil, and helix from steel Billet	Haihe Road #6, Daqiuzhuang, Jinghai District, Tianjin, China
Wu'an Yuhua Steel Mill	Fabrication of steel nut	P4M5+VJG, Wuan, Handan, Hebei, China
Qingdao Wang Baoqiang Industry Co. Ltd.	Welding and galvanisation	Floor 16, Building 2, Software Park, No, 288, Ningxia Road, Shinan District, Qingdao City, Shandong Province, China

Product information

Product name: StopDigging Ground Screws

Product identification: See table below.

Screw type	Art no	Screw thickness (mm)	Screw length (mm)	Outer diameter (mm)	Inner diameter (mm)	Helix height (mm)	Helix spacing (mm)	Helix width (mm)	Head thickness (mm)	Head diameter (mm)	Head width (mm)	Head depth (mm)	Head height (mm)	Fixing hole length (mm)	Fixing hole width (mm)	Thread, centre hole	Thread, side hole	Compression capacity (kN)	Tensile capacity (kN)	Lateral capacity (kN)	Expected min. service life
SGC 76x865	4030	4	865	76		480	60	10	8	200				60	15	M20		14	7	3.5	
SGC 76x1200	4031	4	1200	76		840	60	10	8	200				60	15	M20		25	13	6	
SGC 76x1600	4032	4	1600	76		900	60	10	8	200				60	15	M20		35	22	8.5	
SGC 76x2000	4033	4	2000	76		900	60	10	8	200				60	15	M20		45	34	12	
SGC 76x2500	4034	4	2500	76		900	60	10	8	200				60	15	M20		55	42	15	
SGC 89x1200	4045	4	1200	89		900	60	10	8	200				60	15	M20		38	18	9.5	125 years
SGC 89x1600	4036	4	1600	89		1200	60	10	8	200				60	15	M20		58	36	13	
SGC 89x2000	4037	5	2000	89		1500	60	10	8	200				60	15	M20		72	53	18	
SGC 89x2500	4038	5	2500	89		1500	60	10	8	200				60	15	M20		82	58	22	
SGC 89x3000	4019	4	3000	89		1500	60	10	8	200				60	15	M20		92	65	25	
SGC 114x1600	4056	4	1600	114		1200	50	10	8	230				60	15	M20		67	41	15	
SGC 114x2000	4057	4	2000	114		1500	50	10	8	230				60	15	M20		83	62	20	
SGN 67x865	3002	2	865	67	64	280	40	10									M12	11	4.5	3	
SGN 76x865	3007	4	865	76	68	400	40	10									M12	14	7	3.5	
SGN 89x865x2	3003	2	865	89	85	280	40	10									M12	23	11	3.5	
SGN 89x865x3,5	3008	4	865	89	82	280	40	10									M12	23	11	3.5	
SGN 76x1200	3009	4	1200	76	68	400	40	10									M12	25	13	6	
SGN 76x1600	3005	4	1600	76	68	820	40	10									M12	35	22	8.5	
SGN 114x900	3006	4	900	114	106	400	40	10									M16	20	11	6	
SGN 89x2500	3011	4	2500	89	81	900	60	10									M12	55	42	15	
SGP 580	4005	2	580	67		280	40	10	5		95	70				M20		2.5	1.7	0.5	
SGP 865	4003	2	865	67		280	40	10	5		95	70				M20		6	4.5	2.5	
SGP 1200	4004	2	1200	67		480	40	10	5		95	70				M20		13	6.5	4.5	
SGP 1600	4006	3	1600	67		820	40	10	5		95	70				M20		26	15	6.9	
SGP 2000	4007	4	2000	67		820	40	10	5		95	70				M20		29	16	8	100 years
SGS 70x935	2005	2	735	67			40	10	5		80		200					6	4.5	3	
SGS 95x935	2006	2	735	67			40	10	5		105		200					6	4.5	3	
SGS 70x1200	2007	2	1000	67			40	10	5		80		200					13	6.5	4.5	
SGS 95x1200	2008	2	1000	67			40	10	5		105		200					13	6.5	4.5	
SGU 95x580	10055	2	480	40		280	40	10	5		105		100					2.5	1.7	0.5	
SGU 95x865	1002	2	765	67		280	40	10	5		105		100					6	4.5	2.5	
SGU 95x1000	1003	2	900	67		280	40	10	5		105		100					11	5.5	3.5	
SGU 95x1200	1004	2	1100	67		280	40	10	5		105		100					13	6.5	4.5	
SGU 95x1600	1006	2	1500	67		600	40	10	5		105		100					18	8	7	
SG EX S	4024	4	2000	76		1500	50	10													
SG EX B	4023	4	1000	76																	
SG H C	5035	5	-	89					8	200				60	15	M20					

