ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025 and EN 15804:2012 + A2:2019/AC:2021

Mill finished aluminium sheet

Owner of the declaration:	
Publisher and Programme holder:	EUROPEAN ALUMINIUM
Declaration number:	EPD-2026-0003
Issue date:	2026-03-04
Valid until	2031-03-03

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GENERAL INFORMATION

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The declaration is based on the Product Category Rules	European Aluminium General Programme Instructions version 3, 23rd of September 2020
Declared Unit	1 m^2 of Mill-finished aluminium sheet
Scope of the Environmental Product Declaration	This EPD covers 1 m^2 of mill-finished aluminium sheet. These EPD results have been calculated from an LCA tool for EPD, based on the LCA for expert database, initially realised by Thinkstep in 2013, revised by Ecoinnovazione in 2019 and updated in 2025 with the latest European Aluminium datasets. Among the product family, one representative product has been selected and corresponding EPD results have been calculated based on specific bill of materials. The results generated by the collective tool can be considered as a good proxy to model Mill-finished aluminium sheet produced by Slim Aluminium S.p.A. The EPD may be used in a B2B context within the European Market.
Liability	The owner of the declaration is liable for the underlying manufacturing information and European Aluminium is not liable in this respect.
Disclaimers	This EPD cannot be used as a guarantee of the recycled content of the actual product sold on the market. A specific declaration may be asked from the supplier. The use of this EPD within BIM tools is in principle limited to the products explicitly included in the EPD. The scaling of results to model similar products can only be done if justified and transparently reported in the project report. Any responsibility regarding the misuse of this EPD by third parties is not accepted by the Programme Operator.

Verification

EN15804:2012 +A2:2019 serves as core PCR completed by European Aluminium PCR 03/2020	
Verification of the EPD by an independent third party in accordance with ISO 14025	
☐ Internally	☒ Externally

Verifier

1 PRODUCT

1.1 Product description and applications

This Environmental Product Declaration (EPD) is meant for business-to-business communication.

The representative products being branded under present EPD as MF25 consist of aluminium mill-finish sheets and strips for many different industrial applications and end uses with different thickness range in several aluminium alloys and tempers.

Please note that: The environmental information presented in this EPD is valid only for mill-finished aluminium sheets, and the non-anodised versions of these products (if any). The declared environmental information is not applicable to and can't be used for anodised or other surface-treated versions of these products.

The representative products are mill-finished aluminium sheets of 1, 2 and 3 mm thickness. EPD results have been calculated for 3 representative products, which are detailed in Table 1.

Table 1 Details representative products

ID	Name	Aluminum sheet thickness (mm)
1	Mill-finished aluminium sheet	1
2	Mill-finished aluminium sheet	2
3	Mill-finished aluminium sheet	3

1.2 Technical Data

MF25 combines excellent flatness with good formability properties, depending on the alloy.

According to client requirements, mill finished products, made of alloy series EN-AW 1xxx, 3xxx, 4xxx, 5xxx, 6xxx and 8xxx, can be produced with customized composition and optimized microstructure to match their needs.

More detailed technical data related to aluminium coils and sheets can be provided by Slim Aluminium S.p.A.

Most relevant standards for applications of aluminium sheet products in buildings are EN 485-2, EN 507, EN 508-2, EN 573-3, EN 1396, EN 13501-1, EN 14782, EN 14783, EN 13964/+A1. Please refer to the latest version of those standards.

1.3 Process description

The aluminium sheet is produced using an aluminium slab that undergoes a hot and cold rolling process followed by finishing operations. The aluminium production and the rolling are described in European Aluminium's environmental profile report.

The production phase includes mainly the following steps:

1. Aluminium production and rolling
2. Finishing operations

The main background production processes are reported in Figure 1.

