HERCULES
GRUNDLÄGGNING

Environmental Product Declaration for Rental of reusable sheet piles

According to EN 15804:2012+A2:2019/AC:2021,
ISO 14025, ISO 14040 and ISO 14044
Programme operator: EPD International AB
EPD owner: Hercules Grundläggning AB

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Two sheet piles declared called tkl603 and tkl604.

EPD Information

Declared unit:	1 rotation of 1 meter of reusable sheet pile
PCR:	Product Category Rules PCR 2019:14 Construction products, version 1.2.4 of 2022-09-07
Programme:	The International EPD® System, www.environdec.com

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General product information

Hercules Grundläggning AB rents out steel sheet piles from facilities in Västerås[1] and Stenungsund[2] for different types of foundation work within Sweden.

The EPD includes two types of reusable sheet piles, called tkl603 & tkl604, manufactured by the supplier Vítkovice. The sheet piles are rented out by Hercules to various construction projects in Sweden. When a sheet pile has been used in a project, it is sent back to the Hercules facility where it undergoes processes that enables reuse. The pile is washed and cut and is then ready to be rented out to a new construction project. When the sheet pile has been rotating in different projects for a period of 5-10 years or when its length is down to 3 meters, Hercules sends it to material recycling. The length of the pile varies from 3 to 18 meters with weighted average length of almost 12 meters.

Sheet piles are used as a support structure in foundation work where deep excavation occurs, for example in the construction of basements, pumping stations, tunnels and more. By locking sheet piles into each other and forming a barrier, soil masses or water are kept in place.

The sheet piles declared are certified in accordance with SS EN 10248, steel grade S355.

Sheet piles declared are classified as UN CPC 4126 according to the United Nations Central Product Classification (UN CPC).

Declared unit

1 rotation of 1 meter reusable sheet pile. The weight of the sheet pile is 73.1 kg/meter. This is a conservative approach since type 1 (tkl603) is 64.2 kg/meter and type 2 (tkl604) is 73.1 kg/meter.

This EPD does not consider the first cycle of renting a sheet pile (the first cycle is when a sheet pile is purchased new from the supplier). This EPD reflects the environmental impacts from reusing the sheet pile in order to increase circularity of sheet piles.

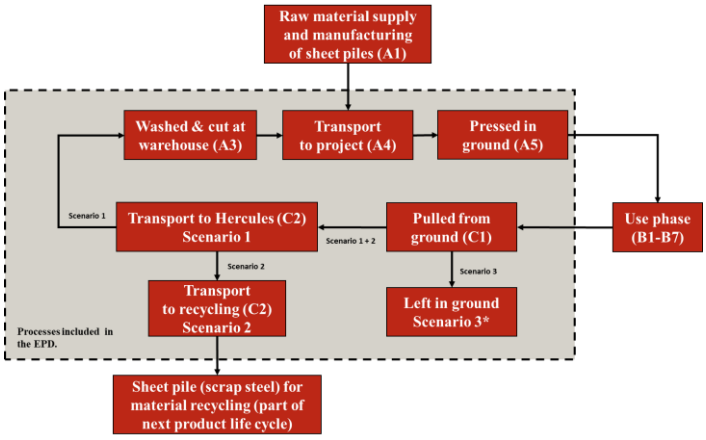
System boundary

The system boundaries cover the entire system of reusing steel sheet piles including various aspects such as technical, temporal and geographical aspects. The setting of system boundaries follows two principles according to EN 15804: (1) The “modularity principle” and (2) the “polluter pays principle”.

The EPD is a service EPD type and is defined as “cradle to gate with modules A1-A5 and optional modules”. This EPD type is not defined in EN 15804 but is defined in the PCR used. The optional modules C1-C2 are declared. Modules C3 and C4 are not relevant[3]. Modules A1 and A2 are not relevant either as the EPD does not consider the first rental of the sheet pile. Module D is not relevant to declare for services and the main material used has no environmental burden so no credits are used, therefore it is also omitted.

The EPD is based on an LCA model described in the LCA background report (see reference list). The declared modules are A3, A4, A5, C1, C2, see Figure 1 and Table 1.

