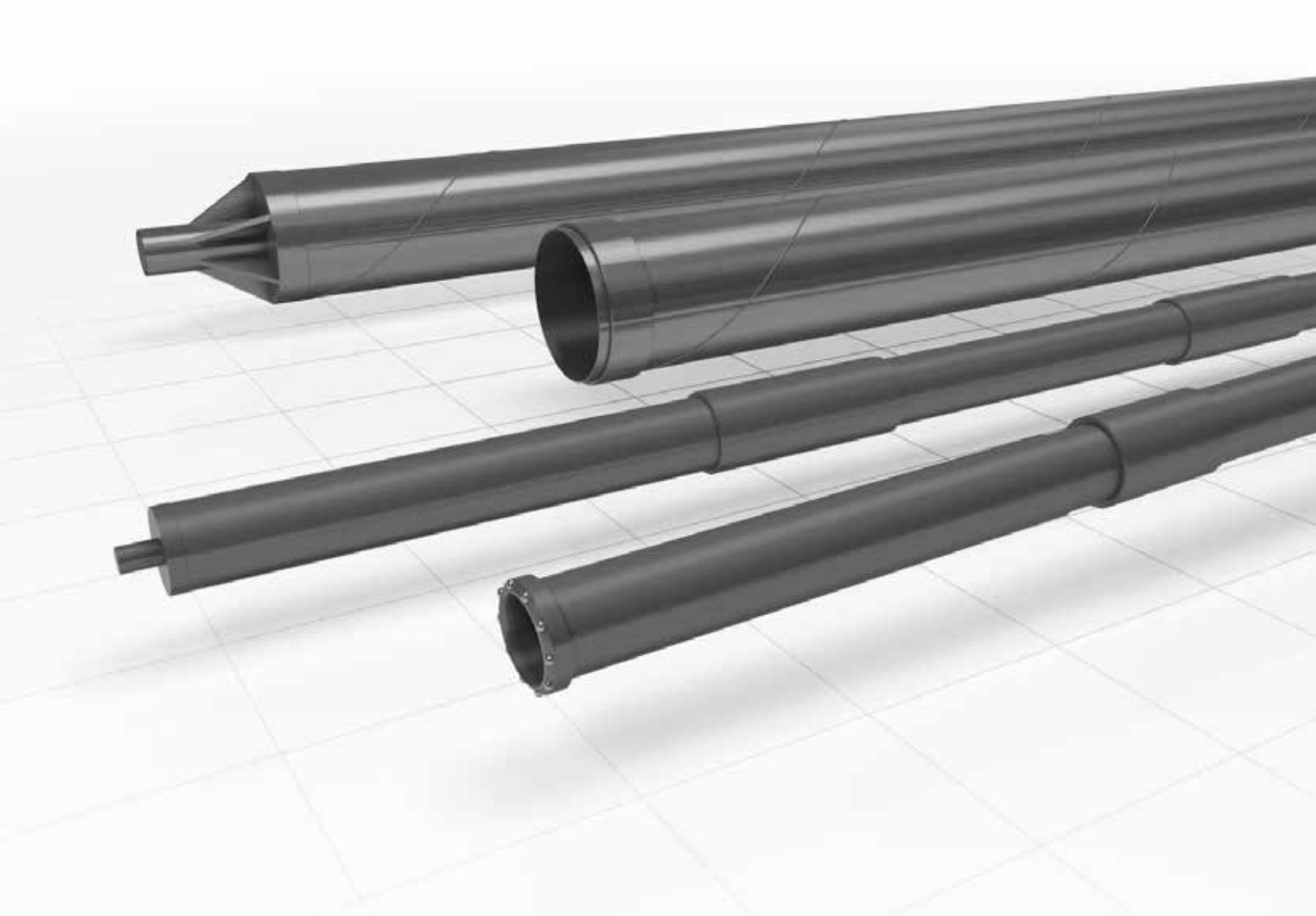




Steel piles

Environmental Product Declaration (EPD)
In accordance with ISO 14025 and EN 15804:2012+A2:2019