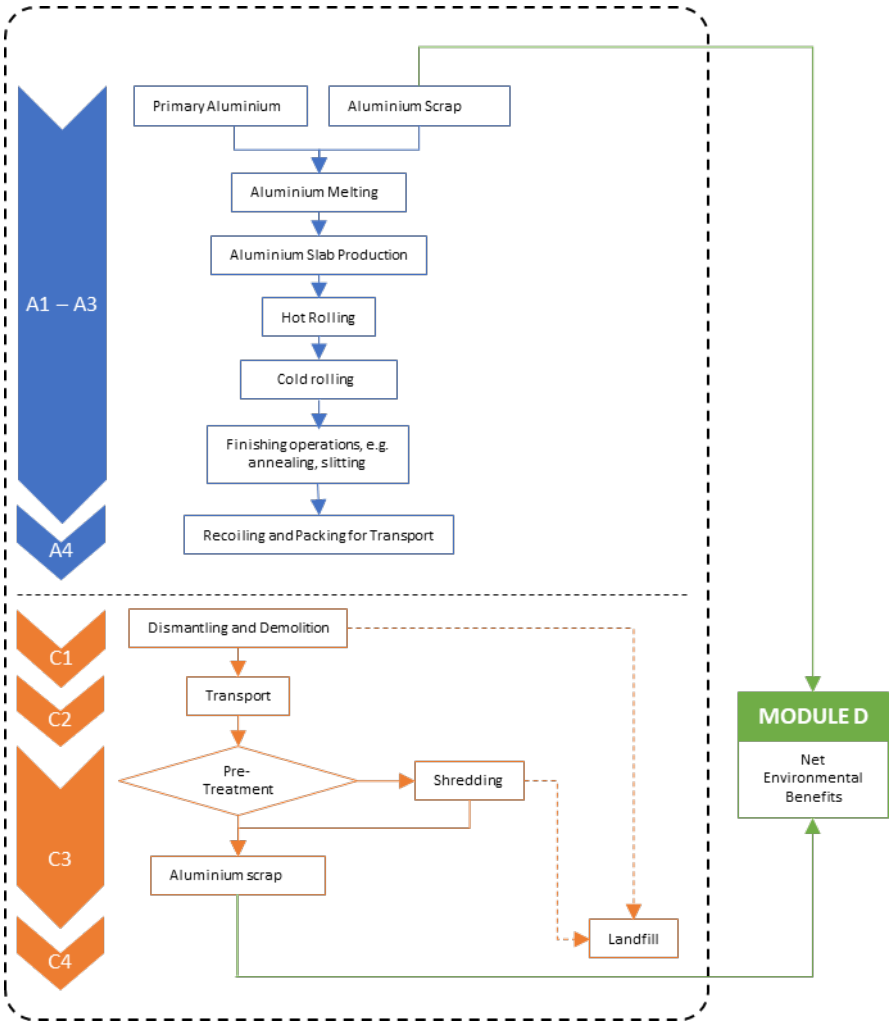


Figure 1 Main production processes and components of the aluminium sheet

The upstream aluminium processes have been modelled using European Aluminium LCI datasets for the primary aluminium production, recycling and remelting as described in the European Aluminium Environmental profile report 2024 (using 2021 data for primary aluminium and rolling and 2017-2019 data for secondary aluminium input through refining)

At the end-of-life stage, the aluminium sheets should be specifically dismantled and collected in order to be treated, since the aluminium can be efficiently recycled. After having been collected, the aluminium sheets are treated through shredding and sorting.

1.4 Health and safety aspects during production and installation

There are no relevant aspects of occupational health and safety during the further processing and installation of the aluminium coil and sheet. Under normal installation, no measurable environmental impacts can be associated to use of aluminium sheet. There is no release of any substance from the REACH SVHC list during further processing or during the use phase.

1.5 Reference service life

Since the use phase is not modelled, no specific information can be given about the Reference Service Life. In normal use, aluminium building products are not altered or corroded over time. A regular cleaning (e.g. once a year) of the product suffices to secure a long service life. However, the use of highly alkaline (pH >10) or highly acidic (pH < 4) cleaning solutions should be avoided. In practice, a service life of 50 years can be assumed in normal use for such application.

2 LCA – CALCULATION RULES

2.1 Declared unit & bill of materials

The Bill of Materials of the analysed product is reported in Table 2. The declared unit corresponds to 1 m^2 of coil aluminium sheet.

Table 2 Bill of materials (kg) of the declared unit for the product

Sheet thickness (mm)	Aluminium mass (kg)
1	2.70
2	5.40
3	8.10

2.2 System boundary

This EPD is from cradle to gate with modules C1-C4 and module D, as reported in Table 3.

The production stage (modules A1-A3) includes processes that provide materials and energy input for the system, manufacturing, and transport processes up to the factory gate, as well as waste processing. For the end-of-life, the default scenario defined in the General Product Instructions and detailed in 3.2 is applied.

Table 3 Modules declared

Production			Installation		Use stage							End-of-Life				Next product system
Raw material	Transport	Manufacturing	Transport to	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy	Operational water	Deconstruction	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	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

Note: ND: Not Declared; X: Module included in the LCA.

Module A4 is declared for a distance of 1 km to give the possibility to adjust the resulting Environmental impacts depending on the specific distance at hand.

2.3 Energy mix

In the model developed, the background electricity mix used is the European electricity mix (EU-28 Electricity grid mix (2021)). For details about the electricity modelling in the datasets (production of primary aluminium, extrusion, rolling and recycling), please refer to the Environmental Profile Report 2024.

2.4 Allocation

The scrap which are produced along the production chain are recycled into the same production chain and are modelled as “closed-loop” within Module A. This recycling loop has been modelled in the LCA for expert model so that the aluminium sheet is the only product exiting the gate. Hence, the production process does not deliver any co-products.