Declaration of the Reference Service Life (RSL) is only possible if B1-B5 are included, i.e. RSL is not assessed. Moreover, for an EPD of a construction service, the declaration of the RSL is not possible according to the PCR used.



*For scenario 3, it is assumed that the sheet pile does not reach the end-of-life stage within a 100-year perspective.

Figure 1: Simplified flow chart of the supply chain and processes for the declared sheet piles.

The sheet piles are manufactured by the supplier Vitkovice, i.e. module A1. The pre-cast sheet piles are then transported to Hercules’ project sites and pressed into the ground (first cycle). After they have fulfilled their use at the construction site they are pulled from the ground and transported to Hercules’ facility in Västerås for cleaning, cutting, and storage until the next project is in need of sheet piles. Once an order has been placed, Hercules arranges transportation of the sheet piles to the

[1] Lågspänningsgatan 15, 721 37 Västerås
[2] Kraftverksvägen, 444 32 Stenungsund
[3] C4 is declared in the “Additional Environmental Information”

project. When the piles have been used at a construction site, they are sent back to Hercules' facility in Västerås where they again go through the processes that enable reuse.

Approximately 24% of the sheet piles are managed in an external facility in Stenungsund where they undergo the same processes as in Hercules facility in Västerås.

The sheet piles are intended to be used in construction works in Sweden. The geographical location of the Hercules site in Västerås and the smaller facility in Stenungsund are shown in Figure 2.

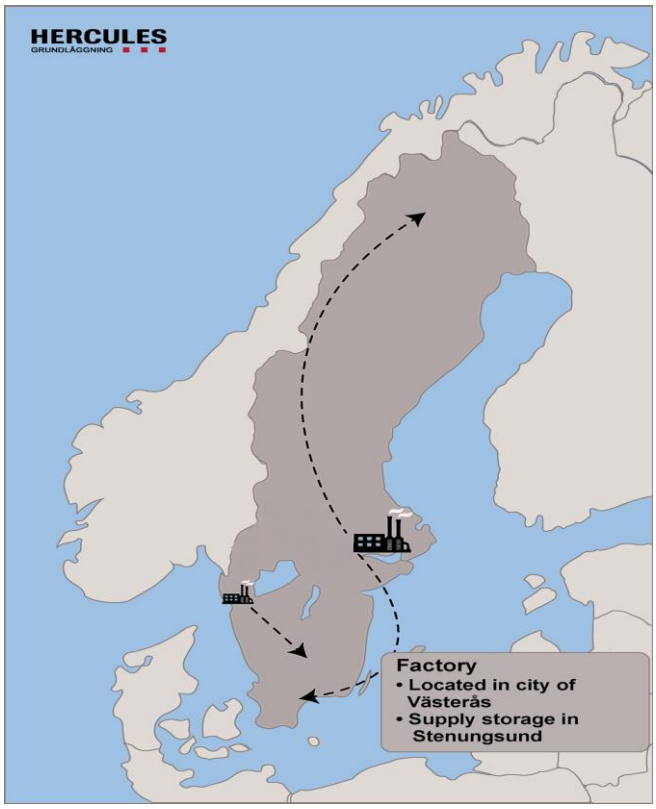


Figure 2: Map showing the geographical location of Hercules site in Västerås, the facility in Stenungsund and delivery routes.

Data that represent the current situation is used. All input data used in the LCA model (e.g. raw materials and other data) that Hercules has influence over are specific data for the year 2021.

The environmental impact from infrastructure, construction, production equipment, and tools that are not directly consumed in any production process are not accounted for in the Life Cycle Inventory (LCI). Personnel-related impacts, such as transportation to and from work, are neither accounted for in the LCI.

Table 1: Modules of the life cycle in the EPD, including geography, share of specific data (in GWP-GHG indicator) and data variation.

	Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundary
	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	ND[1]	ND[1]	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	ND[1]	ND[1]	ND
Geography	CZ	CZ/SE	SE	SE	SE	-	-	-	-	-	-	-	SE	SE	-	-	-
Specific data	33%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%[2]					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	<10%					-	-	-	-	-	-	-	-	-	-	-	-

[1]Modules not declared since they are not relevant. C4 is declared in the "Additional Environmental Information"
[2]Conservative approach where heaviest sheet pile is modelled.