S-P-02243, version 1.0
UN CPC 412
Programme: The International EPD® System, www.environdec.com
Programme operator: EPD International AB
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1. SSAB

1.1 DESCRIPTION OF THE ORGANISATION:

SSAB is the leading steel tube manufacturer in the Nordic countries with a broad selection of products to meet the needs of the construction, automotive and manufacturing industries. SSAB is also one of the leading suppliers of steel infrastructure products in Europe especially for foundation construction. Extensive range of products include structural hollow sections, precision tubes, cold-formed open sections, steel piles, retaining walls, safety barrier systems, trapezoidal sections and water mains. We expertise in high-strength steels and aim at exceeding expectations by continuously developing our operations and products keeping customer's business on focus.

1.2 PRODUCT-RELATED OR MANAGEMENT SYSTEM-RELATED CERTIFICATIONS

- Quality management system certification (ISO 9001:2015 91659-2011-AQ-FIN-FINAS) and Environmental management system certifications ISO 14001:2015 (91660-2011-AE-FIN-FINAS)
- SSAB have CE marking for steel piles based on European Technical Approval (ETA-12/0526)

1.3 NAME AND LOCATION OF PRODUCTION SITE(S)

Steel piles are manufactured at SSAB's production sites in Finland, micro piles in Pulkkila and macro piles in Oulainen. Subcontractors finish the micro piles by installing mechanical parts in Pulkkila and Hämeenlinna. Input material for the production of steel piles is manufactured at SSAB's Raahemill in Finland.

2. Product information

2.1 PRODUCT NAME

Steel Piles

2.2 PRODUCT IDENTIFICATION

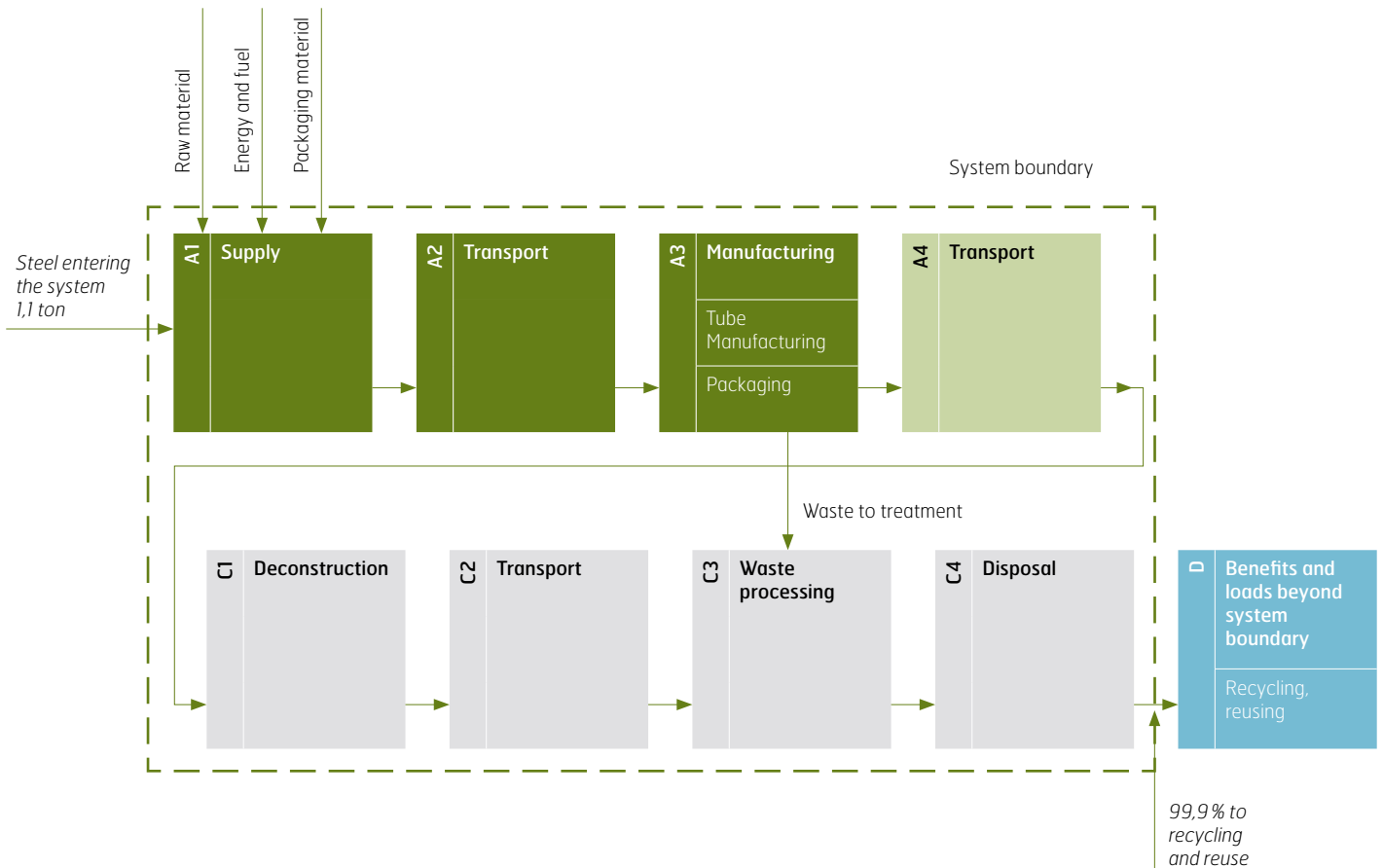
Steel pile is a longitudinally or spirally welded steel pipe with optional mechanical splices, pile tip, bearing plate or welded interlocks for foundation construction.