At the end-of-life stage, the aluminium sheet is sent to an end-of-life treatment which is modelled according to the scenario reported in 3.2. The environmental burdens and benefits of recycling and energy recovery are calculated in module D accordingly.

2.5 Assumptions and Cut-off criteria

The aluminium sheets are composed of a mix of 60% primary aluminium and 40% recycled aluminium. Such mix represents the typical sourcing of aluminium in Europe, all markets included. For the primary aluminium, a primary aluminium ingot consumption mix was considered (European production + net fraction of imports into Europe). Alloying elements were not considered, and a pure aluminium sheet has been assumed as a proxy.

2.6 Data quality

Representativeness

Technological: All primary and secondary data were modelled to be specific to the technologies or technology mixes under study. Where technology-specific data were unavailable, proxy data were used. For the aluminium production, extrusion, rolling and recycling, the datasets described in the Environmental Profile Report 2024 of European Aluminium have been used. The modelling reflects the specific BoM of the analysed products. Technological representativeness is considered as being very good.

Geographical: All primary data were collected specifically to the countries under study. Regarding secondary data, where EU region-specific data were unavailable, DE datasets were used. For the aluminium production, extrusion profiles and recycling, the datasets described in the Environmental Profile Report 2024 of European Aluminium have been used. (considering 2021 data for primary aluminium and rolling and 2017-2019 data for the refining process) Geographical representativeness is considered as being good.

Temporal: All secondary data come from the LCA for Experts version 2025.2, including those on aluminium production, which are the most recent ones as described in the Environmental Profile Report 2024 of European Aluminium.

Completeness

All known operating data was taken into consideration in the analysis. Based on earlier studies conducted by European Aluminium, it can be assumed that the ignored processes or flows contribute to much less than 5% of the impact categories under review.

The process chain is considered sufficiently complete regarding the goal and scope of this study.

Overall, the data quality can be described as good.

2.7 Software and databases

These EPD results have been calculated from an LCA tool for EPD, based on the LCA for Experts database. Currently, the EPD software is using the software LCA for Experts version 2025.2.

2.8 Comparability

As a general rule, a comparison or evaluation of EPD data may be possible when all of the data to be compared has been drawn up in accordance with EN 15804 and the building context or product-specific characteristics are taken into consideration.

3 LCA – SCENARIOS AND ADDITIONAL INFORMATION

3.1 Scenario for additional modules

Module A4 is taken into consideration in this Declaration, and it has been modelled according to the information reported in Table 4.

Table 4 Module A4 – Transport to the building site

Scenario information	Unit (expressed per DU)
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long-distance truck, boat, etc.	Truck-trailer, Euro 4, 34 - 40t gross weight / 27t payload capacity, diesel driven
Distance	1 km
Capacity utilisation (including empty returns)	61 %
Bulk density of transported products	-
Volume capacity utilisation factor (factor = 1 or <1 or ≥1 for compressed or nested packaged products)	Not applicable

3.2 Scenario for Mod. C1-C4

The default scenario for the end-of-life of the aluminium sheet for architectural cladding, as reported in the General Programme Instructions, is the following:

- collection rate: 99%;
- shredding efficiency: 99%;
- scrap recycled through refining process: 96.5%
- overall aluminium recycling rate: 95%

Table 5 reports the main parameters of the end-of-life scenarios for the main materials and components.

Table 5 Parameters of the end-of-life scenarios for the main materials and components, related to the DU

Processes	Unit (expressed per FU or DU of components, products, or materials and by type of material)	1 mm of aluminium sheets
Collection process	Kg collected separately	Aluminium sheet 2.70 kg
Recovery system	Kg for recycling	Aluminium sheet: 2.59 kg
Disposal	Kg to landfill	Aluminium sheet: 0.11 kg

Table 6 Parameters of the end-of-life scenarios for the main materials and components, related to the DU

Processes	Unit (expressed per FU or DU of components, products, or materials and by type of material)	2 mm of aluminium sheets
Collection process	Kg collected separately	Aluminium sheet: 5.40 kg
Recovery system	Kg for recycling	Aluminium sheet: 5.19 kg
Disposal	Kg to landfill	Aluminium sheet: 0.21 kg

Table 7 Parameters of the end-of-life scenarios for the main materials and components, related to the DU

Processes	Unit (expressed per FU or DU of components, products, or materials and by type of material)	3 mm of aluminium sheets
Collection process	Kg collected separately	Aluminium sheet: 8.10 kg
Recovery system	Kg for recycling	Aluminium sheet: 7.78 kg
Disposal	Kg to landfill	Aluminium sheet: 0.32 kg

Note to Tables 5, 6 e 7:

Material collected separately: This amount refers to the waste stream collected separately per material before being subjected to shredding

Material for recycling: This amount refers to the waste stream sent to recycling per material after the shredding and/or sorting process.

