

Environmental Product Declaration



In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

S-Wall[®]

from

Scandia Steel AB



Programme:	The International EPD [®] System, www.environdec.com
Programme operator:	EPD International AB
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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



Environmental Product Declarations (EPD) present transparent, verified and comparable information about the life-cycle environmental impact of products.

The International EPD[®] System is a global program for environmental declarations based on ISO 14025 and EN 15804. The EPD online database currently contains more than 1100 EPDs for a wide range of product categories by organisations in 45 countries.

Company information

Owner of the EPD: Scandia Steel

Contact: Thorulf Hamfors

Description of the organisation: Scandia Steel is a leading supplier of steel piling pipes. The piles are supplied to the Scandinavian building industry and used by well-known construction companies.

Product-related or management system-related certifications:

ISO 9001:2015, ISO 14001:2015, ISO 45001:2018, EN 1090-1:2009+A1:2012, EN ISO 3834-2:2006, ETA and ETA 15/0029.

Product information

S-Wall is a drilled sheet pile wall that is mainly used in difficult ground conditions with block-rich ground or other obstacles where blown sheet piling is not possible. A drilled sheet pile wall is also effective in projects that are sensitive to environmental influences.

The S-wall consist of steel pipes connected by a steel lock, see Figure 1

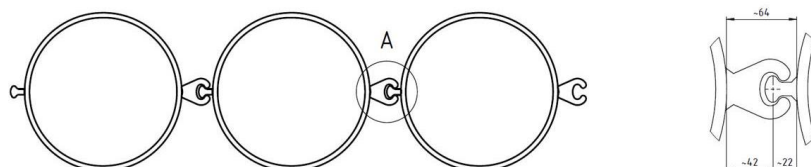


Figure 1, show a schematic of the S-Wall.

A picture of the steel pipes can be seen in Figure 2.



Figure 2 show the steel pipes used in the S-Wall.

LCA information

Functional Unit	The functional unit used in this report is 1m, diameter 323,9 x 12,5mm pipe. The total weight of the final product is 113,9kg
Product group classification	UN CPC 41244
Goal and Scope	<p>The result will be used to understand where the environmental burden for the product occur during the life cycle and aim to lay a road map for development to reduce this burden. The result will be communicated by the International EPD system.</p> <p>The audience is construction companies.</p>
Manufacturing Site	Marcegaglia Carbon Steel S.p.A. – Casalmaggiore plant Via Vanoni 25 26041 Casalmaggiore (CR);
Geographical Area	Europe
Compliant with	<p>This EPD follows the “Book-keeping“ LCA approach which is defined as an attributional LCA in the ISO 14040 standard.</p> <p>The EPD is compliant with:</p> <ul style="list-style-type: none"> • ISO 14025 • EN 15804:2012+A2:2019 • Product Category Rules PCR 2019-12-20. Construction products and construction services. Version 2.33
Cut-Off Rules	<p>The procedure below is followed for the exclusion of inputs and outputs according to the EN 15804:2012+ A2:2019 standard:</p> <ul style="list-style-type: none"> - In the case of insufficient input data or data gaps for a unit process, the cut-off criterion is 1 % of renewable and non-renewable primary energy usage and 1 % of the total mass input to that unit process. - The maximum neglected input flows per declared module (A1- A3) is 5 % of energy usage and mass. <p>No cut-offs have been made concerning specific data in this study.</p>
Background Data	<p>The data quality of the background data is considered good. All site-specific data is collected from the year 2019. ecoinvent is the world’s biggest LCI data library and the latest and most updated version was used. ecoinvent’s data library contain data for the specific geographical regions relevant for this study.</p> <p>The assessment considers all available data from the production process, including all raw materials and auxiliary materials used as well as the energy consumption in relation to available ecoinvent 3.6 datasets for the manufacture of concrete piles.</p> <p>The background data from ecoinvent 3.6 are from 2016-2019</p>
Electricity data	Electricity consumption in the A3 module comes from 100% renewable energy by biomass, solar and wind power, they are represented by data in ecoinvent 3.6 regionalized for Lithuania.
Allocations	<p>Polluter Pays / Allocation by Classification</p> <p>Two allocation rules are applied:</p>

	1) the raw material necessary for the manufacture is allocated by mass of the declared unit 2) the energy necessary for the manufacture is allocated in MJ by production of the declared unit
Impact Assessment methods	Resource use values are calculated from Cumulative Energy Demand V1.11. Potential environmental impacts are calculated with Environmental Footprint 3.0 method as implemented in SimaPro 9.1.
Based on LCA Report	Miljögraff report 817 LCA Scandia Steel
LCA Practitioner	Pär Lindman, Miljögraff AB
Software	SimaPro 9.1

The product documented within this EPD contains no substances in the REACH Candidate list. Furthermore, the product does not contain any substances from the Norwegian priority list.

