

Environmental Product Declaration

In accordance with ISO 14025 and EN 15804 +A2

Raufoss Aluminium low-carbon aluminium profile



The Norwegian
EPD Foundation

Owner of the declaration:

Raufoss Aluminium AS
Postbox 600
2808 Gjøvik, Norway

Product name:

Raufoss Aluminium low-carbon aluminium profile

Declared unit:

1 kg of Raufoss Aluminium low-carbon
aluminium profile.

**This declaration is based on Product Category
Rules:**

NPCR 03.2021 Part A. Construction products and
services vers.2; NPCR 013:06.2021 Part B for
Steel and Aluminium Construction Products
(references to EN 15804 +A2:2019).

Program operator:

The Norwegian EPD Foundation

Declaration number:

NEPD-4812-4064-EN

Registration number:

NEPD-4812-4064-EN

Issue date: 21.08.2023

Valid to: 21.08.2028
ver-090224

General information

Product:

Raufoss Aluminium low-carbon aluminium profile

Program Operator:

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

Declaration number:

NEPD-4812-4064-EN

This declaration is based on Product

Category Rules:

NPCR Part A. Construction products and services vers.2; NPCR 013:06.2021 Part B for Steel and Aluminium Construction Products (references to EN 15804 +A2).

Statements:

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

Declared unit:

1 kg of average Raufoss Aluminium low-carbon aluminium profile.

Declared unit with option:

N/A

Functional unit:

N/A

Verification:

Independent verification of the declaration and data. according to ISO14025:2010

internal external



Independent verifier approved by EPD Norway

Owner of the declaration:

Raufoss Aluminium AS
 Postbox 600
 2808 Gjøvik. Norway
 Contact person: Ronny Valldal
 Phone: +47 41 61 95 99
 e-mail: ronny.valldal@raufossaluminium.com

Manufacturer:

Raufoss Aluminium AS
 Phone: 61153000
 e-mail: post@raufossaluminium.com

Place of production:

Raufoss, Norge

Management system:

S-Docs, BPS(Quality-manual), IATF 16949, ISO 14001

Organisation no:

912 445 313

Issue date: 21.08.2023

Valid to: 21.08.2028

Year of study:

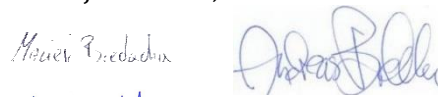

2021

Comparability:

EPD of construction products may not be comparable if they do not comply with EN 15804:2012+A2:2019 and seen in a building context.

The EPD has been worked out by:

Maciej Biedacha, Andreas Brekke

Approved (Manager of EPD Norway)

Product

Product description:

Raufoss Aluminium AS is the leading producer of aluminium profiles in Norway.

Product groups



Automotive



Building & construction



Energy



Transport



Electronics



Offshore



Other applications

Product specification:

This product specific EPD is based on a specific aluminium quality from Hydro Aluminium called Hydro Reduxa (formerly Hydro 4.0). This aluminium product is manufactured with a process certified by DNV to ensure a low carbon footprint. The environmental performance of the product is guaranteed by the producer and documented in an EPD. The product consists of 100% primary aluminium.

Materials	kg	%
Hydro Reduxa	1	100
TOTAL	1	100

Technical data:

Aluminium has a unique combination of properties that make it a versatile and attractive engineering material. Key factors like low weight, flexibility and strength make it a good choice of material for customer applications. The overall high quality of Hydral's products is ensured by conforming to IATF16949:2016 and ISO 14001:2015.

Aluminium profiles as an engineering material represents almost unlimited number of possibilities to our customers, regarding the design and applications. Raufoss Aluminium offers support and cooperation in order to design profiles matching customers technical and product requirements.

The attractive characteristics of aluminium have become even more important in recent years. The fact that aluminium elements with specific dimensions have approximately of 1/3 of the weight of the steel element with the same dimensions, makes it a natural choice in applications where weight is an issue. The extrusion process using the optimal alloy and heat-treatment, provide endless possibilities for lots of applications.