Material for final deposition – aluminium: this amount includes the aluminium not collected separately and the shredding losses.

3.3 Scenario Mod. D

Module D includes:

- a transport from the scrap dealers to the recycling plants, considering an average distance of 200 km;
- recycling of aluminium through refining;
- a net credit for the avoided production of primary aluminium;

The calculation of module D has been implemented in line with the General Programme Instructions of European Aluminium, thus based on the difference between the scrap used at the input and output side. In some cases, this may result in environmental burdens instead of environmental benefits if the product system is a net consumer of valuable secondary material.

3.4 Additional environmental information

In case of fire, aluminium is a non-combustible construction material (European Fire Class A1) in accordance with Commission Decision 96/603/EC (later amended by European Commission Decision 2000/605/EC to follow the new classification system defined in Commission Decision 2000/147/EC, where Class A1 substituted the former Class A), and does therefore not make any contribution to fire.

4 LCA RESULTS – MILL-FINISHED ALUMINIUM SHEET – 1, 2 and 3 mm sheet thicknesses

4.1 Core Environmental impacts indicators

Table 8 Core Environmental impact indicators for 1 m^2 of Mill-finished aluminium sheet – 1 mm thickness

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP - total	kg CO_2 eq.	1.69E+01	1.78E-04	3.48E-01	3.59E-02	8.49E-02	2.33E-03	-1.35E+01
GWP – fossil	kg CO_2 eq.	1.65E+01	1.77E-04	3.44E-01	3.56E-02	8.42E-02	2.39E-03	-1.31E+01
GWP – biogenic	kg CO_2 eq.	1.64E-01	-3.10E-06	3.47E-03	-6.24E-04	3.99E-04	-7.22E-05	-2.26E-01
GWP - luluc	kg CO_2 eq.	2.24E-01	4.54E-06	1.19E-03	9.13E-04	2.07E-04	7.14E-06	-2.02E-01
ODP	kg CFC 11 eq.	1.08E-10	3.40E-17	7.78E-12	6.83E-15	2.67E-15	9.44E-18	-8.68E-11
AP	mol H^+ eq.	1.09E-01	1.18E-06	7.59E-04	2.38E-04	1.46E-04	1.73E-05	-9.60E-02
EP - freshwater	kg PO_4^{3-} eq.	7.97E-06	3.32E-10	7.34E-07	6.67E-08	3.60E-07	4.08E-09	-4.70E-06
EP - marine	kg N eq.	1.55E-02	5.92E-07	1.85E-04	1.19E-04	4.09E-05	4.49E-06	-1.28E-02
EP - terrestrial	mol N eq.	1.71E-01	6.48E-06	2.07E-03	1.30E-03	4.27E-04	4.94E-05	-1.40E-01
POCP	kg NMVOC eq.	4.82E-02	1.13E-06	4.60E-04	2.27E-04	1.03E-04	1.36E-05	-3.95E-02
ADP-MM (**)	kg Sb eq.	1.17E-06	2.37E-11	7.13E-08	4.76E-09	3.23E-08	2.30E-10	-7.68E-07
ADPF (**)	MJ	2.16E+02	2.28E-03	6.99E+00	4.57E-01	1.08E+00	3.23E-02	-1.64E+02
WDP (**)	m^3	1.86E+00	6.51E-07	8.56E-02	1.31E-04	1.91E-03	2.61E-04	-1.40E+00

Note: GWP – Global Warming Potential; ODP – Ozone Depletion; AP – acidification potential for soil and water; EP – Eutrophication potential; POCP – formation potential of tropospheric ozone; ADP - MM – abiotic depletion potential for non fossil resources; ADPF – Abiotic depletion potential for fossil resources; WDP – Water deprivation potential.

(**) **Disclaimer**: the results of this Environmental impacts indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Table 9 Core Environmental impact indicators for 1 m^2 of Mill-finished aluminium sheet – 2 mm thickness

