epd-norge

Environmental Product Declaration

In accordance with ISO 14025 and EN 15804 +A2

Speira Karmøy Aluminium Rolled Products VERSA

Owner of the declaration:
Speira Karmøy Rolling Mill AS

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-3441-2042-EN

Registration Number:
NEPD-3441-2042-EN

Issue date: 29.04.2022
Valid to: 29.04.2027

Product name:
Speira Karmøy Aluminium Rolled Products VERSA

Manufacturer:
Speira Karmøy Rolling Mill AS

The Norwegian EPD Foundation

General information

Product:
Speira Karmøy under the product family; Versa

Program Operator:
The Norwegian EPD Foundation
P.b. 5250 Majorstuen, 0303 Oslo
Norway
Tel: +47 23 08 80 00
e-mail: post@epd-norge.no

Declaration Number:
NEPD-3441-2042-EN

This declaration is based on Product Category Rules:
NS-EN 15804: 2012+A2:2019, NPCR Construction products and services – Part A, and NPCR 013 version 3.0 Part B for steel and aluminium construction products

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

Declared unit:
1 kg of Speira Karmøy mill-finish aluminium rolled product VERSA, scrap containing alloys, produced at Karmøy

Declared unit with option:
1 kg of Speira Karmøy mill-finish aluminium rolled product VERSA, scrap containing alloys, produced at Karmøy, including waste handling and possible environmental benefits after end of life.

Functional unit:
The product is an input to several products. No use scenarios are defined, hence no functional unit.

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

internal	external x

Jane Anderson, ConstructionLCA Ltd
(Independent verifier approved by EPD Norway)

Owner of the declaration:
Speira Karmøy Rolling Mill AS

Contact person:	Kristian Midbøe
Phone:	+47 90634109
e-mail:	Kristian.Midboe@speira.com

Manufacturer:
Speira Karmøy Rolling Mill AS
Hydrovegen 160, 4265 Håvik

Place of production:
Karmøy

Management system:
ISO 9001, ISO 14001 and ISO 45001

Organisation no:
975 934 578

Issue date:
29.04.2022

Valid to:
29.04.2027

Year of study:
2021-22

Comparability:
EPDs from other programmes than EPD-Norge may not be comparable.

The EPD has been worked out by:
Andreas Brekke and Irmeline de Sadeleer

NORSUS
Norsk institutt for bærekraftsforskning

Approved:

Håkon Hauan, CEO EPD-Norge

Product

Product description:

This EPD covers mill-finish aluminium rolled product VERSA. It is valid for flat rolled products (coil, sheet and strip).

Product specification:

Typical content of the Aluminium Products can be found in the table below. The process scrap is flowing in a loop, which explains that 1.223kg input factors are needed to produce 1kg Speira Karmøy Aluminium Rolled Products VERSA.

Materials	kg	%
Primary Liquid Aluminium from own electrolysis	0.552	45.2
Primary metal from external souces	0.438	35.8
Process scrap	0.223	18.2
Alloying elements	0.01	0.8

In addition, the packaging weight amounts to 0.0023 kg per kg aluminium and is composed of 47% corrugated box board, 40% LDPE foil and 12% wire drawing. The waste management of the packaging, which should have been declared in A5, is excluded as it falls under cut-off.

Technical data:

Speira Karmøy produce alloys 1050, 1070, 3103/3003, 3005, 5005, 6101 and 8111 in temper from soft to fully hard conditions. Application areas are within building-, electrotechnical-, automotive- and general engineering products.

Market:

European

Reference service life, product:

Depends on product application, but the material itself has an infinite life time

LCA: Calculation rules

Declared unit:

1 kg of Speira aluminium rolled product VERSA. The EPD also covers modules C2-C4 and D. The product is produced in Speira Karmøy. The results are based on the production volumes of 2019.