Assumptions and approximations

The following important assumptions and approximations are made:

- Two types of sheet piles are declared in the EPD, called tkl603 and tkl604. The individual weight of these are 64.2 kg/meter and 73.1 kg/meter. A conservative approach is used where the 73.1 kg/meter sheet pile is modelled in the EPD.
- The length of a sheet pile varies from 3 to 18 meters with a weighted average length of 11.81 meters, rented out to customers. This average sheet pile has been modelled in the assessment. It is important to notice that the environmental impact from the sheet pile could vary depending on the length.
- The basis for the EPD is that the reused sheet pile reaches an end-of-waste state in the previous life cycle. The upstream cut-off roles can thereby be applied. The requirement is that at least one of the end-of-waste criteria is not fulfilled at any stage in the previous rotation cycle.
- About 24% of the sheet piles are rented out from the facility in Stenungsund. No LCI data are available from this site. It is however assumed that Stenungsund has the same LCI data per declared unit as the site in Västerås.
- No transport of sheet piles occurs between the facilities in Västerås and Stenungsund.
- The amount that needs to be cut from each sheet pile after usage varies. In some cases, no cutting is required and sometimes 1.5 meters are cut. The average is about 10 cm.
- The reference flow (1 meter of sheet pile) is measured at the factory gate leaving Västerås/Stenungsund.
- Waste fractions are allocated equally per declared unit.
- Hercules´ site in Västerås and the site in Stenungsund deliver to all of Sweden. The weighted mean transport is used as an estimation of the most plausible scenario. The same transport scenario is used for module A4 and module C2.
- The data collected for oxygen and acetylene relates to the total use at the facility in Västerås. An assumption has been made that 30% of the quantities are linked to the sheet piles, as this amount is considered the most reasonable.

Allocation

The EPD represents an average sheet pile from Hercules´ site in Västerås and Stenungsund. Each inventory data (e.g. all electricity consumed) are then divided by the total amount of sheet piles rented out at the site. This is based on a weighted mass allocation. No other allocations are conducted.

Cut-offs

In accordance with the EN 15804 standard, the cut-off criterion is set to 1% of the renewable and non-renewable primary energy usage, 1% of the total mass input to the manufacture process. The total of neglected input flows per module, (A1-A3, A4-A5, C1-C4 and module D) shall be a maximum of 5 % of energy usage and mass.

In the assessment, all available inventory data specified and known by the commissioner are considered and included in the LCA, i.e. all raw materials, ancillary materials, and energy consumption, using proper LCI GaBi datasets.

Software and database

The LCA software GaBi Professional and its integrated database from Sphera has been used in the LCA modelling.

Electricity in manufacturing

The energy source behind the electricity in module A3 is shown in Table 2, including the LCA data in grams CO_2-eq./kWh.

Table 2: Electricity in manufacturing (A3).

Energy source	LCA data (g CO_2 eq./kWh)
Hydropower	14.3 (Västerås facility)
Residual mix	100 (Stenungsund facility)

Data quality

No generic selected datasets (secondary data) used are older than ten years. No specific data collected is older than five years and represent a period of about one year.

Overall, the representativeness, completeness, reliability and consistency are considered as good.

The main shortcoming is that no primary data is gathered from the site in Stenungsund. Though, it is expected that this LCI data are fairly similar to the LCI data in Västerås.

About Hercules Grundläggning

Hercules Grundläggning AB is a wholly owned subsidiary to NCC AB.

Hercules is one of the leading deep foundation companies in the Nordic market. We lay the groundwork for future buildings and facilities through our methods of piling, support structures, and foundation reinforcement. A

competence that makes us unique is our engineering department that assists in design and the optimization of your project.

Hercules Grundläggning's management system has long been certified according to SS-EN ISO 9001:2015, 14001:2015 and 45001:2018.

For more information, visit www.hercules.se

EPD owner

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Content declaration including packaging

The sheet piles do not contain any substances of very high concern (SVHC) according to REACH. Table 3 presents the content of sheet piles. The mass of biogenic carbon in the sheet pile is less than 5%. There is no packaging material.