Hydal's unique skills and extensive experience makes Raufoss Aluminium the ideal partner for delivery of a finished product matching customer requirements. Aluminium exposed to oxygen reacts and creates a thin layer of oxide. The oxide provides a natural protection against corrosion, even in extreme conditions. Corrosion resistance can be further improved by surface treatments such as anodising or painting, giving aluminium a low Life Cycle Cost.

Market:

Nordic and European market.

Reference service life for product:

Aluminium has an infinite lifetime as a material, however, RSL is assumed to be equal with a reference study period of 60 years for a building.

Reference service life for building:

60 years.

LCA: Calculation rules

Declared unit:

The declared unit used for the calculations was 1 kg of Raufoss Aluminium low-carbon aluminium profile.

Data quality:

The Ecoinvent database (version 3.8) was used as the main source of data for modelling the background system. The model of the aluminium's value chain was developed based on both generic data from ecoinvent and specific data from previous research performed by NORSUS, (Brekke et al., 2019 and EPD-Norge, 2020). Specific system data were collected by the manufacturer for the year 2021 and provided to the developer of the EPD using an appropriate data collection file. All remaining data are collected or updated within last 10 years.

Allocation:

Allocation was done based on specifications stated in the newly published standard EN 15804 + A2:2019. Energy and water use as well as generated waste were allocated evenly to the product using mass allocation. Material recycling and transport was also allocated accordingly.

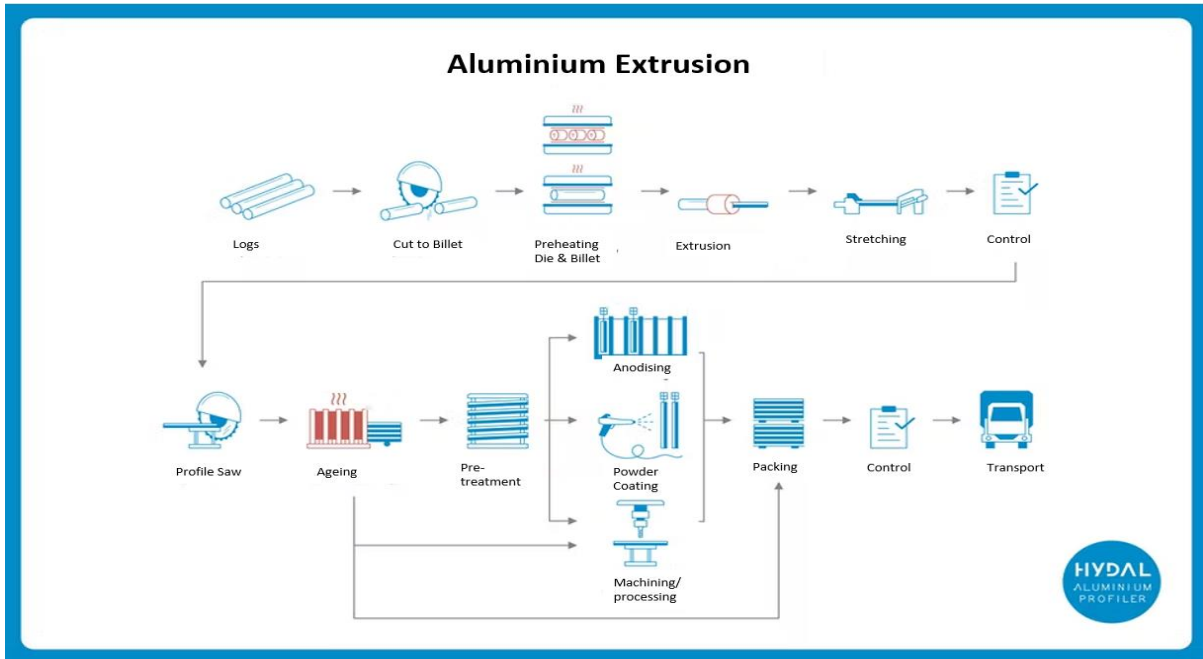


Figure 1. Flow diagram of the production of HAP (Rauffoss Aluminium Aluminium Profiles)