Data quality:

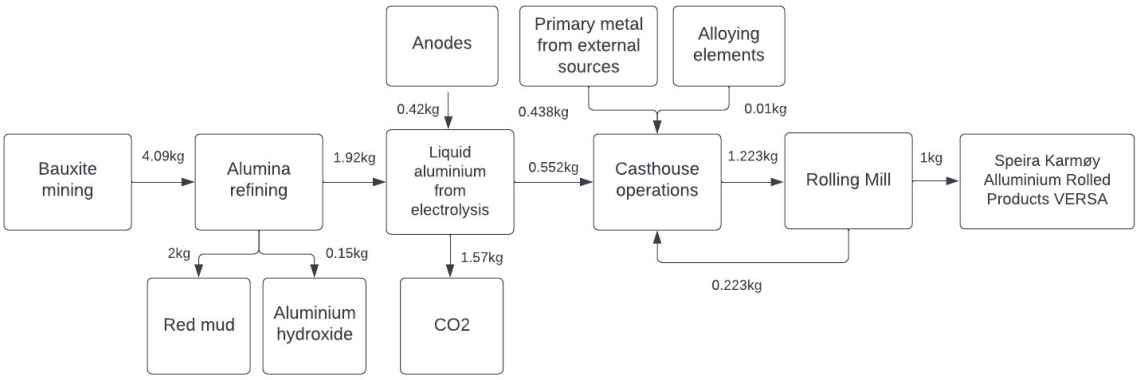
Specific data for Speira Karmøy's processes in the foreground system are from 2019, specific data for the production of aluminium from extraction of raw materials to the production of

primary aluminium are from 2017. Background data on for instance transport and electricity production are from ecoinvent 3.8 (2022).

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy, water and waste production inhouse are allocated equally among all products through mass allocation. For almost all processes, detailed data are provided for each step, and the main allocation is done between aluminium hydroxide and aluminium oxide in the production of alumina. Effects of primary production of recycled materials are allocated to the main product in which the material was used. The recycling process and transportation of the material are allocated to this analysis.

System boundary:



Cradle to gate with options. The following stages have been declared: A1-A4, C2-C4 and D. Further specificed in flow sheet below. Module D covers the potential benefits from recycling of Speira Karmøy Aluminium Rolled Products VERSA after end of useful life. Module D covers all necessary stages from C3 until the aluminium is back to the market and compares to the environmental performance of an average market forge ingot. The module is further specified under scenarios.

Cut-off criteria:

All major raw materials and all the essential energy flows were included. The production processes for raw materials and energy flows with very small amounts.

LCA: Scenarios and additional technical information

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

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	Lorry, >32 metric tons, Euro V	400	2.43E-02	6,07E-01
Boat	80	Cargo ship, 5000 tons	1164	1.29E-02	6.00E-03

Rolled products from Speira Karmøy are transported from Karmøy in Norway to Rotterdam by vessel and thereafter by truck to the final consumer.

End of Life (C1, C3, C4)

	Unit	Value
Hazardous waste disposed	Kg	-
Collected as mixed construction waste	Kg	0.945
Reuse	Kg	-
Recycling	Kg	0.919
Energy recovery	Kg	0.0135
To landfill	Kg	0.069

The aluminium goes predominantly to three different markets with different market shares to each of them. The three markets are: building industry (96%), for electrical applications (92%) and the automotive industry (95%). The numbers in parentheses are collection rates found by European Aluminium for the different markets. Due to the different market shares, the resulting average collection rate is 94.5%. Aluminium that is not collected for recycling is assumed to go to either incineration or landfill. A 50/50 split is employed. In the handling phase (sorting and shredding), there is another loss of 2.7% of the stream going to recycling.

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance KM	Fuel/Energy consumption (l/tkm)	value (l/t)
Truck	40	Lorry, >32 metric tons, Euro V	50	4.74E-02	1.48E-01

The transport to waste handling, module C2, is modelled with a truck of similar size as used in outbound transport of the product, but with a shorter distance and slightly lower capacity utilisation.