Table 3: Content declaration of the sheet pile declared.

Product component	Weight, kg*	Post-consumer recycled material, weight-%**	Biogenic material, weight-% and kg C/kg
Iron	71-72	100	0 resp. 0
Manganese	<1.2	100	0 resp. 0
Silicon	<0.44	100	0 resp. 0
Carbon	<0.20	100	0 resp. 0
Phosphorus	0.014	100	0 resp. 0
Sulfur	0.004	100	0 resp. 0
Nitrogen	0.004	100	0 resp. 0
Packaging material	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Negligible for all product components	-	-	-

*Summed up to the declared unit (73.1 kg)
**Since the EPD does not cover the first rotation, the materials have been post-consumer recycled.

Environmental performance

The environmental performance results of the life cycle assessment based on the declared unit are presented in Table 4 (core environmental indicators), Table 5 (resource use), Table 6 (waste categories and output flows) and Table 7 (additional environmental impact indicators).

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.

Three scenarios for module C are addressed in the EPD. Results from the first scenario (most representative scenario) are presented below in Tables 4-7. Results from the other two scenarios are shown in the Chapter Additional Environmental Information.

Table 4: Results of the LCA (modules A3, A4, A5, C1 and C2) – Core environmental indicators per declared unit.

Core environmental indicators			A3	A4	A5	C1	C2
Impact category		Unit					
Climate change	Total	kg CO_2 eq.	0.12	0.67	1.3	1.2	0.67
	Fossil	kg CO_2 eq.	0.12	0.67	1.3	1.2	0.67
	Biogenic*	kg CO_2 eq.	0	0	0	0	0
	Land use and land use change	kg CO_2 eq.	5.1E-05	3.7E-03	7.1E-03	7.0E-03	3.7E-03
	GWP-GHG	kg CO_2 eq.	0.12	0.68	1.3	1.2	0.68
Ozone depletion		kg CFC 11 eq.	2.1E-13	4.0E-14	1.1E-13	7.6E-14	4.0E-14
Acidification		mol H^+ eq.	2.9E-04	6.0E-04	3.4E-03	3.3E-03	6.0E-04
Eutrophication aquatic freshwater		kg P eq.	1.8E-07	2.0E-06	3.9E-06	3.8E-06	2.0E-06
Eutrophication aquatic marine		kg N eq.	4.5E-05	1.8E-04	1.5E-03	1.5E-03	1.8E-04
Eutrophication terrestrial		mol N eq.	4.8E-04	2.2E-03	0.017	0.017	2.2E-03
Photochemical ozone formation		kg NMVOC eq.	1.3E-04	5.2E-04	4.9E-03	4.8E-03	5.2E-04
Depletion of abiotic resources - minerals and metals		kg Sb eq.	2.7E-08	5.6E-08	1.1E-07	1.1E-07	5.6E-08
Depletion of abiotic resources - fossil fuels		MJ, net calorific value	4.9	8.9	19	17	8.9
Water use		m^3 world eq. deprived	0.080	6.0E-03	0.012	0.011	6.0E-03

*This indicator is set to zero, due to inconsistencies in the dataset used delivered by Sphera. Though, net result over the life cycle is zero since carbon uptake and emission is zero during a life cycle.

Table 5: Results of the LCA (modules A3, A4, A5, C1 and C2) – Resource use per declared unit.

Use of resources		A3	A4	A5	C1	C2
Parameter	Unit					
Use of renewable primary energy excl. renewable primary energy resources used as raw materials	MJ, net calorific value	4.3	0.51	0.99	0.96	0.51
Use of renewable primary energy as raw materials	MJ, net calorific value	0	0	0	0	0
Total use of renewable primary energy	MJ, net calorific value	4.3	0.51	0.99	0.96	0.51
Use of non-renewable primary energy excl. non-renewable primary energy resources used as raw materials	MJ, net calorific value	4.9	9.0	19	17	9.0
Use of non-renewable primary energy as raw materials	MJ, net calorific value	0	0	0	0	0
Total use of non-renewable primary energy	MJ, net calorific value	4.9	9.0	19	17	9.0
Use of secondary material	kg	0	0	0	0	0
Use of renewable secondary fuels	MJ, net calorific value	0	0	0	0	0
Use of non-renewable secondary fuels	MJ, net calorific value	0	0	0	0	0
Use of net fresh water	m^3	0.017	5.7E-04	1.1E-03	1.1E-03	5.7E-04

Table 6: Results of the LCA (modules A3, A4, A5, C1 and C2) – Waste categories and output flows per declared unit.