System boundary:

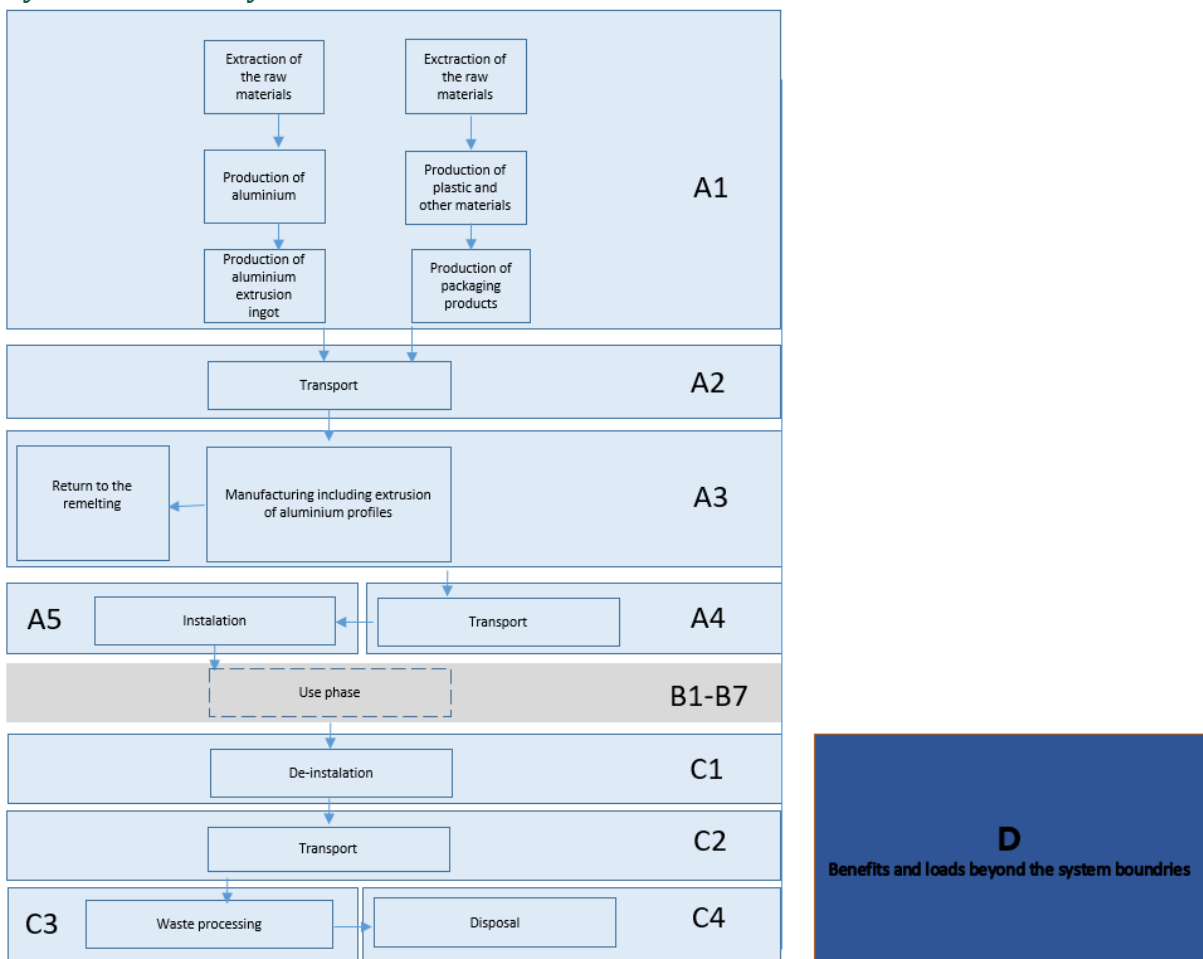


Figure 2. System boundaries.