Product description

Variation	Image	Application/intended use	Description	Expected min. service life
SGC Adapter Screws		Prefabricated buildings, Solar panels, Fence panels and barriers	Our universal screw SGC has a round plate with several slots for attachments and the size of the plate allows a large adjustment space in two joints. The large dimensions of the screw in combination with an extra thick zinc coating make it strong and durable, and thus suitable for heavier work.	125 Years
SGP Adapter screws		Prefabricated buildings, Solar panels, Fence panels and barriers	Our SGP adapter screw has a central hole in the head along with strong threads, making it suitable for many different purposes. The design allows for precise adjustment, so it's perfect for projects that need flexibility but have lower load requirements.	100 years
SGU Beam screws		Wooden decks, Huts	Our beam screws are the right choice when you want to install a foundation of horizontal joists, such as a floor for a hut or the supporting beams for a wooden deck. The screws are available in five lengths, which makes it possible to accommodate differences in ground levels while maintaining stability, just by using the screws.	100 years
SGN Pipe Screws		Signage, parks, Barriers	The pipe screw is exactly what it sounds like – a tube-shaped ground screw intended to hold an elongated or cylindrical object inside it. It's available in several dimensions for different needs. When the pipe screw is mounted, you only need to lower what is to be anchored and fix it with four bolts. It's quick and easy.	100 years
SG EX Adapter screws		Prefabricated buildings, Fence panels and barriers	SGC EX is comprised of three parts. A base screw, an extension section, and a top section with mounting plate. With these extendable ground screws, you can continue to build until you have reached the depth, or capacity, you need.	100 years
SGS Post screws		Carport, Fence	Now you can stop using concrete foundation blocks for good. Our ground screws get the job done more quickly and easily but are just as stable as traditional posts. The screws are available in two different standard widths to suit your project.	100 years

Industry Classification:

UN CPC code: 421. Structural metal products and parts thereof.
ANZSIC Code: C222110. Fabricated structural steel manufacturing - ready made parts for structures.

Geographical scope:

The Components and manufacturing mainly come from China. The Stages A4 – Module D are reprehensive of New Zealand.

LCA information

Declared unit: 1 kg StopDigging Groundscrews
Reference service life: See product description
Time representativeness: 2022
Database(s) and LCA software used: Ecoinvent serves as the database for Life Cycle Impact Assessment, in line with EPD requirements. Ecochain was the software used to model the system.
Type of EPD: EPD of Multiple Products: The representative product SGC 76x865 was utilised to calculate the results. This selection is justified as it is the best-selling product offered by StopDigging NZ. The manufacturing processes for all StopDigging products share the same core processes and are manufactured at the same sites. Furthermore, there is minimal variation among the products, and the material composition remains consistent across the range.

Disclaimer: The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Description of system boundaries: EPD type b; Cradle to gate with options, modules C1–C4, module D and with optional modules (A1–A3 + C + D and additional modules). The additional modules include A4–A5.

Disclaimer: the use of the results of modules A1-A3 without considering the results of module C is discouraged.

Infrastructure and capital goods

Upstream	Excluded
Core	Excluded
Downstream	Excluded

** Disclaimer: Please note that while infrastructure and capital goods are excluded from the core processes, the upstream and downstream processes informed by Ecoinvent data are restricted to information pertaining to those background processes. Since the Ecoinvent data does not specify the inclusion of infrastructure and capital assets, we cannot guarantee the inclusion or exclusion of all processes related to infrastructure and capital goods, as these distinctions may not be clearly articulated for certain datasets utilised.*

A1 – Raw Material Supply
Steel Billet is produced from Blast furnace and manipulated into pipes and plates.

A2 – Transport of Raw Materials
Steel pipes and plates are distributed to Qingdao Wang Baoqiang Industry Co. Ltd.