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP - total	kg CO_2 eq.	3.37E+01	3.57E-04	6.97E-01	7.17E-02	1.70E-01	4.66E-03	-2.70E+01
GWP – fossil	kg CO_2 eq.	3.30E+01	3.54E-04	6.87E-01	7.11E-02	1.68E-01	4.79E-03	-2.61E+01
GWP – biogenic	kg CO_2 eq.	3.29E-01	-6.21E-06	6.94E-03	-1.25E-03	7.99E-04	-1.44E-04	-4.52E-01
GWP - luluc	kg CO_2 eq.	4.47E-01	9.09E-06	2.37E-03	1.83E-03	4.15E-04	1.43E-05	-4.03E-01
ODP	kg CFC 11 eq.	2.16E-10	6.79E-17	1.56E-11	1.37E-14	5.35E-15	1.89E-17	-1.74E-10
AP	mol H^+ eq.	2.17E-01	2.37E-06	1.52E-03	4.76E-04	2.92E-04	3.46E-05	-1.92E-01
EP - freshwater	kg PO_4^{3-} eq.	1.59E-05	6.63E-10	1.47E-06	1.33E-07	7.20E-07	8.16E-09	-9.40E-06
EP - marine	kg N eq.	3.11E-02	1.18E-06	3.69E-04	2.38E-04	8.18E-05	8.99E-06	-2.55E-02
EP - terrestrial	mol N eq.	3.41E-01	1.30E-05	4.14E-03	2.61E-03	8.54E-04	9.87E-05	-2.79E-01
POCP	kg NMVOC eq.	9.64E-02	2.26E-06	9.20E-04	4.54E-04	2.06E-04	2.72E-05	-7.91E-02
ADP-MM (**)	kg Sb eq.	2.34E-06	4.73E-11	1.43E-07	9.51E-09	6.47E-08	4.60E-10	-1.54E-06
ADPF (**)	MJ	4.32E+02	4.55E-03	1.40E+01	9.15E-01	2.15E+00	6.45E-02	-3.28E+02
WDP (**)	m^3	3.72E+00	1.30E-06	1.71E-01	2.62E-04	3.82E-03	5.22E-04	-2.79E+00

Note: GWP – Global Warming Potential; ODP – Ozone Depletion; AP – acidification potential for soil and water; EP – Eutrophication potential; POCP – formation potential of tropospheric ozone; ADP - MM – abiotic depletion potential for non fossil resources; ADPF – Abiotic depletion potential for fossil resources; WDP – Water deprivation potential.

(**) **Disclaimer**: the results of this Environmental impacts indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Table 10 Core Environmental impact indicators for 1 m^2 of Mill-finished aluminium sheet – 3 mm thickness

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP - total	kg CO_2 eq.	5.06E+01	5.35E-04	1.04E+00	1.08E-01	2.55E-01	6.98E-03	-4.05E+01
GWP – fossil	kg CO_2 eq.	4.94E+01	5.31E-04	1.03E+00	1.07E-01	2.53E-01	7.18E-03	-3.92E+01
GWP – biogenic	kg CO_2 eq.	4.93E-01	-9.31E-06	1.04E-02	-1.87E-03	1.20E-03	-2.17E-04	-6.79E-01
GWP - luluc	kg CO_2 eq.	6.71E-01	1.36E-05	3.56E-03	2.74E-03	6.22E-04	2.14E-05	-6.05E-01
ODP	kg CFC 11 eq.	3.24E-10	1.02E-16	2.33E-11	2.05E-14	8.02E-15	2.83E-17	-2.60E-10
AP	mol H^+ eq.	3.26E-01	3.55E-06	2.28E-03	7.14E-04	4.38E-04	5.19E-05	-2.88E-01
EP - freshwater	kg PO_4^{3-} eq.	2.39E-05	9.95E-10	2.20E-06	2.00E-07	1.08E-06	1.22E-08	-1.41E-05
EP - marine	kg N eq.	4.66E-02	1.78E-06	5.54E-04	3.57E-04	1.23E-04	1.35E-05	-3.83E-02
EP - terrestrial	mol N eq.	5.12E-01	1.94E-05	6.20E-03	3.91E-03	1.28E-03	1.48E-04	-4.19E-01
POCP	kg NMVOC eq.	1.45E-01	3.39E-06	1.38E-03	6.81E-04	3.09E-04	4.09E-05	-1.19E-01
ADP-MM (**)	kg Sb eq.	3.50E-06	7.10E-11	2.14E-07	1.43E-08	9.70E-08	6.89E-10	-2.30E-06
ADPF (**)	MJ	6.48E+02	6.83E-03	2.10E+01	1.37E+00	3.23E+00	9.68E-02	-4.92E+02
WDP (**)	m^3	5.58E+00	1.95E-06	2.57E-01	3.93E-04	5.73E-03	7.82E-04	-4.19E+00

Note: GWP – Global Warming Potential; ODP – Ozone Depletion; AP – acidification potential for soil and water; EP – Eutrophication potential; POCP – formation potential of tropospheric ozone; ADP - MM – abiotic depletion potential for non fossil resources; ADPF – Abiotic depletion potential for fossil resources; WDP – Water deprivation potential.