The studied system includes the following modules: A1(raw materials), A2 (transport of raw materials), A3 (manufacturing), A4 (transport to the construction site), A5 (Assembly), C1 (disassembly), C2 (transport to waste processing), C3 (waste processing), C4 (waste disposal), and D (benefits beyond the system boundaries). The above phases were conducted in accordance with specifications in the new EN15804 + A2:2019. The use of Raufoss Aluminium aluminium profiles does not require any particular material or energy use. Maintenance like washing is expected to be negligible. Therefore, modules B1-B7 are not modelled here.

Cut-off criteria:

All the raw materials used are included in the calculations. For some raw materials, proxy datasets were used in the model as approximations. This does not include hazardous materials. The calculations include 100% of materials that make up the product and the packaging.

In module A5 and C1 data on energy required for installation and de-installation is insufficient, it is assumed that these in-puts are less than 1% environmental relevance and therefore has not been considered in this study. Losses of aluminium during sorting and grinding of aluminium scrap in C3 are considered as described in EN 15804+A2, ch. 6.3.6 and disregarded from the study.

LCA: Scenarios and additional technical information

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

For transport to a recycling facility, incineration and landfill, distances of 300 and 85 km have been used in this assessment.

Transport from production place to assembly/user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance (km)	Fuel/Energy consumption (l/tkm)	Value (l/t)
Truck	50	Euro 6 [> 32t. diesel]	300	0.01	6.10

The distance of 300 km to the building site is taken as an average distance based on default values given in NPCR 013 2021 Part B (6.3.8.1).

Assembly (A5)

	Unit	Value
Material loss	kg	0
Output materials for waste treatment (packaging)	kg	0.041

The installation of the HAP does not require use of any auxiliary materials or energy. The aluminium profiles are being installed manually with the use of a basic construction tools. Usage of manual tools have not been included in this assessment. After the installation of the components, the resulting packaging waste is sorted and sent either for recycling or for energy recovery, accordingly. No losses were reported at this stage.

End of Life (C1, C3 and C4)

	Unit	Value
Hazardous waste disposed	kg	-
Collected as mixed construction waste	kg	0.96
Reuse	kg	-
Recycling	kg	0.933
Incineration	kg	0.027*
To landfill	kg	0.04**

No hazardous materials are disposed.

* 70 grams of the original 1 kilogram of aluminium is going to incineration. No loads or benefits are attributed to this flow.

** There will be a small portion of extruded aluminium ending as aggregate at the construction site.

During the deconstruction phase 96% of the aluminium is collected and sent to recycling as part of pre-sorted metal waste. It is assumed that energy required for the activities in module C1 is negligible. The remaining 4% aluminium waste is assumed to be collected as municipal solid waste and sent to landfill. Collected aluminium is being shredded and prepared for remelting, it is assumed that during this process 2.7% of the initial volume entering this stage is being lost and sent to incineration. The amount of aluminium effectively recycled is approximately 93.3% of the total. Scenario for module C is based on data from European Aluminium (2018).

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance (km)	Fuel/Energy consumption (l/tkm)	Value (l/t)
Truck	50%	Euro 6 [> 32t. diesel]	300	0.01	6.10
Truck	50%	Euro 6 [> 16-32t. diesel]	85	0.015	2.65

Transport for distances refers to recycling and incineration.

Benefits and loads beyond the system boundaries (D)

	Unit	Value
Electricity substitution	MJ	0.051
Thermal heat substitution	MJ	0.352
Avoided materials	kg	0.945

Electricity and thermal heat substitution data are taken from Statistic Norway (SSB) with 2019 as the basis year.

LCA: Results

All results were obtained with use of LCA software SimaPro version 9.3.03 (2021), Ecoinvent v 3.8 and methods according to EN15804+A2:2019.