A3 – Manufacturing
Steel pipes and plates are welded and galvanised.

A4 – Transport
Groundscrews are travel 11km by truck to Qingdao port, they then travel 12232 km to Auckland port.

A5 - Construction
Groundscrews are installed with the electric handheld screw installation machine.

C1 - Deconstruction
Groundscrews are deconstructed with the electric handheld screw installation machine.

C2 - Transport
Assumed 85% of Groundscrews will be transported to a metal recycler in New Zealand before travelling 10,649 km on a container ship for reuse by steel manufacturers. 15% transported to landfill.

C3– Waste Processing
85% of Groundscrews need to go through waste processing in New Zealand before being sold and exported for recycling.

C4– Disposal
15% of Groundscrews are disposed of in Landfills in New Zealand

D – Benefits and loads
The processed steel is ready for reuse.

More information: cut-off

According to EN 15804 section 6.3.6, the life cycle inventory data shall include a minimum of 95% of total inflows (mass and energy) per module. In addition, the PCR rules applies the expanded cut-off rule of ISO 21930, which says that at least 95% of the environmental impact per module shall be included as well. In case of insufficient input data for a unit process, the cut-off criteria shall be 1% of primary energy usage and 1% of the total mass input of that unit process. Proxy data or extrapolation should be used to achieve 100% completeness if only 95% of total inflow data is available. Inflows not included in the LCA shall be documented in the EPD (The International EPD System, 2021).

In this study, the following cut-offs have been applied:

(A3) Zinc spray galvanisation (for minor galvanisation alteration) has been excluded as it is only required for defected Groundscrews and is generally not required. Expert judgement has confirmed compliance with the criterion in section 4.4 of the PCR rules that this zinc repair galvanisation process would account for less than 1% of primary energy usage and 1% of the total mass. This inflow is not included in the LCA.

(D) Distributors reportedly reuse the steel packaging; however, the end of life is not clear. Due to uncertainty surrounding the recycling status of these steel pallets and their minimal environmental impact, emissions credits from recycling at the end of their life cycle have not been separately considered.

More information: Key Assumptions, Limitations

(A1) Emissions factors applied to produce the pipe, helix, plate, and nut have been modelled based on CAD models with impacts based on Ecoinvent data. This is because site specific data was not able to be obtained as StopDigging New Zealand Limited does not have operational control of Tianjin Baolai Steel Pipe Co., Ltd or Wu'an Yuhua Steel Mill. Despite numerous attempts to retrieve the information language and communication problems have limited the amount of data that was able to be collected. Upstream impacts from the raw material production have been calculated from 'rest-of-world' data from Ecoinvent. This is because specific information relating to China's production emissions is not available in Ecoinvent. It's been assumed that zero recycled steel is used. This is a conservative assumption.

(A3) Zinc galvanisation impacts have been modelled using CAD drawings to determine coverage and Ecoinvent was used to determine the impacts. Waste generated from the galvanization process has been factored in by accounting for a 5% excess of materials used, which is then allocated for waste treatment

(A3) For the ancillary material welding gas consumption, where a direct relationship between emissions and mass or economic value is not apparent, the specific data on the length of welding has been derived from CAD models and Ecoinvent process data has been used.

(A3) Welding material associated with the steel pallets is represented as alloyed steel.

(A4) The distance of travel between Qingdao Port to Auckland Port has been determined to be 10,649 km based on data sourced from http://ports.com/sea-route. This is deemed as the most accurate distance travelled. It's been assumed that transport to the installer has been completed in

a 7.5-16 metric ton lorry. The distance travelled from the distributor's warehouse to each construction site has been estimated to be 100 km. This has been determined through estimation, considering the geographical area serviced by each partner, and subsequently adjusted based on the distribution of sales and further adjusted to 100km to reflect a conservative assumption.

(A5) It has been assumed that during the installation of the StopDigging Groundscrews, the electric handheld screw installation machine (SGM06) is always used and that the installation machine runs for 3 minutes per StopDigging Groundscrew.

(C1) This module includes the emissions associated with demolition. It assumes that the screw is removed with the same electric handheld screw installation machine (SGM06). As per section 4.3.2 of the PCR rules, personnel-related processes, such as transportation of employees to and from work, have been excluded as they 'shall not be accounted for'.