(**) **Disclaimer**: the results of this Environmental impacts indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

4.1.1 Additional Environmental impacts indicators

Table 11 Additional Environmental impact indicators for 1 m² of Mill-finished aluminium sheet – 1 mm thickness

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Particular Matter emissions	Disease incidence	1.79E-06	4.38E-12	6.31E-09	8.81E-10	1.08E-09	2.15E-10	-1.61E-06
Ionising radiation - human health (*)	[kBq U235 eq.]	1.74E+00	2.53E-07	1.81E-01	5.09E-05	9.98E-03	3.55E-05	-1.32E+00
Eco-toxicity (freshwater) (**)	[CTUe]	1.36E+02	2.60E-03	1.21E+00	5.22E-01	4.06E-01	1.83E-02	-1.19E+02
Human toxicity - cancer effects (**)	[CTUh]	3.79E-05	3.72E-14	1.11E-10	7.47E-12	5.93E-11	2.71E-12	5.88E-05
Human toxicity - non-cancer effects (**)	[CTUh]	2.26E-07	1.41E-12	2.35E-09	2.84E-10	3.78E-10	2.87E-10	-1.59E-07
Land Use related impacts/ Soil quality (**)	dimensionless	2.72E+01	1.20E-03	2.80E+00	2.40E-01	5.32E-01	6.51E-03	-3.36E+00

(*) **Disclaimer**: 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**: the results of this Environmental impacts indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Table 12 Additional Environmental impact indicators for 1 m² of Mill-finished aluminium sheet – 2 mm thickness

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Particular Matter emissions	Disease incidence	3.58E-06	8.76E-12	1.26E-08	1.76E-09	2.15E-09	4.30E-10	-3.22E-06
Ionising radiation - human health (*)	[kBq U235 eq.]	3.48E+00	5.06E-07	3.63E-01	1.02E-04	2.00E-02	7.10E-05	-2.65E+00
Eco-toxicity (freshwater) (**)	[CTUe]	2.72E+02	5.20E-03	2.42E+00	1.04E+00	8.13E-01	3.67E-02	-2.38E+02
Human toxicity - cancer effects (**)	[CTUh]	7.58E-05	7.44E-14	2.23E-10	1.49E-11	1.19E-10	5.42E-12	1.18E-04
Human toxicity - non-cancer effects (**)	[CTUh]	4.51E-07	2.83E-12	4.70E-09	5.69E-10	7.56E-10	5.74E-10	-3.18E-07
Land Use related impacts/ Soil quality (**)	dimensionless	5.45E+01	2.39E-03	5.61E+00	4.81E-01	1.06E+00	1.30E-02	-6.72E+00

(*) **Disclaimer**: 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**: the results of this Environmental impacts indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Table 13 Additional Environmental impact indicators for 1 m² of Mill-finished aluminium sheet – 3 mm thickness

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Particular Matter emissions	Disease incidence	5.37E-06	1.31E-11	1.89E-08	2.64E-09	3.23E-09	6.45E-10	-4.83E-06
Ionising radiation - human health (*)	[kBq U235 eq.]	5.22E+00	7.59E-07	5.44E-01	1.53E-04	2.99E-02	1.07E-04	-3.97E+00
Eco-toxicity (freshwater) (**)	[CTUe]	4.08E+02	7.80E-03	3.63E+00	1.57E+00	1.22E+00	5.50E-02	-3.57E+02
Human toxicity - cancer effects (**)	[CTUh]	1.14E-04	1.12E-13	3.34E-10	2.24E-11	1.78E-10	8.13E-12	1.76E-04
Human toxicity - non-cancer effects (**)	[CTUh]	6.77E-07	4.24E-12	7.05E-09	8.53E-10	1.13E-09	8.61E-10	-4.77E-07
Land Use related impacts/ Soil quality (**)	dimensionless	8.17E+01	3.59E-03	8.41E+00	7.21E-01	1.60E+00	1.95E-02	-1.01E+01

(*) **Disclaimer**: 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**: the results of this Environmental impacts indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

4.2 Resource use

Table 14 Resource use for 1 m² of Mill-finished aluminium sheet – 1 mm thickness

Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	9.47E+01	1.91E-04	4.76E+00	3.84E-02	5.81E-01	4.34E-03	-7.66E+01
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	9.47E+01	1.91E-04	4.76E+00	3.84E-02	5.81E-01	4.34E-03	-7.66E+01
PENRE	MJ	2.16E+02	2.28E-03	6.99E+00	4.57E-01	1.08E+00	3.23E-02	-1.64E+02
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	2.16E+02	2.28E-03	6.99E+00	4.57E-01	1.08E+00	3.23E-02	-1.64E+02
SM	kg	9.27E-01	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	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.80E-01	1.38E-07	3.70E-03	2.77E-05	3.13E-04	7.96E-06	-1.54E-01

Note: PERE – 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 – use of net fresh water.

Table 15 Resource use for 1 m² of Mill-finished aluminium sheet – 2 mm thickness

Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	1.89E+02	3.82E-04	9.53E+00	7.68E-02	1.16E+00	8.68E-03	-1.53E+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	1.89E+02	3.82E-04	9.53E+00	7.68E-02	1.16E+00	8.68E-03	-1.53E+02
PENRE	MJ	4.32E+02	4.55E-03	1.40E+01	9.15E-01	2.15E+00	6.45E-02	-3.28E+02
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	4.32E+02	4.55E-03	1.40E+01	9.15E-01	2.15E+00	6.45E-02	-3.28E+02
SM	kg	1.85E+00	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	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	3.60E-01	2.76E-07	7.39E-03	5.54E-05	6.26E-04	1.59E-05	-3.09E-01

Note: PERE – 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 – use of net fresh water.