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

Product stage			Assembly stage		Use stage								End of life stage				Benefits & loads beyond system boundary
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	

Core environmental impact indicators

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5*
GWP-total	kg CO2 eq.	4.10E+00	4.83E-02	1.27E-01	4.28E+00	2.61E-02	4.32E-02
GWP-fossil	kg CO2 eq.	4.11E+00	4.83E-02	1.26E-01	4.28E+00	2.61E-02	1.46E-03
GWP-biogenic	kg CO2 eq.	-1.15E-02	5.13E-05	7.37E-04	-1.07E-02	2.77E-05	4.17E-02
GWP-LULUC	kg CO2 eq.	6.65E-03	1.81E-05	2.31E-04	6.90E-03	9.79E-06	9.78E-07
ODP	kg CFC11 eq.	4.86E-07	1.20E-08	1.74E-08	5.16E-07	6.51E-09	1.92E-10
AP	mol H ⁺ eq.	2.39E-02	1.54E-04	9.20E-04	2.49E-02	8.31E-05	8.70E-06
EP-freshwater	kg P eq.	5.41E-05	3.44E-07	2.76E-06	5.72E-05	1.86E-07	4.09E-08
EP-marine	kg N eq.	3.41E-03	3.38E-05	2.12E-04	3.66E-03	1.83E-05	2.85E-06
EP-terrestrial	mol N eq.	3.71E-02	3.76E-04	3.31E-03	4.08E-02	2.03E-04	3.12E-05
POCP	kg NMVOC eq.	1.16E-02	1.48E-04	7.26E-04	1.24E-02	8.01E-05	8.20E-06
ADP-M&M	kg Sb eq.	6.23E-06	1.16E-07	1.80E-06	8.15E-06	6.24E-08	2.71E-09
ADP-fossil	MJ	4.07E+01	7.86E-01	1.79E+00	4.33E+01	4.25E-01	1.84E-02
WDP	m ³	1.56E+00	2.70E-03	8.56E-02	1.65E+00	1.46E-03	-1.63E-04

Indicator	Unit	C1**	C2	C3	C4	D
GWP-total	kg CO2 eq.	0.00E+00	2.56E-02	2.50E-01	6.14E-04	-5.36E+00
GWP-fossil	kg CO2 eq.	0.00E+00	2.56E-02	2.46E-01	5.24E-04	-5.24E+00
GWP-biogenic	kg CO2 eq.	0.00E+00	2.71E-05	3.30E-03	9.04E-05	-2.15E-02
GWP-LULUC	kg CO2 eq.	0.00E+00	9.62E-06	1.15E-04	1.69E-07	-9.66E-02
ODP	kg CFC11 eq.	0.00E+00	6.38E-09	9.71E-09	1.49E-10	-3.86E-07
AP	mol H ⁺ eq.	0.00E+00	8.14E-05	8.10E-04	4.24E-06	-3.27E-02
EP-freshwater	kg P eq.	0.00E+00	1.83E-07	9.05E-06	6.00E-09	-1.67E-04
EP-marine	kg N eq.	0.00E+00	1.79E-05	8.98E-05	1.58E-06	-4.50E-03
EP-terrestrial	mol N eq.	0.00E+00	1.99E-04	1.12E-03	1.78E-05	-4.89E-02
POCP	kg NMVOC eq.	0.00E+00	7.82E-05	3.21E-04	5.04E-06	-1.64E-02
ADP-M&M	kg Sb eq.	0.00E+00	6.19E-08	7.46E-06	2.81E-09	3.58E-05
ADP-fossil	MJ	0.00E+00	4.16E-01	1.45E+00	1.23E-02	-6.43E+01
WDP	m ³	0.00E+00	1.43E-03	1.47E-02	6.63E-05	-8.56E-01

GWP-total: Global Warming Potential; **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; See "additional Norwegian requirements" for indicator given as PO4 eq. **EP-marine:** Eutrophication potential. fraction of nutrients reaching freshwater end compartment; **EP-terrestrial:** Eutrophication potential. Accumulated Exceedance; **POCP:** Formation potential of tropospheric ozone; **ADP-M&M:** Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil:** Abiotic depletion potential for fossil resources; **WDP:** Water deprivation potential. deprivation weighted water consumption

*Energy required for installation in module A5 is not included as it is assumed that the contribution of this process is less than 1%.