(C2) It is assumed that all steel scrap generated at the end of life of the Groundscrew will be required to be exported in order for it to be recycled as per the Hera report in 2021. It is assumed that the scrap metal travels 50km to the nearest metal processor, and a further 50km to the nearest port in a 'light commercial vehicle'. It then travels 10,649 km in line with the 'Hera' New Zealand Steel product recycling report 2021. Upon arrival, its assumed to travel a further 50km to the recycling facility.

(C2) It is assumed that steel for landfill travels 100km to the landfill facility, this is a conservative estimate given the estimated distance between construction sites and distance to cities is around 50km.

(C3) It is assumed that 85% of the Groundscrews will be recycled (World Steel Association, 2019, as cited in Hera, 2021). C3 also assumes that all steel scrap for recycling is processed in New Zealand before export (Hera, 2021). Once recycling processes are finalised it's assumed the output is 'unalloyed steel'. Because the end-of-waste state cannot be confirmed that it has been met at the end of the product's life due to the potential presence of contaminates, the environmental burden of processing the steel scrap has been allocated to the Groundscrews.

(C4) Assumes that 15% of the Groundscrews are disposed of in landfills (World Steel Association, 2019, as cited in Hera, 2021). Its assumed that these landfills are in New Zealand. The environmental burdens related to landfilling have been applied to the Groundscrews.

(D) The recycling rate of the StopDigging products at the end of life is assumed to be 85%. This is based on the Steel recycling report (HERA Report No. R5-89v2, 2021), and in line with NZ steel information on the recovery rate for steel in buildings.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	X	ND	ND	ND	ND	ND	ND	X	X	X	X	X	X
Geography	GLO	GLO	GLO	NZ	NZ	NZ	NZ	NZ	NZ	NZ	NZ	NZ	NZ	NZ	NZ	NZ	NZ
Specific data used	<10%			NZ	NZ	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	<10%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Steel	1	0.00%	0.00%
TOTAL	1	0.00%	0.00%
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Steel pallet	0.043	4.3%	0.00%
Low-Density Polyethylene (LDPE) film for wrapping	0.01333	1.33%	0.00%
Plastic Strapping	0.00001	0.001%	0.00%
TOTAL	0.01634	5.63%	0.00%

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per declared unit
No SVHC over 0,1%	-	-	-

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Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator. The results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, noncancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological, and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.*

Potential environmental impact - mandatory indicators according to EN 15804:2012+A2:2019									
Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-fossil	kg CO_2 eq.	4.35E+00	1.45E-01	3.12E-03	1.32E-03	2.65E-01	4.87E-02	8.22E-04	-1.56E+00
GWP-biogenic	kg CO_2 eq.	3.57E-03	6.32E-06	4.08E-05	3.95E-05	2.51E-04	1.36E-05	1.06E-06	3.47E-03
GWP- luluc	kg CO_2 eq.	5.00E-03	9.85E-05	4.37E-07	1.81E-07	1.80E-04	3.84E-06	3.32E-07	-9.87E-04
GWP-total	kg CO_2 eq.	4.36E+00	1.45E-01	3.16E-03	1.36E-03	2.65E-01	4.87E-02	8.23E-04	-1.56E+00
ODP	kg CFC 11 eq.	1.68E-07	2.91E-08	1.36E-10	5.23E-11	5.22E-08	1.05E-08	1.43E-10	-7.11E-08
AP	mol H^+ eq.	4.26E-02	3.86E-03	7.53E-06	4.08E-06	3.75E-03	5.10E-04	7.56E-06	-6.00E-03
EP-freshwater	kg P eq.	1.87E-04	6.91E-07	9.30E-08	8.73E-08	2.77E-06	1.77E-07	1.09E-08	-6.55E-05
EP-marine	kg N eq.	4.56E-03	9.54E-04	3.51E-06	6.28E-07	9.70E-04	2.25E-04	3.09E-06	-1.33E-03
EP-terrestrial	mol N eq.	1.38E-01	1.06E-02	2.15E-05	7.12E-06	1.08E-02	2.47E-03	3.40E-05	-1.51E-02
POCP	kg NMVOC eq.	1.70E-02	2.76E-03	6.48E-06	2.12E-06	3.00E-03	6.79E-04	9.44E-06	-7.41E-03
ADP-minerals&metals*	kg Sb eq.	7.99E-05	2.88E-07	9.18E-09	8.53E-09	2.64E-06	7.47E-08	5.34E-10	-2.13E-06
ADP-fossil*	MJ	4.55E+01	1.90E+00	2.44E-02	1.78E-02	3.67E+00	6.71E-01	1.10E-02	-1.52E+01
WDP*	m^3	8.97E-01	4.16E-03	2.70E-04	1.15E-04	1.54E-02	8.98E-04	3.76E-05	-3.27E-01
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption								