2.3 PRODUCT DESCRIPTION

- RR® PILES – Steel piles with effective splicing technology for quick and cost-effective installation by driving.
- RD® PILES – Special steel piles for difficult ground and environmental conditions installed by drilling.
- RD® PILE WALL – Driven RD® PILE WALL for demanding retaining wall and other foundation structures.

3. LCA information

- **Declared unit:** 1 ton of product
- **Reference service life:** N/A
- **Time representativeness:** The data is collected from year 2019. The database data are from 2018.
- **Database(s) and LCA software used:** SimaPro (release 9.0.0.49), and database ecoinvent 3.5
- **Description of system boundaries:** The EPD type is cradle to gate with options, modules C1–C4, and module D (A1–A3, C, D and additional modules). The additional module is A4.
- **Excluded lifecycle stages:** Modules A5 and B1–B5 are not assessed. In B1–B5, only minimal maintenance is required. The excluded modules are very dependent on particular scenarios for a specific building or construction work.
- **Numbers:** Numbers are expressed using the French style (comma as the decimal separator).
- **Results:** The results are declared separately for two different steel pile products: macro piles, that are made in Oulainen, and micro piles, that are made in Pulkkila.
- **System diagram:** See illustration below.
- **LCA practitioner:** Ecobio Oy, info@ecobio.fi
Explanatory material can be obtained from the EPD owner and/or LCA practitioner.
- **Cut-off rule:** 1% cut-off rule was applied for input flows in the inventory. The material used is as up-to-date as possible and at most five years old for producer specific data and at most ten years old for generic data.
- **Electricity source:** The electricity is market priced electricity. The emission factor used for the electricity is 269 g CO₂-eq./kWh.
- **Data quality:** The production data has been collected from the production sites in 2019. The raw material data is collected in 2017 and the database data are from 2018.
- **Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation:** See the table on the next page.



	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	ND	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x	
Geography	EU27	EU27	EU27	EU27	-	-	-	-	-	-	-	-	EU27	EU27	EU27	EU27	EU27	
Specific data	>90%					-	-	-	-	-	-	-	-	-	-	-	-	
Variation – products	>10%					-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	<10%					-	-	-	-	-	-	-	-	-	-	-	-	-



4. Content information

Product components of macro piles	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Hot rolled steel	1000	0	0
TOTAL	1000	0	0
Packaging materials	Weight, kg	Weight-% (versus the product)	
Steel straps	0,2	0,0006	
Wood	1,1	0,0026	
TOTAL	1,3	0,0032	

Product components of micro piles	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Hot rolled steel	1000	0	0
TOTAL	1000	0	0
Packaging materials	Weight, kg	Weight-% (versus the product)	
Steel straps	1,0	0,002	
Wood	4,3	0,011	
TOTAL	5,3	0,013	

The steel piles do not contain substances which exceed the limits for registration with the European Chemicals Agency regarding the "Candidate List of Substances of Very High Concern for Authorisation".