**Energy required for de-installation in module C1 is not included as it is assumed that the contribution of this process is less than 1%.

Additional environmental impact indicators

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5
PM	Disease incidence	3.45E-07	5.59E-09	1.63E-08	3.67E-07	3.02E-09	1.15E-10
IRP	kBq U235 eq.	1.52E-01	3.41E-03	1.48E-02	1.71E-01	1.84E-03	7.18E-05
ETP-fw	CTUe	1.20E+02	6.14E-01	2.42E+00	1.23E+02	3.32E-01	1.60E-02
HTP-c	CTUh	1.20E-08	1.67E-11	1.61E-10	1.22E-08	9.04E-12	1.50E-12
HTP-nc	CTUh	1.59E-07	6.45E-10	2.02E-09	1.61E-07	3.49E-10	7.21E-11
SQP	Dimensionless	1.47E+01	8.98E-01	6.11E+00	2.17E+01	4.86E-01	8.46E-03

Indicator	Unit	C1	C2	C3	C4	D
PM	Disease incidence	0.00E+00	2.95E-09	1.40E-08	8.67E-11	-4.13E-07
IRP	kBq U235 eq.	0.00E+00	1.80E-03	3.42E-03	8.33E-05	-2.80E-01
ETP-fw	CTUe	0.00E+00	3.25E-01	5.88E+00	2.48E+01	-5.76E+01
HTP-c	CTUh	0.00E+00	8.89E-12	1.56E-10	1.15E-12	-1.24E-08
HTP-nc	CTUh	0.00E+00	3.42E-10	6.75E-09	2.11E-11	-1.20E-07
SQP	Dimensionless	0.00E+00	4.72E-01	1.43E+00	2.57E-02	-5.42E+00

PM: Particulate matter emissions; **IRP:** Ionising radiation. human health; **ETP-fw:** Ecotoxicity (freshwater); **HTP-c:** Human toxicity. cancer effects; **HTP-nc:** Human toxicity. non-cancer effects; **SQP:** Land use related impacts / soil quality

Classification of disclaimers to the declaration of core and additional environmental impact indicators

ILCD classification	Indicator	Disclaimer
ILCD type / level 1 ILCD type / level 2	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
	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 / level 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
<p>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 are also not measured by this indicator.</p>		
<p>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</p>		

Resource use

Parameter	Unit	A1	A2	A3	A4	A5
RPEE	MJ	5.79E+01	1.00E-02	4.64E+00	5.42E-03	4.00E-01
RPEM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TPE	MJ	5.79E+01	1.00E-02	4.64E+00	5.42E-03	4.00E-01
NRPE	MJ	4.07E+01	7.86E-01	1.79E+00	4.25E-01	1.84E-02
NRPM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TRPE	MJ	4.07E+01	7.86E-01	1.79E+00	4.25E-01	1.84E-02
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
W	m ³	5.04E-01	9.34E-05	9.80E-02	5.05E-05	-1.85E-06

Parameter	Unit	C1	C2	C3	C4	D
RPEE	MJ	0.00E+00	5.32E-03	1.99E-01	2.29E-03	-2.36E+01
RPEM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TPE	MJ	0.00E+00	5.32E-03	1.99E-01	2.29E-03	-2.36E+01
NRPE	MJ	0.00E+00	4.16E-01	1.45E+00	1.23E-02	-6.43E+01
NRPM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TRPE	MJ	0.00E+00	4.16E-01	1.45E+00	1.23E-02	-6.43E+01
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.67E-05
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
W	m ³	0.00E+00	4.94E-05	8.09E-04	1.78E-05	-1.25E-01

RPEE Renewable primary energy resources used as energy carrier; **RPEM** Renewable primary energy resources used as raw materials; **TPE** Total use of renewable primary energy resources; **NRPE** Nonrenewable primary energy resources used as energy carrier; **NRPM** Nonrenewable primary energy resources used as materials; **TRPE** Total use of nonrenewable primary energy resources; **SM** Use of secondary materials; **RSF** Use of renewable secondary fuels; **NRSF** Use of nonrenewable secondary fuels; **W** Use of net fresh water