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

System Boundary

This is a Cradle to Gate with options with modules A1-A4+C+D (see Table 1 for included modules). The system boundary mean that all processes needed for raw material extraction, transport, manufacturing and disposal are included in the study. For an overview of the included processes see Figure 3.

Table 1, show an overview of the included and accounted life cycle phases.

	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	
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	IT/DE	Euro	LT	Euro	SE/NO	SE/NO	SE/NO	SE/NO	SE/NO	SE/NO	SE/NO	SE/NO	SE/NO	SE/NO	SE/NO	SE/NO	SE/NO
Specific data	>90%					-	-	-	-	-	-	-	-	-	-	-	-

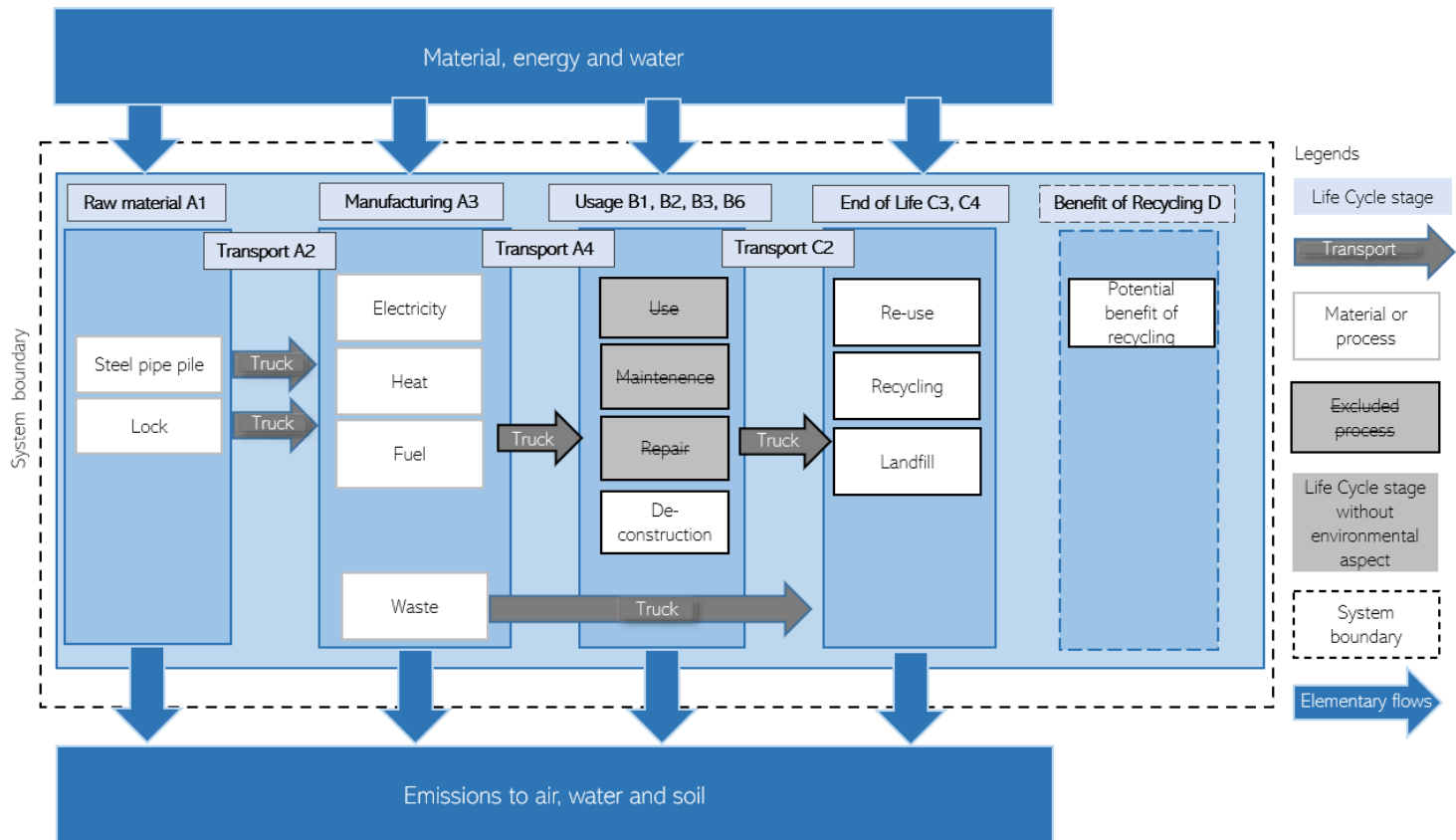


Figure 3, shows what is considered in the different modules



Content and life cycle information

The S-Wall consist of two components, a steel pipe and a steel lock. The weight per FU and part recycled material can be seen in Table 2.

Table 2, show the weight and part recycled material for the two components in the S-Wall.

Product components	Weight, kg	Post-consumer material, weight-%
Steel pipe	96	24
Steel lock	17,9	50
Total	113,9	28

The steel raw material is produced in Italy for the steel pipe and in Germany for the steel lock. The steel pipe piles go through the following manufacturing processes at the manufacturer: coils cutting (slitter), profiling (tube mill), normalizing and annealing (Heat treatments), straightening, cutting tubes to size. The finished steel pipe pile weighs 96 kg/m and is of steel quality S460MH. The steel lock has steel quality S355 GP and S355J2.

The finished components are transported with lorry to Scandia Steel:s facility in Kretinga, Lithuania for final assembly. In Kretinga the lock is welded to the steel pipe. In Kretinga only certified renewable electricity is used.

The finished product is then transported without any packaging to different constructions sites in Sweden and Norway.

After usage, the S-Wall is de-constructed and sent for recycling. A recycling rate is set to 91% as an average for the different markets where the S-Wall is installed. Considering the high durability of steel in the ground the potential benefit is calculated from avoiding other steel products.



Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Impact category	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Climate change	kg CO2 eq	1,93E+02	3,87E+01	7,11E-01	2,33E+02	8,65E+00	2,80E-02	9,50E-01	2,39E+00	5,40E-02	-1,15E+02
Ozone depletion	kg CFC11 eq	9,79E-06	8,79E-06	4,56E-08	1,86E-05	1,90E-06	6,05E-09	2,16E-07	3,84E-07	2,22E-08	-6,49E-06
Ionising radiation, HH	kBq U-235 eq	7,57E+00	3,01E+00	6,70E-02	1,06E+01	6,81E-01	1,75E-03	7,38E-02	4,81E-01	6,74E-03	-6,12E+00
Photochemical ozone formation, HH	kg NMVO C eq	9,95E-01	1,59E-01	3,22E-03	1,16E+00	4,74E-02	3,90E-04	3,90E-03	2,29E-02	5,64E-04	-5,56E-01
Respiratory inorganics	disease inc.	1,69E-05	2,70E-06	9,24E-08	1,97E-05	5,33E-07	7,76E-09	6,62E-08	4,26E-07	9,95E-09	-1,11E-05
Non-cancer human health effects	CTUh	9,37E-06	5,09E-07	6,23E-08	9,94E-06	1,06E-07	2,00E-10	1,25E-08	1,91E-07	6,96E-10	-1,27E-05
Cancer human health effects	CTUh	1,12E-06	1,31E-08	7,25E-09	1,14E-06	3,12E-09	8,12E-12	3,22E-10	4,01E-09	2,26E-11	-1,04E-06
Acidification terrestrial and freshwater	mol H+ eq	9,03E-01	1,58E-01	3,95E-03	1,07E+00	4,41E-02	2,93E-04	3,88E-03	3,17E-02	5,13E-04	-6,06E-01
Eutrophication freshwater	kg P eq	1,68E-01	2,83E-03	5,02E-04	1,71E-01	7,00E-04	1,01E-06	6,95E-05	1,94E-03	5,54E-06	-8,12E-02
Eutrophication marine	kg N eq	2,02E-01	4,74E-02	8,06E-04	2,50E-01	1,52E-02	1,30E-04	1,16E-03	7,34E-03	1,77E-04	-1,36E-01
Eutrophication terrestrial	mol N eq	2,13E+00	5,19E-01	8,06E-03	2,65E+00	1,66E-01	1,42E-03	1,27E-02	8,36E-02	1,94E-03	-1,35E+00
Ecotoxicity freshwater	CTUe	1,04E+04	4,67E+02	3,02E+01	1,09E+04	1,02E+02	2,32E-01	1,15E+01	1,64E+02	9,79E-01	-5,28E+03
Land use	Pt	5,88E+02	4,02E+02	2,72E+00	9,92E+02	8,93E+01	4,92E-02	9,87E+00	7,84E+01	3,16E+00	-4,43E+02
Water scarcity	m3 depriv.	4,73E+01	1,62E+00	3,06E-01	4,92E+01	3,73E-01	5,17E-04	3,98E-02	3,53E-01	6,76E-02	-1,93E+01
Resource use, energy carriers	MJ	1,95E+03	5,83E+02	8,52E+00	2,54E+03	1,27E+02	3,86E-01	1,43E+01	3,40E+01	1,51E+00	-1,26E+03
Resource use, mineral and metals	kg Sb eq	2,56E-03	1,05E-03	1,96E-05	3,63E-03	2,07E-04	4,30E-08	2,57E-05	1,55E-04	4,94E-07	-1,97E-03
Climate change - fossil	kg CO2 eq	1,93E+02	3,87E+01	7,08E-01	2,33E+02	8,64E+00	2,80E-02	9,49E-01	2,38E+00	5,40E-02	-1,15E+02
Climate change - biogenic	kg CO2 eq	1,83E-01	1,41E-02	1,43E-03	1,99E-01	3,63E-03	4,70E-06	3,45E-04	8,28E-03	3,16E-05	-1,57E-01
Climate change - land use and transform.	kg CO2 eq	6,79E-02	1,35E-02	6,91E-04	8,21E-02	5,23E-03	2,21E-06	3,32E-04	4,74E-03	1,50E-05	-7,87E-02