4.1 PACKAGING

Distribution packaging: The products are packed with steel straps to bind the products. In some cases, also wood is used to protect the packed products.

4.2 MANUFACTURING

The products manufacturing processes consist of the following phases: Tube manufacturing in longitudinally welding lines, tube manufacturing in spirally welding line, installation of optional mechanical splices, pile tip, bearing plate or welded interlocks for foundation construction, and packaging.



5. Environmental information

POTENTIAL ENVIRONMENTAL IMPACT – MANDATORY INDICATORS ACCORDING TO EN 15804

Results of macro piles per declared unit								
Indicator	Unit	Tot.A1-A3	A4	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	2,54E+03	5,43E+01	2,29E+00	4,49E+00	0,00E+00	7,40E-01	-1,54E+03
GWP-biogenic	kg CO ₂ eq.	1,58E+01	2,46E-01	5,84E-03	1,96E-02	0,00E+00	5,64E-03	5,46E+00
GWP-luluc	kg CO ₂ eq.	8,21E-01	1,48E-02	2,44E-04	1,13E-03	0,00E+00	2,03E-04	-6,02E-02
GWP-total	kg CO ₂ eq.	2,56E+03	5,46E+01	2,29E+00	4,51E+00	0,00E+00	7,46E-01	-1,54E+03
ODP	kg CFC 11 eq.	5,90E-06	1,02E-05	4,03E-07	8,63E-07	0,00E+00	2,67E-07	3,65E-05
AP	mol H ⁺ eq.	7,08E+00	2,56E-01	2,36E-02	1,91E-02	0,00E+00	7,32E-03	-3,51E+00
EP-freshwater	kg P eq.*	1,00E-02	4,45E-03	1,63E-04	3,59E-04	0,00E+00	8,51E-05	1,94E-01
EP-marine	kg N eq.	1,79E+00	7,20E-02	1,02E-02	5,63E-03	0,00E+00	2,42E-03	-7,70E-01
EP-terrestrial	mol N eq.	1,94E+01	7,95E-01	1,12E-01	6,22E-02	0,00E+00	2,66E-02	-8,26E+00
POCP	kg NMVOC eq.	5,31E+00	2,40E-01	3,03E-02	1,94E-02	0,00E+00	7,55E-03	-2,79E+00
ADP-minerals&metals**	kg Sb eq.	4,15E-03	1,24E-04	1,15E-06	8,42E-06	0,00E+00	8,33E-07	3,31E-03
ADP-fossil**	MJ	2,81E+04	8,39E+02	3,27E+01	7,06E+01	0,00E+00	2,24E+01	-1,47E+04
WDP	m ³	-1,57E+02	-9,17E-02	-2,73E-04	-5,98E-03	0,00E+00	2,72E-03	2,76E+00
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							

* The EP-freshwater indicator is calculated in unit kg P eq. ** 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.