Additional mandatory and voluntary impact category indicators according to the PCR

Additional Mandatory impacts according to PCR									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG [1]	kg CO_2 eq.	4.36E+00	1.45E-01	3.12E-03	1.32E-03	2.65E-01	4.87E-02	8.22E-04	-1.56E+00
[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO2 is set to zero.									

Additional Potential environmental impact according to EN 15804:2012+A2:2019

Additional Potential environmental impact – environmental information according to EN 15804:2012+A2:2019									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	5.32E-07	5.75E-09	9.99E-11	2.22E-11	2.10E-08	1.36E-08	1.87E-10	-1.18E-07
IRP	kBq U235 eq	9.88E-02	8.04E-03	3.13E-05	4.74E-06	1.55E-02	2.87E-03	4.63E-05	-2.17E-02
ETP-fw	CTUe	1.42E+02	1.30E+00	5.07E-02	4.11E-02	3.47E+00	4.04E-01	8.88E-03	-4.37E+01
HTP-c	CTUh	1.55E-08	8.22E-11	8.03E-13	6.18E-13	3.22E-10	1.41E-11	2.45E-13	-9.15E-09
HTP-nc	CTUh	9.11E-08	9.45E-10	1.57E-11	1.05E-11	3.76E-09	3.47E-10	7.37E-12	-3.25E-08
SQP	dimensionless	1.07E+01	4.48E-01	1.75E-02	1.74E-03	1.37E+00	8.14E-02	2.75E-02	-4.19E+00
PM = Particulate Matter emissions, IRP = Ionizing radiation - human health, ETP-fw = Eco-toxicity - freshwater, HTP-c = Human toxicity - cancer effects, HTP-nc = Human toxicity - non-cancer effects, SQP = Land use related impacts / soil quality									

Declaration of the energy source used in the manufacturing process in A3

During the manufacturing process (Module A3) at Qingdao Wang Baoqiang Industry Co., Ltd., electricity is sourced from the local grid. The table below details the breakdown of electricity sources based on the most recent data from International Energy Agency and Ember. Ecoinvent data has been applied to calculate the environmental impacts according to the requirements of EN 15804:2012+A2:2019. Below is the kg CO_2 eq./kWh is using the GWP - GHG indicator.

Electricity Source Distribution		
Electricity Source	Percentage distribution	kg CO_2 eq./kWh (GWP-GHG)
Coal	60.69%	1.12E-01
Gas	3.25%	3.19E-03
Hydro	13.17%	3.00E-02
Nuclear	4.60%	5.16E-05
Other Fossil (oil)	0.78%	1.15E-03
Wind + Solar + bioenergy	17.51%	9.31E-04
Weighted GWP-GHG per kWh		1.02E+00

Resource use indicators

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.88E+00	1.57E-02	4.82E-02	4.80E-02	6.86E-02	3.63E-03	2.79E-04	-4.90E-01
PENRE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	4.82E+01	2.02E+00	2.68E-02	1.98E-02	3.89E+00	7.12E-01	1.16E-02	-1.60E+01
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	2.68E-02	1.38E-04	7.25E-06	3.26E-06	5.29E-04	3.45E-05	1.57E-06	-8.96E-03
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								

Waste indicators

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	6.05E-04	2.51E-06	3.30E-08	2.07E-08	4.68E-05	1.83E-06	2.50E-08	-1.31E-04
Non-hazardous waste disposed	kg	7.55E-01	2.15E-02	5.66E-02	2.06E-04	8.53E-02	7.94E-04	1.50E-01	-3.03E-01
Radioactive waste disposed	kg	8.37E-05	1.30E-05	4.45E-08	5.25E-09	2.38E-05	4.66E-06	6.71E-08	-2.47E-05