End of life - Waste

Parameter	Unit	A1	A2	A3	A4	A5
HW	kg	3.02E-02	1.90E-06	7.43E-06	1.03E-06	4.01E-08
NHW	kg	3.13E+00	7.80E-02	1.62E-01	4.22E-02	1.42E-03
RW	kg	2.17E-04	5.32E-06	1.20E-05	2.88E-06	9.07E-08

Parameter	Unit	C1	C2	C3	C4	D
HW	kg	0.00E+00	1.01E-06	6.17E-03	1.51E-08	-3.20E-03
NHW	kg	0.00E+00	4.10E-02	1.25E+00	8.22E-02	-2.19E+00
RW	kg	0.00E+00	2.82E-06	4.25E-06	8.49E-08	-2.67E-04

HW Hazardous waste disposed; NHW Non-hazardous waste disposed; RW Radioactive waste disposed

End of life – output flow

Parameter	Unit	A1	A2	A3	A4	A5
CR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	kg	0.00E+00	0.00E+00	2.58E-02	0.00E+00	1.03E-02
MER	kg	0.00E+00	0.00E+00	5.94E-03	0.00E+00	2.85E-02
EEE	MJ	0.00E+00	0.00E+00	7.89E-03	0.00E+00	2.14E-02
ETE	MJ	0.00E+00	0.00E+00	6.60E-02	0.00E+00	2.35E-01

Parameter	Unit	C1	C2	C3	C4	D
CR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	kg	0.00E+00	0.00E+00	9.34E-01	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	2.56E-02	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ETE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

Reading example: $9.0 \text{ E-03} = 9.0 \cdot 10^{-3} = 0.009$

Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in the product	kg C	0
Biogenic carbon content in the accompanying packaging	kg C	0.012

Biogenic carbon contents are calculated for the wooden materials only.

Additional Norwegian requirements

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

For the calculation electricity medium voltage has been applied (A3).

National electricity grid	Unit	Value
El-mix low-voltage Norway (ecoinvent 3.8)	g CO ₂ -eq/kWh	26
El-mix medium-voltage Norway (ecoinvent 3.8)	g CO ₂ -eq/kWh	23.4

Additional environmental impact indicators required in NPCR Part A for construction products

In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator for GWP has been sub-divided into the following:

GWP-IOBC Climate impacts calculated according to the principle of instantaneous oxidation
 GWP-BC Climate impacts from the net uptake and emission of biogenic carbon from each module.

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5
EP-freshwater*	kg PO ₄ eq.	1.50E-03	1.68E-05	1.14E-04	1.63E-03	9.06E-06	1.59E-06
GWP-IOBC	kg CO ₂ eq.	4.13E+00	4.83E-02	1.28E-01	4.31E+00	2.61E-02	1.46E-03
GWP-BC	kg CO ₂ eq.	-3.11E-02	3.21E-05	-7.87E-04	-3.19E-02	1.74E-05	4.17E-02
GWP total	kg CO ₂ eq.	4.10E+00	4.83E-02	1.27E-01	4.28E+00	2.61E-02	4.32E-02

Indicator	Unit	C1	C2	C3	C4	D
EP-freshwater*	kg PO ₄ eq.	0.00E+00	8.87E-06	6.49E-05	6.15E-07	-2.14E-03
GWP-IOBC	kg CO ₂ eq.	0.00E+00	2.56E-02	2.47E-01	5.26E-04	-5.36E+00
GWP-BC	kg CO ₂ eq.	0.00E+00	1.70E-05	2.28E-03	8.81E-05	5.28E-03
GWP	kg CO ₂ eq.	0.00E+00	2.56E-02	2.50E-01	6.14E-04	-5.35E+00

*: Eutrophication potential, fraction of nutrients reaching freshwater end compartment. Declared as PO₄ eq.

