METRA SPA

ENVIRONMENTAL PRODUCT DECLARATION

Product: name:

METRA RE.AL.E alloys

[RE.AL.E - C1, RE.AL.E – C2, RE.AL.E – C3, RE.AL.E – C4, RE.AL.E – C5]

Site Plant:

Rodengo Saiano - Brescia – Italy

in compliance with ISO 14025 and EN 15804:2012+A2:2019

Program Operator	EPDItaly
Publisher	EPDItaly

Declaration Number	RE.AL.E._METRA_ALLOYS
Registration Number	EPDITALY0403

Issue Date	26/05/2023
Valid to	26/05/2028

GENERAL INFORMATION

EPD OWNER:	METRA SpA - via Stacca, 1 25050 Rodengo Saiano - Brescia – Italy
PLANTS INVOLVED in the declaration:	Foall Srl - via Stacca, 1 25050 Rodengo Saiano - Brescia – Italy. Company fully controlled by METRA SpA.
SCOPE OF APPLICATION:	This Environmental Product Declaration (EPD) is valid for RE.AL.E - C1, RE.AL.E – C2, RE.AL.E – C3, RE.AL.E – C4, RE.AL.E – C5 aluminium alloy billets. The production facility is located in Rodengo Saiano, Brescia (IT). The life cycle assessment is representative for the product introduced in the declaration for the given system boundaries.
PROGRAM OPERATOR:	EPDITALY, via Gaetano De Castillia 10, 20124 Milano, Italia.
INDIPENDENT CHECK:	This declaration has been developed referring to EPDItaly, following the General Program Instruction; further information and the document are available at: www.epditaly.it. This EPD document is valid within the following geographical area: worlwide according to sales market conditions. CEN standard EN 15804:2012+A2:2019 served as the core PCR (PCR ICMQ-001/15 rev 3.0). PCR review was conducted by Daniele Pace. Contact via info@epditaly.it Independent verification of the declaration and data, according to EN ISO 14025:2010. Third party verifier: ICMQ SpA, via De Castillia, 10 20124 Milano (www.icmq.it) ☐EPD process certification (Internal)☑ EPD verification (External) ***Accredited by: Accredia***
CPC CODE:	415 “Semi-finished products of copper, nickel, aluminium, lead, zinc and tin or their alloys”.
CORPORATE CONTACT:	Francesco Falconi - f.falconi@metra.it
TECHNICAL SUPPORT:	Sphera https://www.sphera.com
COMPARABILITY:	Environmental statements published within the same product category, but from different programs, may not be comparable. In particular, EPDs of construction products may not be comparable if they do not comply with EN 15804:2012+A2:2019.
ACCOUNTABILITY:	METRA SpA relieves EPDItaly from any non-compliance with environmental legislation. The holder of the declaration will be responsible for the information and supporting evidence; EPDItaly declines all responsibility for the manufacturer's information, data and results of the life cycle assessment.

REFERENCE DOCUMENT:	This declaration has been developed following the General Program Instruction document of EPDItaly, available at www.epditaly.it.
PRODUCT CATEGORY RULES (PCR):	PCR ICMQ-001/15 rev 3.0 EN 15804:2012+A2:2019 is the framework reference for PCRs.

Scope and Type of EPD

The type of EPD is “cradle to gate” and it’s specific EPD for the products RE.AL.E - C1, RE.AL.E – C2, RE.AL.E – C3, RE.AL.E – C4, RE.AL.E – C5 (aluminium alloy billets) produced in the METRA plant located in Rodengo Saiano, Brescia (IT) and sold worldwide. All data refer to the 2021 production.

Database: Managed LCA Content 2022.2 (2022)

Software: LCA for Expert (version 10)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

According to the PCR ICMQ-001/15 rev. 3 the LCA study it’s “cradle to gate”. Modules included are A1, A2 and A3. All manufacturing activities and packaging/auxiliary’s production are in module A3, while energy production and input materials are in A1. “MND” indicates “Module not declared”.

The declaration is 1a (specific product from a specific manufacturer) according to /REGOLAMENTO EPDITALY V.5.2/.

The production facility is located in Rodengo Saiano, Brescia (IT).

Product description

Declared unit

The declared unit is 1 kg of METRA RE.AL.E alloys (RE.AL.E - C1, RE.AL.E – C2, RE.AL.E – C3, RE.AL.E – C4, RE.AL.E – C5).

