

Environmental product declaration

In accordance with ISO 14025 and EN15804+A2

Aquaculture - Masterlinks – Hot dip/Thermogalvanized 16-22mm and 45-70mm



nøsted &
TRYGG IGLAND FRAM

Owner of the declaration:

Nøsted & AS

Product:

Aquaculture - Masterlinks – Hot dip/Thermogalvanized
16-22mm and 45-70mm

Declared unit:

1 kg

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core
PCR
NPCR 013:2021 Part B for Steel and aluminium
construction products

Program operator:

EPD-Global

Declaration number:

NEPD-15106-17816

Issue date:

09.03.2026

Valid to:

09.03.2031

EPD software:

LCAno EPD generator ID: 1049177

EPD-Global

General information

Product

Aquaculture - Masterlinks – Hot dip/Thermogalvanized 16-22mm and 45-70mm

Program operator:

EPD-Global
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Phone: +47 977 22 020
web: www.epd-global.com

Declaration number:

NEPD-15106-17816

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 013:2021 Part B for Steel and aluminium construction products

Statement of liability:

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

Declared unit:

1 kg Aquaculture - Masterlinks – Hot dip/Thermogalvanized 16-22mm and 45-70mm

Declared unit with option:

A1-A3, A4, A5, C1, C2, C3, C4, D

Functional unit:

-NA

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-Global'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-Global, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Global'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 EPD-Global's procedures and guidelines for verification and approval of EPD tools.

Third party verifier:

Alexander Borg, Asplan Viak AS

(no signature required)

Owner of the declaration:

Nøsted & AS
Contact person: Kristine Ribe-Christensen
Phone: +47 382 72 550
e-mail: post@nosted.com

Manufacturer:

Nøsted & AS
Grønviksvæien 8
4515 Mandal, Norway

Place of production:

Nøsted & AS - Kragerø
Industriveien 2
3766 Sannidal, Norway

Management system:

ISO 9001/14001

Organisation no:

914 781 213

Issue date:

09.03.2026

Valid to:

09.03.2031

Year of study:

2024

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-Global. Approval number: NEPDT183 Nøsted & AS

Developer of EPD: Arne Edvard Taanevig

Reviewer of company-specific input data and EPD: Lena Birkeland

Approved:



Håkon Hauan, CEO EPD-Global

Product

Product description:

FRAM B-links are manufactured in accordance with NS-EN 1677-4 and certified according to NS 9415:2021 for use in aquaculture. They are available with thermogalvanizing and traditional hot-dip galvanizing.

Product specification

Materials	kg	%
Metal - Steel	0.9983	99.83
Metal - Zinc	0.0017	0.17
Total	1.00	100.00

Packaging	kg	%
Packaging - Wood	0.025	100.00
Total incl. packaging	1.03	100.00

Technical data:

FRAM links are manufactured from 16mm to 70 mm.

Market:

European market.

Reference service life, product

Service life varies significantly depending on application, maintenance, and environmental conditions. Proper use and periodic inspection are essential to achieve full service life.

No reference service life is declared.

Reference service life, building or construction works

NA

LCA: Calculation rules

Declared unit:

1 kg Aquaculture - Masterlinks – Hot dip/Thermogalvanized 16-22mm and 45-70mm

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.

Primary data for manufacturing processes are collected directly from Nøsted & AS production sites. Secondary data for raw materials, energy, and transport are sourced from recognized LCI databases.

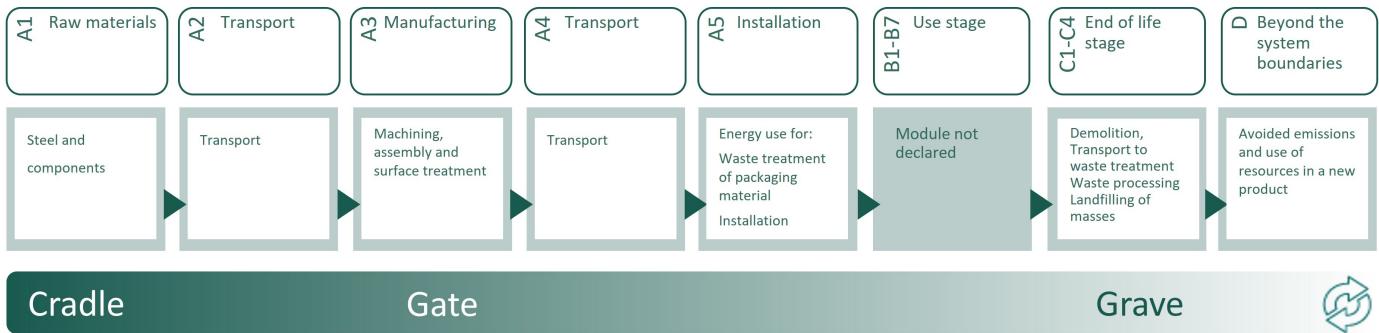
Materials	Source	Data quality	Year
Metal - Steel	S-P-01369	EPD	2022
Metal - Zinc	ecoinvent 3.6	Database	2019
Packaging - Wood	Modified ecoinvent 3.6	Database	2019

