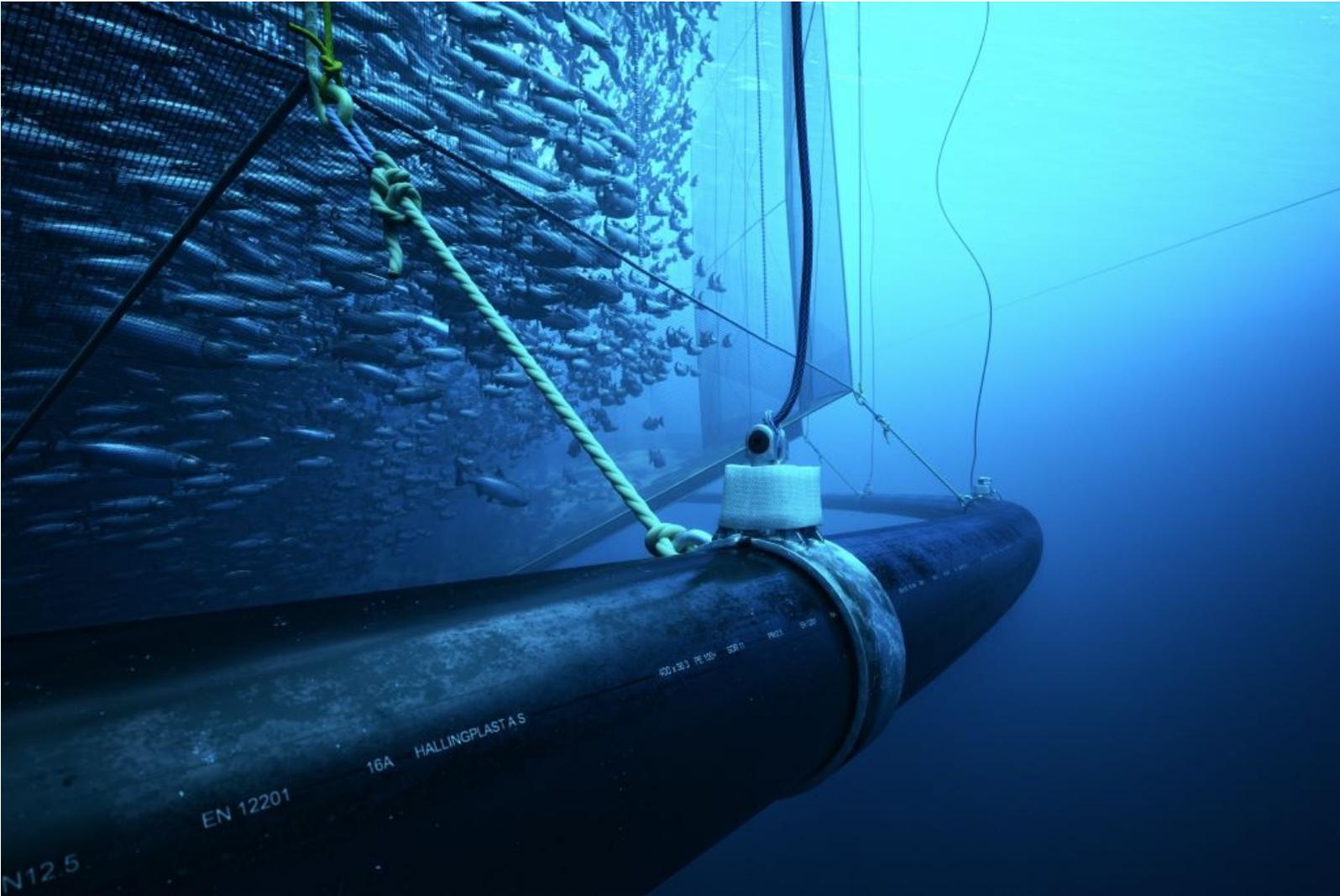


Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

Sinker tube for 157m fish farming pens (pipe \varnothing 400mm)



The Norwegian EPD Foundation

Owner of the declaration:

Scale Aquaculture AS

Product:

Sinker tube for 157m fish farming pens (pipe \varnothing 400mm)

Declared unit:

1 pcs

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR

NPCR 031:2023 Part B for sea-based aquaculture infrastructure and components

Program operator:

The Norwegian EPD Foundation

Declaration number:

NEPD-5904-5174-EN

Registration number:

NEPD-5904-5174-EN

Issue date: 01.02.2024

Valid to: 01.02.2029

EPD software:

LCAno EPD generator ID: 69896

General information

Product

Sinker tube for 157m fish farming pens (pipe ø400mm)

Program operator:

Post Box 5250 Majorstuen, 0303 Oslo, Norway
The Norwegian EPD Foundation
Phone: +47 23 08 80 00
web: post@epd-norge.no

Declaration number:

NEPD-5904-5174-EN

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 031:2023 Part B for sea-based aquaculture infrastructure and components

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Declared unit:

1 pcs Sinker tube for 157m fish farming pens (pipe ø400mm)

Declared unit with option:

A1,A2,A3,A4,C1,C2,C3,C4,D

Functional unit:

1 piece of sinker tube for 157m fish farming pens (pipe HDPE100 ø400mm, SDR11), manufactured and delivered at the sea-farm, including waste treatment at end-of-life.

General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPD-Norway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools

Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools. Approval number: NEPDT65.

Third party verifier:

Elisabet Amat, GREENIZE projects

(no signature required)

Owner of the declaration:

Scale Aquaculture AS
Contact person: Hanne Digre
Phone: +4795726482
e-mail: hanne.digre@scaleaq.com

Manufacturer:

Scale Aquaculture AS

Place of production:

Scale Aquaculture AS
Beddingen 16
7042 Trondheim, Norway

Management system:

ISO 9001 and ISO 14001

Organisation no:

929 013 581

Issue date:

01.02.2024

Valid to:

01.02.2029

Year of study:

2023

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD Norway.

Developer of EPD: June Valla

Reviewer of company-specific input data and EPD: Truls Øksnevad

Approved:



Håkon Hauan

Managing Director of EPD-Norway

Product

Product description:

Sinker tube for 157m pens (Pipe ø400mm)

As one of few suppliers of equipment to the fish farming industry, ScaleAQ is an approved supplier of pens, nets and mooring equipment. Both at home as well as abroad, we exclusively employ certified plastic welders with considerable experience of cage assembly. Our certificates are approved in accordance with the requirements of NS 9415.

The sinker tube is optional in accordance with the floating collar.

Scale AQs floating collars and sinker tubes combines the flexibility and durability of high density polyethylene plastic pipes with strong steel brackets. A sinker tube helps prevent the shape and thus the net volume from changing in locations subject to storms. The sinker tube is designed to make the handling of the net easier. All ScaleAQ pens are certified for use with a sinker tube.

Benefits using sinker tube:

Safety:

- Reduces point load on nets.
- Gives you full control during lining up.
- Minimal risk of propeller damage to nets.
- Stable net volume, even under extreme conditions.

Environmental benefits:

- Open mesh ensures good through-flow and less marine growth.
- "Constant" cylindrical net volume means fewer injuries and stress for the fish.
- A sinker tube makes delousing using sealed tarpaulins easier in large net pens.

Easier cleaning:

- Easy washing using brushes/high-pressure washes or divers.
- Net drying without significant changes to net shape.

Product specification

Materials	kg	%
Metal - Steel	13775,00	66,16
Plastic - Polyethylene (HDPE)	7046,00	33,84
Total	20821,00	

Technical data:

HDPE100 ø400mm SDR11

Brackets: Galvanized steel brackets, total 20pcs.

Steel wire: reused steel

Total weight of sinker tube : 20 821 kg

Market:

Norway

Reference service life, product

20 years

Reference service life, building or construction works

There are no standard service life for sea-based aquaculture farm. Each components have different service life and are repaired/replaced according to the regulations in NS9415-2021.