Product

The green future of METRA Building passes through low-carbon alloys: METRA RE.AL.E, produced by METRA in its Brescia headquarters. The name combines the prefix "RE" (recycle) with the suffix "AL" (aluminium) and the letter "E" (extrusion).

METRA RE.AL.E low carbon alloys allow a configuration that comes in 5 proposals as showed in the table below.

Aluminium alloy name	Numerical alloy designation	Primary aluminium [%]	Secondary aluminium [%]	
			Pre-consumer	Post-consumer
RE.AL.E - C1	EN-AW 6005A	-	100	-
RE.AL.E – C2	EN-AW 6082	-	100	-
RE.AL.E – C3	EN-AW 6060 (6063)	rest	>60	-
RE.AL.E – C4	EN-AW 6060 (6063)	rest	>88	-
RE.AL.E – C5	EN-AW 6060 (6063)	11	75	14

The recycled aluminium used to produce the RE.AL.E C1 - C2 - C3 - C4 alloys are made up of aluminium scrapped during the production processes that take place within Metra's plants. Instead, as regards the RE.AL.E. C5 scenario, a part of the aluminium (primary and secondary) used to make the alloy arrives as an ingot already processed by a supplier, as shown in the table below.

Primary aluminium	Pre-consumer aluminium	Post-consumer aluminium
34%	23%	43%

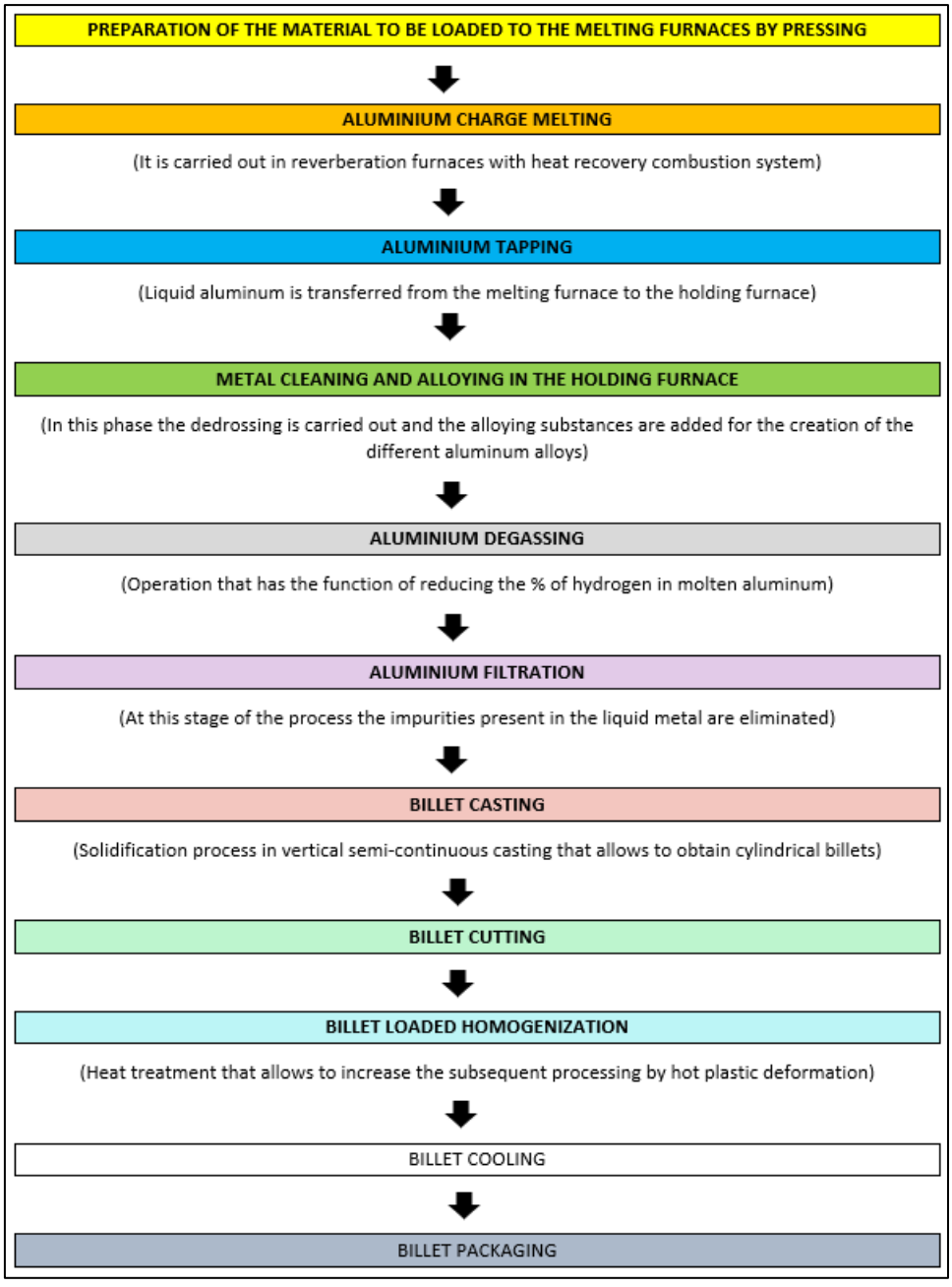
The main product components of the scenarios analysed are as follows:

Aluminium alloy name	Numerical alloy designation	Primary aluminium [%]	Secondary aluminium [%]		Alloy elements [%]	Total [%]
			Pre-consumer	Post-consumer		
RE.AL.E - C1	EN-AW 6005A	-	99.1	-	0.9	100
RE.AL.E – C2	EN-AW 6082	-	99.1	-	0.9	100
RE.AL.E – C3	EN-AW 6060 (6063)	39.5	59.9	-	0.6	100
RE.AL.E – C4	EN-AW 6060 (6063)	11.9	87.6	-	0.6	100
RE.AL.E – C5	EN-AW 6060 (6063)	10.7	75.1	13.7	0.6	100

The product does not contain any substances included in the “Candidate List of Substances of Very High Concern for Authorization" compliant with /REACH/.

Production process

Both the primary and the secondary aluminium enter the foundry where METRA RE.AL.E alloys are produced; apart from the aluminium and water, auxiliary materials such as argon and oil are used. Billets production is quite energy demanding and requires both electricity from grid and natural gas. Once the billets are produced, they are packed and ready to be sent to the extrusion plant where billets are extruded. In the figure below all the production process steps are listed:



Technical data

Billets complying with reference standards for chemical composition (UNI EN 573-3).

Company

Since 1962 Made in Metra has been the philosophy that brings solutions to Italian and International companies that start from the supply of aluminum and turn into a flexible partnership that is always focused on innovation.

Dynamism and continual research, experience and approach to the relationship are the bearing points of a path that led Metra to qualify as a point of reference for the textile industry, with an annual production of over 90,000 tons of aluminum bars.

Thanks to a structure that is organized and efficient, but at the same time streamlined and flexible, Metra responds precisely to the most complete design needs with the versatility of a service designed to measure the needs of the client.

Today the Metra Group has extensive coverage of Italy and a strong presence in Europe and the world.

Under the guidance of the Brescia office, are 3 production establishments in Italy, 2 logistical centers and a lot of points of sale, among dealers and retailers. In Europe and the world Metra is currently present across a commercial and distributive network to be able to supply the international market through the sites located in Canada (production and finishing) high standard of quality and service. The expansion continues, with internationalization both at a production level and distribution level and a consistent search for growth in the network of partners, dealers and distributors outside Europe.

The 5 products considered for the EPD are produced by Foall Srl, a company located within the boundaries of Metra's head quarter, precisely in via Provinciale Stacca, 1 - 25050 Rodengo Saiano, Brescia, Italy. Foall Srl is part of the Metra Spa group and completely controlled by Metra Spa which pays a transformation cost to Foall Srl. For these reasons, the developed CFP refers to Metra Spa as the following report.

LCA results – Environmental impact per functional or declared unit

Additional environmental impact indicators have been calculated and included in the project report but are not declared according to EN 15804:2012+A2:2019 chapter 7.2.3.2.