Waste categories & output flows		A3	A4	A5	C1	C2
Parameter/Indicator	Unit					
Hazardous waste disposed	kg	1.0E-03	4.3E-11	1.0E-10	8.1E-11	4.3E-11
Non-hazardous waste disposed	kg	8.8	1.3E-03	2.6E-03	2.4E-03	1.3E-03
Radioactive waste disposed	kg	1.1E-03	1.1E-05	2.8E-05	2.1E-05	1.1E-05
Components for re-use	kg	0	0	0	0	73
Materials for recycling	kg	3.2	0	0	0	0
Materials for energy recovery	kg	0.021	0	0.033	0	0
Exported energy	MJ per energy carrier	0	0	0	0	0

Table 7: Results of the LCA (modules A3, A4, A5, C1 and C2) – Additional environmental impact indicators per declared unit.

Additional environmental impact indicators		A3	A4	A5	C1	C2
Impact category	Unit					
Particulate Matter emissions	Disease incidence	2.3E-09	3.7E-09	2.5E-04	2.5E-04	3.7E-09
Ionizing radiation, human health	kBq U235 eq.	0.12	1.6E-03	4.2E-03	3.1E-03	1.6E-03
Eco-toxicity (freshwater)	CTUe	1.8	6.2	13	12	6.2
Human toxicity, cancer effects	CTUh	1.2E-10	1.3E-10	1.4E-09	1.4E-09	1.3E-10
Human toxicity, non-cancer effects	CTUh	1.5E-09	6.5E-09	4.3E-07	4.2E-07	6.5E-09
Land use related impacts/Soil quality	dimensionless	0.14	3.1	5.8	5.8	3.1

Table 8: Classification of disclaimers to the declaration of core and additional environmental impact indicators.

ILCD classification	Indicator	Disclaimer
ILCD Type 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD Type 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD Type 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2

Disclaimer 1 – 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 nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator
Disclaimer 2 – 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

General information

The operation in the Västerås facility is certified in accordance with:

- ISO 9001
- ISO 14001
- ISO 45001

Explanatory material is given in the LCA background report to this EPD.

Hercules facility in Västerås reduces the need for new steel materials to be cast by systematically reusing existing sheet piles until they are no longer useable. Careful cleaning after each rental, and cutting away any damage from the foot of the sheet pile (caused by pressing the sheet piles into the ground) ensures that each sheet pile is fully utilized, reducing material waste. The cut pieces and sheet piles that have reached end-of-life are, in turn, sold to a facility where they are melted down to create new steel products.

To read more about Hercules' and NCC's general sustainability work, please refer to our webpages; https://hercules.se/hallbarhet/ and https://www.ncc.group/sustainability/

Release of dangerous substances to indoor air, soil and water during the use stage

According to EN 15804, the EPD does not need to give this information if the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonized test methods according to the provisions of the respective technical committees for European product standards are not available. This criterion is fulfilled for sheet piles.

Scenario information

For modules other than A1-A3, scenario-based information shall be declared for the sheet piles.

Module A4
When a sheet pile has been washed and cut, it is ready to be rented out to a new project. When a project needs to rent sheet piles, they contact Hercules and place an order for the specific lengths they need. Hercules then arranges the transport of the sheet piles out to the project. Since the sheet pile is cut before each new rental, it becomes about a decimeter shorter after each rotation. This means that Hercules can provide reusable sheet piles in differing lengths that suit different geotechnical properties in the projects. The transport from Hercules' facility to the construction site is declared in module A4.