LCA: Calculation rules

Declared unit:

1 pcs Sinker tube for 157m fish farming pens (pipe ø400mm)

Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

Data quality:

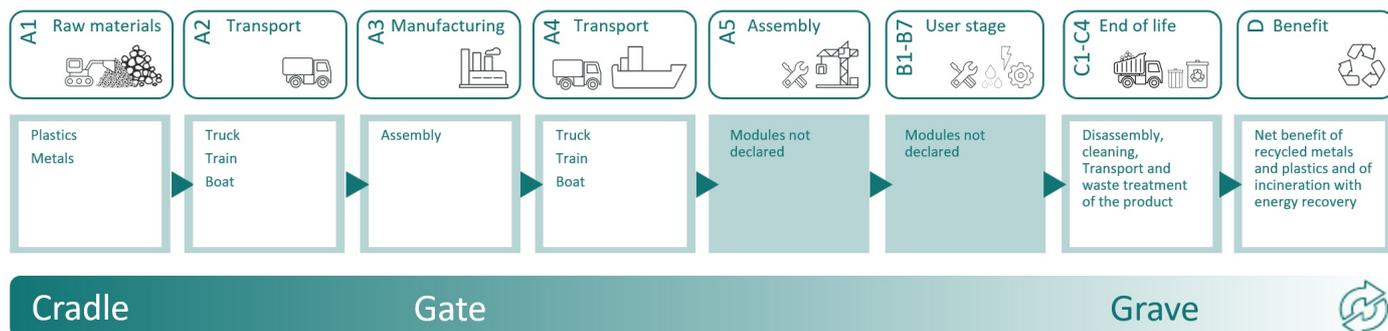
Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the raw materials in A1 is presented in the table below.

Materials	Source	Data quality	Year
Metal - Steel	ecoinvent 3.6	Database	2019
Metal - Steel	LCA.no	Database	2021
Plastic - Polyethylene (HDPE)	ecoinvent 3.6	Database	2019

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Product stage			Construction installation stage		Use stage								End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X	

System boundary:



Additional technical information:

The use of components made of plastic compose a risk of releasing microplastic into the ocean during its user phase. We have complete control over our sold floating collars, where no loss of equipment occurs.

As one of the industry's largest suppliers, we are daily aware of our responsibility to minimize the footprint of our business. In our sustainability pledges, we aim to reduce the release of plastic into nature and increase the recycling of our products. We have established "Scale Circular" as an initiative for increased sustainability and a circular economy. We have committed ourselves to several of the UN's sustainability goals, two of which are sustainability goal number 12, which is about responsible consumption and production, and number 13 stop climate change.

ScaleAQ is certified according to ISO 14001, environmental management, and is an approved Global GAP supplier.

A user manual is included with the purchase of the product.

For more information regarding our environmental work, please visit our site on <https://scaleaq.com/sustainability/#scale-on-sustainability>.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Ship, aquaculture transport, service vessel, 24 meters, with tugging (kgkm) - Global	20,0 %	370	1,080	l/tkm	400,03
De-construction demolition (C1)					
	Unit	Value			
Aquaculture operation, service vessel, 24 meter, product de-construction (per hour) - Floating collar	h/DU	0,50			
Diesel, burned (L)	L/DU	50,00			
Ship, aquaculture transport, service vessel, 24 meters, with tugging (kgkm) - Global	kgkm/DU	30560,49			
Transport to waste processing (C2)					
	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 6 (km) - Europe	36,7 %	300	0,043	l/tkm	12,90
Waste processing (C3)					
	Unit	Value			
Polyethylene to recycling (kg)	kg	6693,70			
Steel to recycling (kg)	kg	12397,50			
Waste treatment of polyethylene (PE), incineration with energy recovery and fly ash extraction (kg)	kg	352,30			
Waste treatment per kg of non-impregnated aquaculture components, washing process (kg) - Norway	kg	20821,00			
Disposal (C4)					
	Unit	Value			
Landfilling of ashes from incineration of Polyethylene (PE), process per kg ashes and residues (kg)	kg	12,42			
Landfilling of steel (kg)	kg	1277,50			
Benefits and loads beyond the system boundaries (D)					
	Unit	Value			
Substitution of electricity (MJ)	MJ	683,17			
Substitution of Polyethylene, HDPE granulate (kg)	kg	6693,70			
Substitution of primary steel with net scrap (kg)	kg	11762,30			
Substitution of thermal energy, district heating (MJ)	MJ	10335,71			

LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Environmental impact											
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D	
 GWP-total	kg CO ₂ -eq	2,05E+04	1,70E+03	1,78E+02	2,67E+04	4,54E+02	1,02E+03	2,82E+03	6,17E+00	-2,65E+04	
 GWP-fossil	kg CO ₂ -eq	2,03E+04	1,70E+03	1,78E+02	2,67E+04	4,54E+02	1,02E+03	2,82E+03	6,16E+00	-2,64E+04	
 GWP-biogenic	kg CO ₂ -eq	1,85E+02	4,65E-01	6,57E-02	5,01E+00	9,53E-02	4,22E-01	5,77E+00	5,02E-03	-7,71E+01	
 GWP-luluc	kg CO ₂ -eq	1,26E+01	5,02E-01	1,88E-02	9,67E+00	1,56E-01	3,63E-01	1,10E+00	1,18E-03	-1,20E+01	
 ODP	kg CFC11 -eq	8,00E-04	3,73E-04	3,83E-05	5,82E-03	9,81E-05	2,31E-04	2,35E-04	2,74E-06	-4,37E+00	
 AP	mol H+ -eq	8,45E+01	3,23E+01	1,86E+00	9,21E+02	1,13E+01	2,93E+00	1,30E+01	5,58E-02	-1,13E+02	
 EP-FreshWater	kg P -eq	6,44E-01	7,95E-03	7,28E-04	7,04E-02	1,54E-03	8,15E-03	4,64E-02	5,02E-05	-1,03E+00	
 EP-Marine	kg N -eq	1,47E+01	7,37E+00	8,17E-01	2,22E+02	3,10E+00	5,80E-01	3,14E+00	2,08E-02	-2,17E+01	
 EP-Terrestrial	mol N -eq	1,64E+02	8,22E+01	8,97E+00	2,43E+03	3,40E+01	6,49E+00	3,73E+01	2,29E-01	-2,30E+02	
 POCP	kg NMVOC -eq	6,88E+01	2,17E+01	2,47E+00	6,38E+02	9,04E+00	2,49E+00	1,10E+01	6,54E-02	-1,10E+02	
 ADP-minerals&metals ¹	kg Sb-eq	5,13E+00	2,26E-02	3,60E-04	1,10E-01	1,86E-03	2,82E-02	9,76E-02	5,21E-05	-3,44E-01	
 ADP-fossil ¹	MJ	5,85E+05	2,35E+04	2,45E+03	3,64E+05	6,20E+03	1,54E+04	3,16E+04	1,83E+02	-5,84E+05	
 WDP ¹	m ³	1,03E+06	1,31E+04	3,32E+03	6,13E+04	1,20E+03	1,49E+04	1,47E+05	4,37E+02	1,60E+05	

GWP-total = Global Warming Potential total; 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

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

1. 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

Remarks to environmental impacts

Additional environmental impact indicators

Indicator		Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
	PM	Disease incidence	7,82E-04	6,93E-05	4,90E-05	6,37E-03	1,15E-04	6,25E-05	1,88E-04	1,17E-06	-1,50E-03
	IRP ²	kgBq U235 -eq	7,57E+02	1,02E+02	1,07E+01	1,58E+03	2,67E+01	6,74E+01	7,09E+01	7,95E-01	-2,75E+02
	ETP-fw ¹	CTUe	3,37E+05	1,43E+04	1,40E+03	1,91E+05	3,40E+03	1,14E+04	3,38E+04	9,89E+01	-8,00E+05
	HTP-c ¹	CTUh	2,65E-05	0,00E+00	5,51E-08	2,31E-05	2,91E-07	0,00E+00	2,11E-06	3,14E-09	-6,60E-05
	HTP-nc ¹	CTUh	3,96E-04	8,81E-06	1,31E-06	1,62E-04	3,08E-06	1,25E-05	2,46E-05	7,27E-08	1,27E-03
	SQP ¹	dimensionless	7,88E+04	9,18E+03	3,17E+02	4,68E+04	8,04E+02	1,08E+04	5,19E+03	6,60E+02	-2,89E+04

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 = Potential Soil Quality Index (dimensionless)

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

1. 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
2. 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.