Table 16 Resource use for 1 m² of Mill-finished aluminium sheet – 3 mm thickness

Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	2.84E+02	5.73E-04	1.43E+01	1.15E-01	1.74E+00	1.30E-02	-2.30E+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	2.84E+02	5.73E-04	1.43E+01	1.15E-01	1.74E+00	1.30E-02	-2.30E+02
PENRE	MJ	6.48E+02	6.83E-03	2.10E+01	1.37E+00	3.23E+00	9.68E-02	-4.92E+02
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	6.48E+02	6.83E-03	2.10E+01	1.37E+00	3.23E+00	9.68E-02	-4.92E+02
SM	kg	2.78E+00	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	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	5.40E-01	4.13E-07	1.11E-02	8.31E-05	9.40E-04	2.39E-05	-4.63E-01

Note: PERE – 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 – use of net fresh water.

4.3 Output flows, waste categories

Table 17 Output flows, waste categories for 1 m² of Mill-finished aluminium sheet – 1 mm thickness

Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
HWD	kg	4.95E-03	1.08E-13	9.10E-09	2.17E-11	8.36E-10	3.42E-12	-5.88E-08
NHWD	kg	3.99E+00	3.27E-07	5.40E-03	6.57E-05	1.11E-03	1.61E-01	-3.59E+00
RWD	kg	7.90E-03	2.64E-09	1.10E-03	5.30E-07	1.01E-04	3.38E-07	-5.43E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	2.04E-01	0.00E+00	0.00E+00	0.00E+00	2.54E+00	0.00E+00	-3.37E-02
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Note: HWD – hazardous waste disposed; NHWD – Non-hazardous waste disposed; RWD – Radioactive waste disposed; CRU – Components for re-use; MFR – Materials for recycling; MER – Materials for energy recovery; EEE – Exported electrical energy; EET – Exported thermal energy

Table 18 Output flows, waste categories for 1 m² of Mill-finished aluminium sheet – 2 mm thickness

Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
HWD	kg	9.89E-03	2.16E-13	1.82E-08	4.34E-11	1.67E-09	6.85E-12	-1.18E-07
NHWD	kg	7.97E+00	6.54E-07	1.08E-02	1.31E-04	2.23E-03	3.22E-01	-7.17E+00
RWD	kg	1.58E-02	5.28E-09	2.20E-03	1.06E-06	2.03E-04	6.76E-07	-1.09E-02
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	4.07E-01	0.00E+00	0.00E+00	0.00E+00	5.08E+00	0.00E+00	-6.75E-02
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Note: HWD – hazardous waste disposed; NHWD – Non-hazardous waste disposed; RWD – Radioactive waste disposed; CRU – Components for re-use; MFR – Materials for recycling; MER – Materials for energy recovery; EEE – Exported electrical energy; EET – Exported thermal energy

Table 19 Output flows, waste categories for 1 m² of Mill-finished aluminium sheet – 3 mm thickness

Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D
HWD	kg	1.48E-02	3.24E-13	2.73E-08	6.51E-11	2.51E-09	1.03E-11	-1.76E-07
NHWD	kg	1.20E+01	9.81E-07	1.62E-02	1.97E-04	3.34E-03	4.83E-01	-1.08E+01
RWD	kg	2.37E-02	7.91E-09	3.30E-03	1.59E-06	3.04E-04	1.01E-06	-1.63E-02
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	6.11E-01	0.00E+00	0.00E+00	0.00E+00	7.62E+00	0.00E+00	-1.01E-01
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Note: HWD – hazardous waste disposed; NHWD – Non-hazardous waste disposed; RWD – Radioactive waste disposed; CRU – Components for re-use; MFR – Materials for recycling; MER – Materials for energy recovery; EEE – Exported electrical energy; EET – Exported thermal energy