* Disclaimer: The results of this environmental impact indicator in the Table above should be applied with care due to the relatively high degree of uncertainty of the results, alongside limited general experience with the indicator.

Use of resources

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	1,03E+02	8,23E+00	6,00E+00	1,17E+02	2,01E+00	2,09E-03	2,02E-01	7,86E+00	1,22E-02	-1,17E+02
PERM	MJ	0	0	0	0	0	0	0	0	0	0
PERT	MJ	1,03E+02	8,23E+00	6,00E+00	1,17E+02	2,01E+00	2,09E-03	2,02E-01	7,86E+00	1,22E-02	-1,17E+02
PENRE	MJ	2,06E+03	6,19E+02	3,52E+00	2,68E+03	1,35E+02	4,10E-01	1,52E+01	3,59E+01	1,60E+00	-1,33E+03
PENRM	MJ	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	2,06E+03	6,19E+02	3,52E+00	2,68E+03	1,35E+02	4,10E-01	1,52E+01	3,59E+01	1,60E+00	-1,33E+03
SM	kg	3,19E+01	0	1,20E-01	3,20E+01	0	0	0	0	0	0
RSF	MJ	1,05E-10	0	0	1,05E-10	1,00E-10	0	0	0	0	0
NRSF	MJ	1,40E-10	0	0	0	1,40E-10	0	0	0	0	0
FW	m3	1,51E+00	1,10E-01	7,65E-03	1,63E+00	2,61E-02	4,08E-05	2,70E-03	1,54E-02	1,68E-03	-1,10E+00
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 production and output flows

Waste production

Indicator	Unit	A1	A2	A3	A1-A3	A4	C	D
Hazardous waste disposed	kg	0,91	0	0	0,91	0	0	0
Non-hazardous waste disposed	kg	2,28*	0	0	2,28	0	0	0
Radioactive waste disposed	kg	0	0	0	0	0	0	0

*Slag from electric arc producing recycled steel

Information on biogenic carbon content



Results per functional or declared unit		
BIOGENIC CARBON CONTENT	Unit	QUANTITY
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	0

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



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2012:01. Construction products and construction services. Version 2.3, the International EPD System, Date 2018-11-15
PCR review was conducted by: PCR Committee: IVL Swedish Environmental Research Institute, Swedish Environmental Protection Agency, SP Trä, Swedish Wood Preservation Institute, Swedisol, SCDA, Svenskt Limträ AB, SSAB Moderator: Martin Erlandsson, IVL Swedish Environmental Research Institute
Independent third-party verification of the declaration and data, according to ISO 14025:2006: <input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification
Third party verifier: Dr. Hüdai Kara, Metsims. Individual verifier approved by the International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

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

EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

References

General Programme Instructions of the International EPD[®] System. Version 3.01.

EN 15804:2012+A2:2019, "Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products"

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