Resource use											
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D	
 PERE	MJ	2,38E+04	2,07E+02	2,22E+02	1,60E+03	3,32E+01	2,21E+02	1,04E+04	3,08E+00	-2,21E+04	
 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	0,00E+00	
 PERT	MJ	2,38E+04	2,07E+02	2,22E+02	1,60E+03	3,32E+01	2,21E+02	1,04E+04	3,08E+00	-2,21E+04	
 PENRE	MJ	2,86E+05	2,35E+04	2,45E+03	3,64E+05	6,20E+03	1,54E+04	3,16E+04	1,83E+02	-3,20E+05	
 PENRM	MJ	2,99E+05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,99E+05	0,00E+00	-2,84E+05	
 PENRT	MJ	5,85E+05	2,35E+04	2,45E+03	3,64E+05	6,20E+03	1,54E+04	-2,68E+05	1,83E+02	-6,04E+05	
 SM	kg	6,35E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,93E+01	
 RSF	MJ	1,01E+03	7,67E+00	4,88E-01	0,00E+00	3,24E-01	7,90E+00	2,51E+01	6,53E-02	-6,59E+00	
 NRSF	MJ	-1,39E+03	3,11E+01	5,17E+00	0,00E+00	4,76E+00	2,82E+01	0,00E+00	1,42E+00	1,32E+04	
 FW	m ³	2,92E+02	1,44E+00	1,68E+00	1,46E+01	3,07E-01	1,65E+00	9,59E+01	2,16E-01	-1,96E+02	

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 materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

End of life - Waste											
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D	
	HWD	kg	4,04E+01	9,17E-01	8,68E-02	1,05E+01	1,97E-01	7,96E-01	5,12E+00	1,05E+01	-7,64E+01
	NHWD	kg	1,73E+03	5,42E+02	4,14E+00	4,75E+02	9,32E+00	7,50E+02	2,18E+02	1,28E+03	-5,74E+03
	RWD	kg	6,62E-01	1,63E-01	1,70E-02	2,58E+00	4,34E-02	1,05E-01	7,96E-02	3,68E-05	-2,51E-01

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

*Reading example: 9,0 E-03 = $9,0 \cdot 10^{-3} = 0,009$

*INA Indicator Not Assessed

End of life - Output flow											
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D	
	CRU	kg	0,00E+00								
	MFR	kg	0,00E+00	0,00E+00	8,18E-01	0,00E+00	0,00E+00	0,00E+00	1,91E+04	0,00E+00	-4,69E+00
	MER	kg	0,00E+00	0,00E+00	2,01E-06	0,00E+00	0,00E+00	0,00E+00	3,52E+02	0,00E+00	-1,77E+01
	EEE	MJ	0,00E+00	0,00E+00	2,79E-01	0,00E+00	0,00E+00	0,00E+00	6,83E+02	0,00E+00	-2,59E+01
	EET	MJ	0,00E+00	0,00E+00	4,23E+00	0,00E+00	0,00E+00	0,00E+00	1,03E+04	0,00E+00	-3,92E+02

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

*Reading example: 9,0 E-03 = $9,0 \cdot 10^{-3} = 0,009$

*INA Indicator Not Assessed

Biogenic Carbon Content		
Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in accompanying packaging	kg C	0,00E+00

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

Additional requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

Electricity mix	Data source	Amount	Unit
Electricity, Norway (kWh)	ecoinvent 3.6	24,33	g CO ₂ -eq/kWh

Dangerous substances

The product contains no substances given by the REACH Candidate list.

Indoor environment

Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products										
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
GWPIOBC	kg CO ₂ -eq	2,05E+04	1,70E+03	1,78E+02	2,67E+04	4,54E+02	1,02E+03	2,82E+03	6,19E+00	-3,22E+04

GWPI-IOBC: Global warming potential calculated according to the principle of instantaneous oxidation. In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

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 epd-norway <small>Global Program Operator</small>	Program operator and publisher The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo, Norway	Phone: +47 23 08 80 00 e-mail: post@epd-norge.no web: www.epd-norge.no
	Owner of the declaration: Scale Aquaculture AS Beddingen 16, 7042 Trondheim	Phone: +4795726482 e-mail: hanne.digre@scaleaq.com web: https://scaleaq.com/
	Author of the Life Cycle Assessment LCA.no AS Dokka 6B, 1671	Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no
	Developer of EPD generator LCA.no AS Dokka 6B,1671 Kråkerøy	Phone: +47 916 50 916 e-mail: post@lca.no web: www.lca.no
	ECO Platform ECO Portal	web: www.eco-platform.org web: ECO Portal