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	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

System boundary:

The assessment covers the full life cycle from raw material extraction (A1) through manufacturing (A3), transport (A2, A4), assembly (A5), and end-of-life processing (C1–C4), including potential benefits and loads beyond the system boundary (D). The use stage (B1–B7) is not included due to lack of relevant emissions or environmental impacts during the product use phase.



Additional technical information:

LCA: Scenarios and additional technical information

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














A5: Not included due to lack of relevant energy use in installation of products

C1: Not included due to lack of relevant energy use in demolition of products

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 7.5-16 tonnes, EURO 6 (km) - Europe	35.4 %	300.00	0.056	l/tkm	16.80
Assembly (A5)					
Waste, packaging, pallet, EUR wooden pallet, reusable, average treatment (kg)	kg	0.025			
Transport to waste processing (C2)					
Truck, 16-32 tonnes, EURO 6 (km) - Europe	36.7 %	169.86	0.043	l/tkm	7.30
Waste processing (C3)					
Waste, Materials to recycling (kg)	kg	0.90			
Disposal (C4)					
Waste, scrap Zinc, to landfill (kg)	kg	0.00017			
Waste, scrap steel, to landfill (kg)	kg	0.09983			
Benefits and loads beyond the system boundaries (D)					
Substitution of Zinc (kg)	kg	0.001449			
Substitution of electricity (MJ)	MJ	0.0008624			
Substitution of thermal energy, district heating (MJ)	MJ	0.01305			
Substitution of primary steel with net scrap (kg)	kg	-0.09983			

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-A3	A4	A5	C1	C2	C3	C4	D	
 GWP-total	kg CO ₂ -eq	1.54E+00	6.43E-02	3.79E-02	0	2.78E-02	0.00E+00	4.29E-04	1.05E-01	
 GWP-fossil	kg CO ₂ -eq	1.56E+00	6.42E-02	3.36E-05	0	2.77E-02	0.00E+00	4.28E-04	1.05E-01	
 GWP-biogenic	kg CO ₂ -eq	-2.76E-02	2.97E-05	3.79E-02	0	1.15E-05	0.00E+00	3.64E-07	1.82E-05	
 GWP-luluc	kg CO ₂ -eq	6.44E-03	2.78E-05	8.63E-09	0	9.88E-06	0.00E+00	8.40E-08	3.21E-05	
 ODP	kg CFC11 -eq	1.85E-07	1.41E-08	5.00E-12	0	6.29E-09	0.00E+00	2.09E-10	-5.51E-06	
 AP	mol H+ -eq	1.25E-02	1.85E-04	2.70E-07	0	7.97E-05	0.00E+00	4.18E-06	5.02E-04	
 EP-FreshWater	kg P -eq	1.27E-04	5.89E-07	4.03E-10	0	2.22E-07	0.00E+00	3.20E-09	6.25E-06	
 EP-Marine	kg N -eq	1.64E-03	3.49E-05	1.16E-07	0	1.58E-05	0.00E+00	1.57E-06	1.03E-04	
 EP-Terrestrial	mol N -eq	1.87E-02	3.92E-04	1.24E-06	0	1.76E-04	0.00E+00	1.73E-05	1.05E-03	
 POCP	kg NMVOC -eq	6.15E-03	1.50E-04	3.20E-07	0	6.76E-05	0.00E+00	4.94E-06	5.23E-04	
 ADP-minerals&metals ¹	kg Sb-eq	1.93E-04	2.32E-06	5.45E-10	0	7.66E-07	0.00E+00	3.79E-09	-1.10E-04	
 ADP-fossil ¹	MJ	2.43E+01	9.59E-01	3.95E-04	0	4.19E-01	0.00E+00	1.38E-02	8.59E-01	
 WDP ¹	m ³	7.37E+02	1.15E+00	6.08E-04	0	4.06E-01	0.00E+00	2.91E-02	-5.87E+00	