Benefits and loads beyond the system boundaries (D)

	Unit	Value
Aluminium foundry alloy to recycling	g	926

Aluminium collected and recycled is assumed to replace an average extrusion ingot in Europe consisting of 40% recycled and 60% primary aluminium. This is a conservative approach.

LCA: Results

All results are calculated with the use of SimaPro v.9.3.0.3 (2019) and impact methods according to EN 15804+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	MND	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	MNR

Core environmental impact indicators

Indicator	Unit	A1-A3	A4	C2	C3	C4	D
GWP-total	kg CO2 eq.	4.55E+00	5.32E-02	7.79E-03	2.47E-01	0.00E+00	-5.36E+00
GWP-fossil	kg CO2 eq.	4.48E+00	5.32E-02	7.78E-03	2.43E-01	0.00E+00	-5.25E+00
GWP-biogenic	kg CO2 eq.	1.46E-02	4.87E-05	6.69E-06	3.09E-03	0.00E+00	-1.84E-02
GWP-LULUC	kg CO2 eq.	5.71E-02	1.96E-05	3.08E-06	1.14E-04	0.00E+00	-9.57E-02
ODP	kg CFC11 eq.	3.76E-07	1.97E-08	1.82E-09	9.79E-09	0.00E+00	-3.92E-07
AP	mol H^+ eq.	3.66E-02	5.36E-04	3.94E-05	8.03E-04	0.00E+00	-3.53E-02
EP-freshwater	kg P eq.	1.42E-03	3.79E-06	5.06E-07	1.03E-04	0.00E+00	-1.87E-03
EP-marine	kg N eq.	4.50E-03	1.20E-04	1.36E-05	1.04E-04	0.00E+00	-5.13E-03
EP-terrestrial	mol N eq.	4.82E-02	1.32E-03	1.48E-04	1.12E-03	0.00E+00	-5.04E-02
POCP	kg NMVOC eq.	1.56E-02	3.91E-04	4.23E-05	3.23E-04	0.00E+00	-1.68E-02
ADP-M&M	kg Sb eq.	8.19E-06	9.42E-08	2.73E-08	7.35E-06	0.00E+00	1.75E-05
ADP-fossil	MJ	4.19E+01	1.25E+00	1.19E-01	1.45E+00	0.00E+00	-6.52E+01
WDP	m^3	1.29E+00	2.42E-03	3.55E-04	1.38E-02	0.00E+00	-1.03E+00

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.*

Additional environmental impact indicators

Indicator	Unit	A1-A3	A4	C2	C3	C4	D
PM	Disease incidence	4.63E-07	4.85E-09	6.94E-10	1.43E-08	0.00E+00	-4.13E-07
IRP	kBq U235 eq.	3.57E-01	5.84E-03	6.10E-04	9.33E-03	0.00E+00	-6.97E-01
ETP-fw	CTUe	1.32E+02	8.47E-01	9.26E-02	6.14E+00	0.00E+00	-8.26E+01
HTP-c	CTUh	1.15E-08	1.68E-11	3.00E-12	1.55E-10	0.00E+00	-1.28E-08
HTP-nc	CTUh	1.88E-07	6.16E-10	9.70E-11	6.67E-09	0.00E+00	-1.51E-07
SQP	Dimensionless	1.23E+01	7.36E-01	8.15E-02	1.44E+00	0.00E+00	-5.84E+00

PM: *Particulate matter emissions;* ***IRP:*** *Ionising radiation, human health;* ***ETP-fw:*** *Ecotoxicity (freshwater);* ***ETP-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	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
ILCD type / level 2	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

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 is also not measured by this indicator.