GWP-IOBC Global warming potential calculated according to the principle of instantaneous oxidation. **GWP-BC** Global warming potential from net uptake and emissions of biogenic carbon from the materials in each module. **GWP** Global warming potential

Hazardous substances

The declaration is based upon reference to threshold values and/or test results and/or material safety data sheets provided to EPD verifiers. Documentation available upon request to EPD owner.

- X The product contains no substances given by the REACH Candidate list or the Norwegian priority list.
- The product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0.1 % by weight.
- The product contains dangerous substances more than 0.1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.
- The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforskiten. Annex III). see table.

Indoor environment

Not relevant.

Carbon footprint






Calculations related to climate change and global warming potential (GWP) include greenhouse gas emissions from fossil sources and land use change connected to extraction of raw materials. Biogenic emissions of CO₂ are also calculated and included.

Bibliography

ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
IATF 16949:2016	Quality management system for organizations in the automotive industry
EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
Ecoinvent v.3	Allocation, cut-off by classification, Swiss Centre of Life Cycle Inventories
EU, 2011	Council Regulation (EU) No 333/2011 of 31 March 2011 establishing criteria determining when certain types of scrap metal cease to be waste under Directive 2008/98/EC of the European Parliament and of the Council https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32011R0333
ISO 14001:2015	Environmental management systems - A practical guide for SMEs
ISO 21930:2007	Sustainability in building construction - Environmental declaration of building products
NPCR 03.2021	PART A: Construction products and services Version: 2.0
NPCR 013:2021	Part B for Steel and Aluminium Construction Products
PCR 2013	European Aluminium Association. 2013. Product Category Rules (PCR) for Aluminium Building Products. PCR developed within the EAA EPD program. Brussels: EAA
Brekke A. et al (2019)	Background report for the Environmental Product Declarations for Hydro 4.0 Aluminium Extrusion Ingot, Hydro Aluminium Extrusion Ingot Europe, Hydro 75R Aluminium Extrusion Ingot
Raadal. H. L. et al (2009)	Klimaregnskap for avfallshåndtering. Fase I og II. Oppdragsrapport nr. 18.09 fra Østfoldforskning. Norge.
EPD-Norge 2019	Hydro Aluminium, NEPD-1839-768-EN, [online] Available at:
EPD-Norge 2020	Hydro Aluminium, NEPD-2349-1085-EN, [online] Available at: https://www.epd-norge.no/getfile.php/1314789-1608285991/EPDer/Byggevarer/St%C3%A5lkonstruksjoner/NEPD-2349-1085_Hydro-Aluminium-Reduxa-HyForge.pdf
European Aluminium 2018	Environmental profile report: Life-Cycle inventory data for aluminium production and transformation processes in Europe

European Aluminium 2020 European Aluminium General Programme Instructions. Available at:
<https://europeanaluminium.eu/wpcontent/uploads/2022/12/EPD-programme-rules-3rd-rev-European-Aluminium.pdf>

Fjernkontrollen 2019 *Energy sources used in heat generation in Norway.* [online]
 Available at: <https://www.fjernkontrollen.no/>

	Program Operator	tlf	+47 23 08 80 00
	The Norwegian EPD Foundation Post Box 5250 Majorstuen. 0303 Oslo Norway	e-post: web	post@epd-norge.no www.epd-norge.no
	Publisher	tlf	+47 23 08 80 00
	The Norwegian EPD Foundation Post Box 5250 Majorstuen. 0303 Oslo Norway	e-post: web	post@epd-norge.no www.epd-norge.no
	Owner of the declaration	tlf	+47 61153000
	Raufoss Aluminium AS Postbox 600 2808 Gjøvik. Norway	Fax e-post: web	 post@raufossaluminium.com https://raufossaluminium.com/
	Author of the life cycle assessment	tlf	+47 69 35 11 00
	NORSUS Norsk institutt for bærekraftsforskning Stadion 4. 1671 Kråkerøy. Norway	Fax e-post: web	+47 69 34 24 94 post@norsus.no www.norsus.no
	ECO Platform ECO Portal	web	www.eco-platform.org
		web	ECO Portal

EPD for the best environmental decision



The Norwegian EPD foundation
www.epd-norge.no