5 LCA – INTERPRETATION

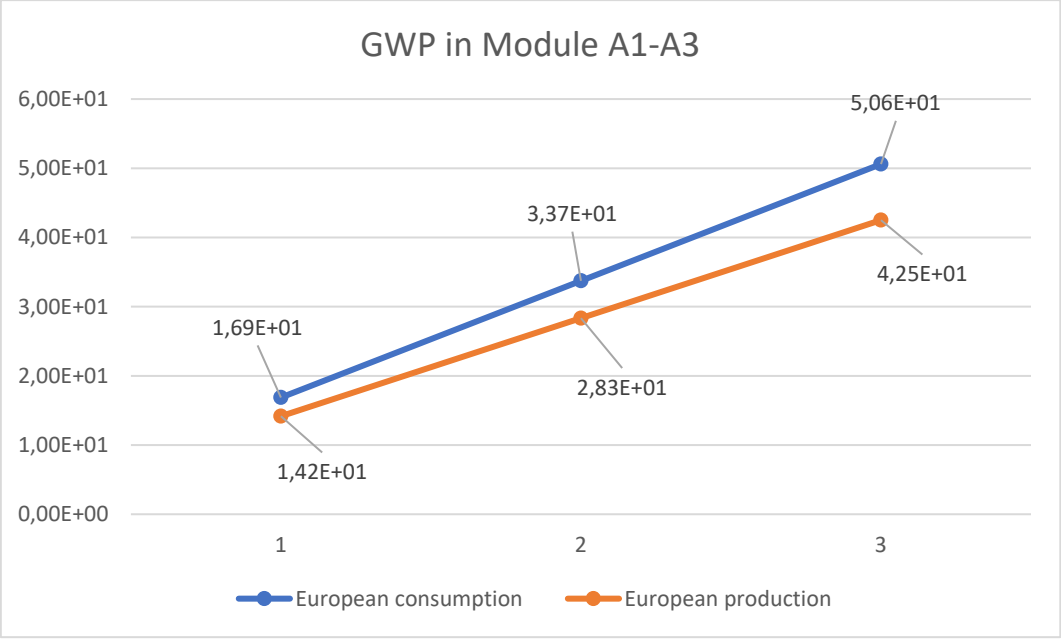
The analysis of the LCIA results for all the products declared shows that most of the environmental impacts come from the aluminium coil and sheet manufacturing. Within the manufacturing processes, the primary aluminium production is dominant, especially the alumina production and the electrolysis. The rolling process, which converts ingot into coil, and contribute much less to the LCA results. The LCA modelling and the impact of the primary aluminium production are detailed in European Aluminium's environmental profile report.

The evolution of GWP of Module A1-A3 for the 3 sheet thicknesses is shown in the following diagram.

Increasing the aluminium sheet thickness (doubling or tripling), the GWP increases in proportion to the change in thickness. The GWP values change from 1.69E+01 kg for the 1 mm-thick sheet to 3.37E+01 kg for the 2 mm-thick sheet to 5.06E+01 kg of CO_2-equiv for the 3 mm-thick sheet. The other indicators follow the same trends, e.g. ODP increases from 1.08E-10 to 2.16E-10 to 3.24E-10 [kg CFC11-eq.] and acidification potential from 1.09E-02 to 2.17E-01 to 3.26E-01 [kg SO_2-eq.].

Comparing the GWP value of European primary aluminium consumption (i.e. European production + net fraction of imports into Europe, as used in the present EPD) with that of European primary aluminium production scenario (i.e. using 100% of primary aluminium produced in Europe), the kg of CO_2-eq. decreases by 16% for all the aluminium sheet thickness of 1 mm, 2 mm and 3 mm.

Figure 2 Sensitivity analysis: EU consumption GWP against EU production GWP



6 OTHER INFORMATION

With plants in Cisterna di Latina (Italy) and Merseburg (Germany), 500 people employed and around 110,000 tons of finished products, Slim Aluminium is currently among the largest aluminium rolling mills in Italy and a significant player in Europe.

The plant in Cisterna di Latina, employing almost 450 employees plus temporary workers, and a production capacity up to 120,000 tons per year, manufactures products that cover around 40% of domestic demand, while the rest is destined for export to Europe and other continents.

In addition to its products, the company provides flexibility, quality of service, technical assistance, as well as a mind-set willingness to collaborate with its partners for the creation of new applications.

This ability is the result of the deep knowledge of the market, of the products, of customer expectations, of the technical standards of the machines, allowing us to manufacture the most suitable material for specific end uses.

Slim Aluminium is founded on the concept of corporate responsibility and includes recognition of the need for positive actions and continuous support and development of the local communities neighboring our facilities.

Through its Management Systems, certified according to ISO 9001:2015, ISO 14001:2015, ISO 50001 and ASI-Performance Standard, Aluminium Slim actively implements best practices regarding environmental protection through significant investments and measures, by optimizing the production cycle, implementing new procedures that reduce the energy footprint of our plants, and the vigilant prevention of any possible environmental pollution.

When looking at sustainability, Slim Aluminium, with its integrated production plant including Cast House, Hot Rolling, Cold Rolling and Finishing, is able to produce semi-finished rolled products with high recycled content and consequent low Carbon Footprint below 2000 kgCO2eq/t levering one of the best property of aluminium infinitively recyclable.

Additional information about Slim Aluminium's corporate responsibility and sustainability policy and the products can be found on the Slim Aluminium website www.slimalu.com.

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7 REFERENCES

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