Output flow indicators

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	1.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.50E-01	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Conditions and Limitations of Use

1. The STOPDIGGING! Ground Screw Foundation System is certified for use as foundations of buildings, located in Exposure zones B, C and D (as defined in NZS3604:2011 section 4.2,except microclimates), as described in either 1(a) or 1(b).

a. foundations of buildings, new and existing, with suspended floors that come within the scope of NZS3604:2011 section 1.1.2 (b to o) or NASH Standard Part 2: May 2019 section 1.1.3 where;

i. the foundations are situated on ground with adequate bearing capacity as established by static pile testing (but excluding ground that has the potential for liquefaction or lateral spread); and
ii. diagonal bracing is not required; and
iii. the maximum floor live load does not exceed 3kPa; and
iv. the maximum above ground height of the ground screw does not exceed 900 mm; and
v. the spacing between joists and bearers is within the scope of Table 3 or Table 4, Appendix 2 of the STOPDIGGING! Design Guide Version 6.1, June 2024 ("the Design Guide");

b. foundations for buildings not within the scope of 1 (a), where:

i. the foundations are situated on ground with adequate bearing capacity as established by static pile testing, but the ground has the potential for liquefaction or lateral spread; or
ii. diagonal bracing is required; or
iii. the maximum floor live load exceeds 3kPa; or
iv. the maximum above ground height of the ground screw exceeds 900 mm; or
v. the spacing between joists and bearers is not within the scope of Table 3 or Table 4, Appendix 2 of the Design Guide.

2. The STOPDIGGING! Ground Screw Foundation System shall be designed in accordance with the relevant section of the STOPDIGGING! Design Guide and installed in accordance with the STOPDIGGING Installation Guide Version 4.0, March 2024.

3. For foundations under 1(a) the LBP Designer shall complete Part 1 of the STOPDIGGING! Ground Screw Foundation System Design Declaration Version 2.2, June 2024 to certify that the foundation system has been designed in accordance with the pre-engineered solution described in the Design Guide, Part 1.

4. For foundations under 1(b) a CPEng (Structural or Geotechnical) shall complete Part 2 of the STOPDIGGING! Ground Screw Foundation System Design Declaration Version 2.2, June 2024 to certify that the foundation system as a specifically engineered solution in accordance with the Design Guide, Part 2.

5. The installer shall provide a complete STOPDIGGING! Installation Record Version 1.0, September 2022 and STOPDIGGING! Static Pile Test Report Version 1.0, February 2023 for submission with an application for a Code Compliance Certificate that all installation conditions of this CodeMark certificate have been met when installing the STOPDIGGING! Ground Screw Foundation System.

Additional social and economic information

StopDigging NZ + CodeMark

Our ground screw foundation system has received CodeMark™ and now certifies the Groundscrew and the foundation system, method of design, and installation. This brings a new, straightforward way of foundations to the market and significantly saves money and time building. CodeMark™ certification is the highest level of product compliance available in New Zealand.

CodeMark
CMNZ70132

List of abbreviations

LCA	Life Cycle Assessment
EPD	Environmental Product Declaration
PCR	Product Category Rules
GLO	Global
RER	Europe
RoW	Rest of the World
GWP-total	Global Warming Potential Total
GWP-fossil	Global Warming Potential Fossil
GWP-biogenic	Global Warming Potential Biogenic
GWP-luluc	Global Warming Potential Land Use and Land Use Change
ODP	Ozone Depletion Potential
AP	Acidification Potential
EP-freshwater	Eutrophication Potential, Fraction of Nutrients Reaching Freshwater End Compartment
EP-marine	Eutrophication Potential Fraction of Nutrients Reaching Marine End Compartment
EP-terrestrial	Eutrophication Potential, Accumulated Exceedance
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 Use
PERE	Use of Renewable Primary Energy Excluding 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 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
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
EE	Exported Energy
PM	Particulate Matter Emissions
IRP	Ionizing Radiation, Human Health
ETP-FW	Ecotoxicity, Freshwater
HTP-c	Human Toxicity, Cancer
HTP-nc	Human Toxicity, Non-cancer
SQP	Land Use Related Impacts/Soil Quality

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