Results of micro piles per declared unit								
Indicator	Unit	Tot.A1-A3	A4	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	2,43E+03	5,56E+01	3,04E-01	4,49E+00	0,00E+00	7,40E-01	-1,53E+03
GWP-biogenic	kg CO ₂ eq.	1,06E+01	2,52E-01	7,76E-04	1,96E-02	0,00E+00	5,64E-03	7,36E+00
GWP-luluc	kg CO ₂ eq.	8,21E-01	1,52E-02	3,24E-05	1,13E-03	0,00E+00	2,03E-04	-3,27E-02
GWP-total	kg CO ₂ eq.	2,44E+03	5,59E+01	3,04E-01	4,51E+00	0,00E+00	7,46E-01	-1,52E+03
ODP	kg CFC 11 eq.	1,03E-05	1,05E-05	5,36E-08	8,63E-07	0,00E+00	2,67E-07	3,71E-05
AP	mol H ⁺ eq.	6,80E+00	2,62E-01	3,14E-03	1,91E-02	0,00E+00	7,32E-03	-3,46E+00
EP-freshwater	kg P eq.*	1,44E-02	4,55E-03	2,16E-05	3,59E-04	0,00E+00	8,51E-05	1,95E-01
EP-marine	kg N eq.	1,71E+00	7,37E-02	1,35E-03	5,63E-03	0,00E+00	2,42E-03	-7,57E-01
EP-terrestrial	mol N eq.	1,86E+01	8,14E-01	1,48E-02	6,22E-02	0,00E+00	2,66E-02	-8,12E+00
POCP	kg NMVOC eq.	5,10E+00	2,46E-01	4,02E-03	1,94E-02	0,00E+00	7,55E-03	-2,75E+00
ADP-minerals&metals**	kg Sb eq.	4,05E-03	1,27E-04	1,53E-07	8,42E-06	0,00E+00	8,33E-07	3,35E-03
ADP-fossil**	MJ	2,67E+04	8,60E+02	4,34E+00	7,06E+01	0,00E+00	2,24E+01	-1,46E+04
WDP	m ³	-1,47E+02	-9,39E-02	-3,63E-05	-5,98E-03	0,00E+00	2,72E-03	1,82E+00
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							

* The EP-freshwater indicator is calculated in unit kg P eq. ** 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.

POTENTIAL ENVIRONMENTAL IMPACT – ADDITIONAL MANDATORY INDICATORS

Results of macro piles per declared unit								
Indicator	Unit	Tot.A1-A3	A4	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	2,54E+03	5,44E+01	2,29E+00	4,49E+00	0,00E+00	7,40E-01	-1,54E+03

Results of micro piles per declared unit								
Indicator	Unit	Tot.A1-A3	A4	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	2,43E+03	5,56E+01	3,04E-01	4,49E+00	0,00E+00	7,40E-01	-1,53E+03

¹ The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

USE OF RESOURCES

Results of macro piles per declared unit								
Indicator	Unit	Tot.A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	1,11E+03	9,25E+00	2,74E-01	7,60E-01	0,00E+00	1,86E-01	1,16E+02
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,11E+03	9,25E+00	2,74E-01	7,60E-01	0,00E+00	1,86E-01	1,16E+02
PENRE	MJ	2,86E+04	8,62E+02	3,33E+01	7,25E+01	0,00E+00	2,28E+01	-1,25E+04
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,86E+04	8,62E+02	3,33E+01	7,25E+01	0,00E+00	2,28E+01	-1,25E+04
SM	kg	3,02E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	9,57E-20	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	1,12E-18	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	-1,39E+00	1,50E-01	4,98E-03	1,32E-02	0,00E+00	2,35E-02	-1,18E+02
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 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							

Results of micro piles per declared unit								
Indicator	Unit	Tot.A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	1,14E+03	9,47E+00	3,63E-02	7,60E-01	0,00E+00	1,86E-01	1,59E+02
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,14E+03	9,47E+00	3,63E-02	7,60E-01	0,00E+00	1,86E-01	1,59E+02
PENRE	MJ	2,74E+04	8,83E+02	4,43E+00	7,25E+01	0,00E+00	2,28E+01	-1,23E+04
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,74E+04	8,83E+02	4,43E+00	7,25E+01	0,00E+00	2,28E+01	-1,23E+04
SM	kg	2,83E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	8,96E-20	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	1,05E-18	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	-1,15E+00	1,54E-01	6,61E-04	1,32E-02	0,00E+00	2,35E-02	-1,18E+02
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 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							

WASTE PRODUCTION AND OUTPUT FLOWS

Waste production

Results of macro piles per declared unit								
Indicator	Unit	Tot.A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	9,78E-04	5,12E-04	1,94E-05	4,16E-05	0,00E+00	1,52E-05	-1,03E-01
Non-hazardous waste disposed	kg	8,28E+01	5,84E+01	5,30E-02	6,11E+00	0,00E+00	1,40E+02	6,85E+00
Radioactive waste disposed	kg	1,97E-01	5,79E-03	2,26E-04	4,88E-04	0,00E+00	1,50E-04	-1,67E-03