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

Resource use

Parameter	Unit	A1-A3	A4	C2	C3	C4	D
RPEE	MJ	4.21E+01	1.00E-02	1.68E-03	1.96E-01	0.00E+00	-2.34E+01
RPEM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TPE	MJ	4.21E+01	1.00E-02	1.68E-03	1.96E-01	0.00E+00	-2.34E+01
NRPE	MJ	4.19E+01	1.25E+00	1.19E-01	1.45E+00	0.00E+00	-6.52E+01
NRPM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TRPE	MJ	4.19E+01	1.25E+00	1.19E-01	1.45E+00	0.00E+00	-6.52E+01
SM	kg	0.00E+00	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	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
W	m^3	2.51E-01	8.43E-05	1.32E-05	7.82E-04	0.00E+00	-1.27E-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 Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE 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; W Use of net fresh water

End of life - Waste

Parameter	Unit	A1-A3	A4	C2	C3	C4	D
HW	KG	2.07E-02	1.83E-06	3.10E-07	6.07E-03	0.00E+00	-1.92E-03
NHW	KG	3.60E+00	5.90E-02	6.87E-03	1.36E+00	2.70E-02	-2.51E+00
RW	KG	2.03E-04	8.54E-06	8.02E-07	4.29E-06	0.00E+00	-2.69E-04

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

End of life – output flow

Parameter	Unit	A1-A3	A4	C2	C3	C4	D
CR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	kg	0.00E+00	0.00E+00	0.00E+00	9.19E-01	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	9.40E-02	0.00E+00	0.00E+00
EEE	MJ	3.33E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ETE	MJ	3.66E-04	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 E-03 = 9,0*10-3 = 0,009

Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	kg C	0
Biogenic carbon content in the accompanying packaging	kg C	0.001

Additional Norwegian requirements

Greenhouse gas emission 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).

National electricity grid	Unit	Value
Norway	kg CO2 -eq/kWh	6.20E-03

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-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.
GWP-BC Climate impacts from the net uptake and emission of biogenic carbon from each module.

Indicator	Unit	A1-A3	A4	C2	C3	C4	D
EP-freshwater*	kg PO4 eq.	6.54E-03	5.92E-05	6.78E-06	3.85E-04	0.00E+00	-8.01E-03
GWP-IOBC	kg CO2 eq.	4.54E+00	5.32E-02	7.79E-03	2.43E-01	0.00E+00	-5.34E+00
GWP-BC	kg CO2 eq.	1.46E-02	4.87E-05	6.69E-06	3.09E-03	0.00E+00	-1.84E-02
GWP	kg CO2 eq.	4.55E+00	5.32E-02	7.79E-03	2.47E-01	0.00E+00	-5.36E+00

EP-freshwater* *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.

☒ 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 contain dangerous substances, more then 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 (Avfallsforskiften, Annex III), see table.

Indoor environment

The product meets the requirements for low emissions.

Carbon footprint

A separate carbon footprint analysis has not been published for the product.

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

NPCR Construction products and services – Part A, and NPCR 013 version 3.0

NPCR Construction products and services – Part B for steel and aluminium construction products

epd-norge The Norwegian EPD Foundation	**Program Operator**	tlf	+47 23 08 80 00
	The Norwegian EPD Foundation		
	Post Box 5250 Majorstuen, 0303 Oslo	e-post:	post@epd-norge.no
	Norway	web	www.epd-norge.no
epd-norge The Norwegian EPD Foundation	**Publisher**	tlf	+47 23 08 80 00
	The Norwegian EPD Foundation		
	Post Box 5250 Majorstuen, 0303 Oslo	e-post:	post@epd-norge.no
	Norway	web	www.epd-norge.no
speira	**Owner of the declaration**	tlf	
	Speira Karmøy Rolling Mill AS		
	Ringavegen 40, 4265 Håvik	e-post:	
	Norway	web	
NORSUS Norsk institutt for bærekraftsforskning	**Author of the life cycle assessment**	tlf	
	NORSUS Norsk Institutt for Bærekraftsforskning		
	Stadion 4, 1671 Kråkerøy	e-post:	post@norsus.no
	Norway	web	www.norsus.no

EPD for the best environmental decision

Global
Program
Operator

The Norwegian EPD foundation
www.epd-norge.no

epd-norge