Module A5
The process of pressing the sheet pile into the ground is carried out with a sheet pile machine, free hanging vibro or movax (machine that grips the pile from the side). The installation depth is affected by factors such as the sheet piles profile, the properties of soil layers and the groundwater level. If the sheet pile is pressed into bedrock, it is provided with studs to ensure proper contact with the bedrock. Module A5 covers all processes at the construction site related to pressing the sheet pile in the ground.

Module C1 (3 scenarios)
In scenario 1 and 2 in module C1 the sheet pile is pulled from the ground. This is done with the same type of machine that was used when the pile was pressed into the ground: free hanging vibro or movax (machine that grips the pile from the side).

In scenario 3, the sheet pile is not pulled up from the ground, instead it remains in the ground.

Module C2 (3 scenarios)
In the first scenario, the sheet pile is sent back to Hercules´ facility for cleaning and cutting after it has been used in a project.

In the second scenario, the sheet pile is sent back to Hercules´ facility and, in addition, transported to the final recycling at an external company. The second scenario shall represent the last cycle of renting out the sheet pile.

No transport is carried out in scenario 3 because the sheet pile is left in ground.

Environmental performance (scenario 2 and 3)

Results for scenario 2 and 3 are presented in the tables below. Please note that for almost all impact categories, indicators, and parameters for C4 (scenario 3), the results are assessed as zero. Due to lack of data these parameters have not been calculated. However, the scenario has been discussed with the external verifier and is considered reasonable, as this type of steel products are not expected to leach harmful contaminants into the soil and groundwater in any harmful quantities.

Table 9: Results of the LCA for scenario 2 and 3 (modules C1 and C2) – Core environmental indicators per declared unit.

Core environmental indicators			C1	C2	C4
Impact category		Unit	Scenario 2 / 3	Scenario 2 / 3	Scenario 2 / 3
Climate change	Total	kg CO_2 eq.	1.2 / 0	0.76 / 0	0/0
	Fossil	kg CO_2 eq.	1.2 / 0	0.76 / 0	0/0
	Biogenic	kg CO_2 eq.	0 / 0	0 / 0	0/0
	Land use and land use change	kg CO_2 eq.	7.0E-03 / 0	4.2E-03 / 0	0/0
	GWP-GHG	kg CO_2 eq.	1.2 / 0	0.76 / 0	0/0
Ozone depletion		kg CFC 11 eq.	7.6E-14 / 0	4.5E-14 / 0	0/0
Acidification		mol H^+ eq.	3.3E-03 / 0	6.7E-04 / 0	0/0
Eutrophication aquatic freshwater		kg P eq.	3.8E-06 / 0	2.3E-06 / 0	0/0
Eutrophication aquatic marine		kg N eq.	1.5E-03 / 0	2.0E-04 / 0	0/0
Eutrophication terrestrial		mol N eq.	0.017 / 0	2.4E-03 / 0	0/0
Photochemical ozone formation		kg NMVOC eq.	4.8E-03 / 0	5.8E-04 / 0	0/0
Depletion of abiotic resources - minerals and metals		kg Sb eq.	1.1E-07 / 0	6.3E-08 / 0	0/0
Depletion of abiotic resources - fossil fuels		MJ, net calorific value	17 / 0	10 / 0	0/0
Water use		m^3 world eq. deprived	0.011 / 0	6.8E-03 / 0	0/0

Table 10: Results of the LCA for scenario 2 and 3 (modules C1 and C2) – Resource use per declared unit.

Use of resources		C1	C2	C4
Parameter	Unit	Scenario 2 / 3	Scenario 2 / 3	Scenario 2 / 3
Use of renewable primary energy excl. renewable primary energy resources used as raw materials	MJ, net calorific value	0.96 / 0	0.57 / 0	0 / 0
Use of renewable primary energy as raw materials	MJ, net calorific value	0 / 0	0 / 0	0 / 0
Total use of renewable primary energy	MJ, net calorific value	0.96 / 0	0.57 / 0	0 / 0
Use of non-renewable primary energy excl. non-renewable primary energy resources used as raw materials	MJ, net calorific value	17 / 0	10 / 0	0 / 0
Use of non-renewable primary energy as raw materials	MJ, net calorific value	0 / 0	0 / 0	0 / 0
Total use of non-renewable primary energy	MJ, net calorific value	17 / 0	10 / 0	0 / 0
Use of secondary material	kg	0 / 0	0 / 0	0 / 0
Use of renewable secondary fuels	MJ, net calorific value	0 / 0	0 / 0	0 / 0
Use of non-renewable secondary fuels	MJ, net calorific value	0 / 0	0 / 0	0 / 0
Use of net fresh water	m^3	1.1E-03 / 0	6.5E-04 / 0	0 / 0

Table 11: Results of the LCA for scenario 2 and 3 (modules C1 and C2) – Waste categories and output flows per declared unit.