Results of micro piles per declared unit								
Indicator	Unit	Tot.A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,25E-03	5,24E-04	2,58E-06	4,16E-05	0,00E+00	1,52E-05	2,68E-03
Non-hazardous waste disposed	kg	9,30E+01	5,98E+01	7,04E-03	6,11E+00	0,00E+00	1,40E+02	7,75E+00
Radioactive waste disposed	kg	1,88E-01	5,93E-03	3,00E-05	4,88E-04	0,00E+00	1,50E-04	2,20E-04

Output flows

Results of macro piles per declared unit								
Indicator	Unit	Tot.A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	0	0	150	0	0	0	0
Material for recycling	kg	49,8	0	684	0	0	0	0
Materials for energy recovery	kg	0,373	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0

Results of micro piles per declared unit								
Indicator	Unit	Tot.A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	0	0	150	0	0	0	0
Material for recycling	kg	87,4	0	684	0	0	0	0
Materials for energy recovery	kg	0,146	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0

INFORMATION ON BIOGENIC CARBON CONTENT

Results of macro piles per declared unit		
BIOGENIC CARBON CONTENT	Unit	QUANTITY
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	0,55

Results of micro piles per declared unit		
BIOGENIC CARBON CONTENT	Unit	QUANTITY
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	2,0

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

6. Additional information – scenarios

End-of-life (C)

The products are collected from their point of installation after their expected service life. They are transported to treatment or to landfill in the end-of-life phase.

Parameter	Unit
Collection process	collected separately
Transportation	50 km road
Recovery system	71 % recycled and 15 % reused
Disposal	14 % to landfill

Recycling and reuse (D)

The recycled and reused steel substitute primary steel and steel piles with a ratio of 1:1. The amount of steel scrap entering the product system (2,6 %) is subtracted from the amount of steel going to recycling as it has already been recovered from a previous system.

7. Differences versus previous versions

The values of module D have been updated. No other changes have been made to the EPD.



8. Programme information

Programme	The International EPD® System. EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden. www.environdec.com
EPD registration number	S-P-02243
Published	2020-09-14
Revision date	2021-02-26
Valid until	2025-08-28
Product group classification	UN CPC 4128
Reference year for data	2019
Geographical scope	Europe

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

Core product category rules (c-PCR)	CEN standard EN 15804 serves as the Core Product Category Rules (PCR).
Product category rules (PCR)	PCR 2019:14 Construction products. Version 1.0. 2019-12-20.
PCR review was conducted by	The Technical Committee of the International EPD® System. Chair: Claudia A. Peña. Contact via info@environdec.com
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	<input type="checkbox"/> EPD Process Certification (internal) <input checked="" type="checkbox"/> EPD Verification (external)
Third party verifier	Hannu Karppi Ramboll Finland Oy
<i>In case of recognised individual verifiers:</i>	
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 programmes 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.

9. References

- General Programme Instructions of the International EPD® System. Version 3.01.
- PCR 2019:14 Construction products. Version 1.0. 2019-12-20.
- Ecobio Oy. 2020. LCA Report – SSAB Europe Oy’s Structural hollow sections, steel piles and precision tubes.

10. Contact information

EPD owner	SSAB Europe Oy Tubular Products FI – 13300 Hämeenlinna Finland www.ssab.com Petteri Steen
LCA author:	Ecobio Oy Malminkatu 16 00100 Helsinki Finland www.ecobio.fi info@ecobio.fi
Program operator	EPD International AB info@environdec.com



SSAB is a Nordic and US-based steel company. SSAB offers value added products and services developed in close cooperation with its customers to create a stronger, lighter and more sustainable world. SSAB has employees in over 50 countries. SSAB has production facilities in Sweden, Finland and the US. SSAB is listed on the Nasdaq OMX Nordic Exchange in Stockholm and has a secondary listing on the Nasdaq OMX in Helsinki.