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"

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-A3	A4	A5	C1	C2	C3	C4	D	
 PM	Disease incidence	5.54E-08	3.60E-09	3.00E-12	0	1.70E-09	0.00E+00	8.90E-11	8.91E-09	
 IRP ²	kgBq U235 -eq	1.57E-01	4.19E-03	1.43E-06	0	1.83E-03	0.00E+00	6.00E-05	-8.78E-04	
 ETP-fw ¹	CTUe	2.25E+01	7.48E-01	4.50E-04	0	3.11E-01	0.00E+00	6.83E-03	5.89E+00	
 HTP-c ¹	CTUh	8.40E-10	0.00E+00	0.00E+00	0	0.00E+00	0.00E+00	0.00E+00	5.03E-10	
 HTP-nc ¹	CTUh	2.29E-08	9.00E-10	2.00E-12	0	3.40E-10	0.00E+00	4.00E-12	-1.22E-08	
 SQP ¹	dimensionless	1.31E+01	5.70E-01	2.22E-04	0	2.93E-01	0.00E+00	5.04E-02	3.19E-02	

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"

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-A3	A4	A5	C1	C2	C3	C4	D	
 PERE	MJ	2.82E+01	1.63E-02	8.12E-06	0	6.01E-03	0.00E+00	2.13E-04	5.97E-02	
 PERM	MJ	3.47E-01	0.00E+00	-3.47E-01	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
 PERT	MJ	2.85E+01	1.63E-02	-3.47E-01	0	6.01E-03	0.00E+00	2.13E-04	5.97E-02	
 PENRE	MJ	2.43E+01	9.59E-01	3.95E-04	0	4.20E-01	0.00E+00	1.38E-02	8.59E-01	
 PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
 PENRT	MJ	2.43E+01	9.59E-01	3.95E-04	0	4.20E-01	0.00E+00	1.38E-02	8.59E-01	
 SM	kg	1.03E+00	0.00E+00	0.00E+00	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
 RSF	MJ	1.92E-01	5.89E-04	2.37E-07	0	2.15E-04	0.00E+00	4.39E-06	-4.20E-03	
 NRSF	MJ	6.94E-02	2.14E-03	2.70E-06	0	7.68E-04	0.00E+00	1.26E-05	-1.16E-01	
 FW	m ³	1.63E-01	1.14E-04	2.88E-07	0	4.49E-05	0.00E+00	1.65E-05	8.60E-05	






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"

End of life - Waste										
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D	
 HWD	kg	5.97E-03	5.31E-05	0.00E+00	0	2.16E-05	0.00E+00	0.00E+00	5.11E-04	
 NHWD	kg	4.34E-01	3.78E-02	1.25E-03	0	2.04E-02	0.00E+00	1.00E-01	4.43E-02	
 RWD	kg	1.11E-04	6.47E-06	0.00E+00	0	2.86E-06	0.00E+00	0.00E+00	-6.45E-07	

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

"Reading example: 9.0 E-03 = 9.0*10⁻³ = 0.009"

End of life - Output flow										
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D	
 CRU	kg	0.00E+00	0.00E+00	2.38E-02	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
 MFR	kg	4.56E-02	0.00E+00	2.93E-08	0	0.00E+00	9.00E-01	0.00E+00	0.00E+00	
 MER	kg	6.01E-03	0.00E+00	1.24E-03	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
 EEE	MJ	3.48E-03	0.00E+00	8.62E-04	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
 EET	MJ	5.26E-02	0.00E+00	1.30E-02	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

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*10⁻³ = 0.009"

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	1.03E-02

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	Source	Amount	Unit
Electricity, Lithuania (kWh)	ecoinvent 3.6	373.46	g CO ₂ -eq/kWh
Electricity, Norway (kWh)	ecoinvent 3.6	24.33	g CO ₂ -eq/kWh
Electricity, Solar, Norway (kWh)	ecoinvent 3.6	104.80	g CO ₂ -eq/kWh

Dangerous substances

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

Indoor environment

N/A

Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWPIOBC	kg CO ₂ -eq	1.72E+00	6.43E-02	3.36E-05	0	2.78E-02	0.00E+00	4.29E-04	1.05E-01

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.

Bibliography

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