Waste categories & output flows		C1	C2	C4
Parameter/Indicator	Unit	Scenario 2 / 3	Scenario 2 / 3	Scenario 2 / 3
Hazardous waste disposed	kg	8.1E-11 / 0	4.8E-11 / 0	0 / 0
Non-hazardous waste disposed	kg	2.4E-03 / 0	1.5E-03 / 0	0 / 73.1
Radioactive waste disposed	kg	2.1E-05 / 0	1.2E-05 / 0	0 / 0
Components for re-use	kg	0 / 0	0 / 0	0 / 0
Materials for recycling	kg	0 / 0	73 / 0	0 / 0
Materials for energy recovery	kg	0 / 0	0 / 0	0 / 0
Exported energy	MJ per energy carrier	0 / 0	0 / 0	0 / 0

Table 12: Results of the LCA for scenario 2 and 3 (modules C1 and C2) – Additional environmental impact indicators per declared unit.

Additional environmental impact indicators		C1	C2	C4
Impact category	Unit	Scenario 2 / 3	Scenario 2 / 3	Scenario 2 / 3
Particulate Matter emissions	Disease incidence	2.5E-04 / 0	4.2E-09 / 0	0 / 0
Ionizing radiation, human health	kBq U235 eq.	3.1E-03 / 0	1.8E-03 / 0	0 / 0
Eco-toxicity (freshwater)	CTUe	12 / 0	7.0 / 0	0 / 0
Human toxicity, cancer effects	CTUh	1.4E-09 / 0	1.4E-10 / 0	0 / 0
Human toxicity, non-cancer effects	CTUh	4.2E-07 / 0	7.3E-09 / 0	0 / 0
Land use related impacts/Soil quality	dimensionless	5.8 / 0	3.5 / 0	0 / 0

Programme information

This EPD is developed by Hercules Grundläggning AB. The EPD is valid for five years (after which it can be revised and reissued). Hercules Grundläggning AB is the declaration owner and has the liability and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes 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.

The aim of this EPD is that it shall provide objective and reliable information on the environmental impact of the production of the declared product.

The intended use of the EPD is for business-to-business communication.

Table 13: Verification details.

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
ISO standard ISO 21930 and CEN standard EN 15804 serve as the core Product Category Rules (PCR)
Product category rules (PCR): PCR 2019:14 Construction products, version 1.2.4
PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com/TC 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.
Life cycle assessment (LCA)
LCA accountability: Sofia Dahling, NCC
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: EPD verification by individual verifier Third-party verifier: Håkan Stripple, hakan.stripple@ivl.se, IVL Swedish Environmental Research Institute. Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third-party verifier: ☒ Yes ☐ No

Address of programme operator: EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com

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SS-EN 10248-2:1995 Hot rolled sheet piling of non alloy steels – Part 2: Tolerances on shape and dimensions (SS EN 10248-2:1995)

SS-EN ISO 14025:2010 Environmental labels and declarations - Type III environ-mental declarations - Principles and procedures (ISO 14025:2006)

SS-EN ISO 14040:2006 Environmental management – Life cycle assessment – Principles and framework (ISO 14040:2006)

SS-EN ISO 14044:2006/A1:2018 Environmental management - Life cycle assessment - Requirements and guidelines – Amendment 1 (ISO 14044:2006 / Amd 1:2018)

The International EPD® System, EPD International AB, Stockholm, Sweden, http://www.environdec.com/

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Differences versus previous versions

Table 14: Versions of this EPD.

Date of revision	Description of difference versus previous versions
2022-12-05	Original version