Aluminium alloy billet RE.AL.E - C1 [EN AW 6005A]

Environmental Impact for 1kg				
Environmental impacts indicators	**Unit**	**A1**	**A2**	**A3**
Climate Change - total	[kg CO2 eq.]	2.66E-01	4.66E-04	2.80E-01
Climate Change, fossil	[kg CO2 eq.]	2.65E-01	4.62E-04	2.80E-01
Climate Change, biogenic	[kg CO2 eq.]	6.35E-04	1.50E-06	1.48E-04
Climate Change, land use and land use change [kg CO2 eq.]	[kg CO2 eq.]	4.69E-05	3.10E-06	1.14E-05
Ozone depletion [kg CFC-11 eq.]	[kg CFC-11 eq.]	8.43E-13	4.52E-17	2.08E-13
Acidification [Mole of H+ eq.]	[Mole of H+ eq.]	6.24E-04	1.54E-06	2.52E-04
Eutrophication, freshwater [kg P eq.]	[kg P eq.]	9.17E-08	1.65E-09	4.11E-06
Eutrophication, marine [kg N eq.]	[kg N eq.]	1.43E-04	7.04E-07	9.29E-05
Eutrophication, terrestrial [Mole of N eq.]	[Mole of N eq.]	1.56E-03	7.88E-06	1.03E-03
Photochemical ozone formation, human health [kg NMVOC eq.]	[kg NMVOC eq.]	4.52E-04	1.38E-06	2.68E-04
Resource use, mineral and metals [kg Sb eq.]*	[kg Sb eq.]	2.57E-06	4.64E-11	5.53E-09
Resource use, fossils [MJ]*	[MJ]	6.84E+00	6.05E-03	4.16E-01
Water use [m³ world equiv.]*	[m³ world equiv.]	2.88E-02	5.15E-06	1.07E-01

* 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 according to EN 15804+A2:2019 chapter 7.2.3.2.

Aluminium alloy billet RE.AL.E – C2 [EN AW 6082]

Environmental Impact for 1kg				
Environmental impacts indicators	**Unit**	**A1**	**A2**	**A3**
Climate Change - total	[kg CO2 eq.]	2.65E-01	4.64E-04	2.80E-01
Climate Change, fossil	[kg CO2 eq.]	2.64E-01	4.59E-04	2.80E-01
Climate Change, biogenic	[kg CO2 eq.]	6.32E-04	1.49E-06	1.48E-04
Climate Change, land use and land use change [kg CO2 eq.]	[kg CO2 eq.]	4.64E-05	3.09E-06	1.14E-05
Ozone depletion [kg CFC-11 eq.]	[kg CFC-11 eq.]	8.39E-13	4.50E-17	2.08E-13
Acidification [Mole of H+ eq.]	[Mole of H+ eq.]	6.18E-04	1.53E-06	2.52E-04
Eutrophication, freshwater [kg P eq.]	[kg P eq.]	8.96E-08	1.64E-09	4.11E-06
Eutrophication, marine [kg N eq.]	[kg N eq.]	1.42E-04	7.00E-07	9.29E-05
Eutrophication, terrestrial [Mole of N eq.]	[Mole of N eq.]	1.55E-03	7.84E-06	1.03E-03
Photochemical ozone formation, human health [kg NMVOC eq.]	[kg NMVOC eq.]	4.49E-04	1.37E-06	2.68E-04
Resource use, mineral and metals [kg Sb eq.]*	[kg Sb eq.]	7.39E-08	4.62E-11	5.53E-09
Resource use, fossils [MJ]*	[MJ]	6.82E+00	6.01E-03	4.16E-01
Water use [m^3 world equiv.]*	[m^3 world equiv.]	2.84E-02	5.13E-06	1.07E-01

*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 according to EN 15804+A2:2019 chapter 7.2.3.2.

Aluminium alloy billet RE.AL.E – C3 [EN AW 6060(6063)]

Environmental Impact for 1kg				
Environmental impacts indicators	**Unit**	**A1**	**A2**	**A3**
Climate Change - total	[kg CO2 eq.]	3.98E+00	5.77E-02	2.80E-01
Climate Change, fossil	[kg CO2 eq.]	3.97E+00	5.73E-02	2.80E-01
Climate Change, biogenic	[kg CO2 eq.]	7.01E-03	1.42E-04	1.48E-04
Climate Change, land use and land use change [kg CO2 eq.]	[kg CO2 eq.]	6.25E-04	2.43E-04	1.14E-05
Ozone depletion [kg CFC-11 eq.]	[kg CFC-11 eq.]	4.11E-12	4.75E-15	2.08E-13
Acidification [Mole of H+ eq.]	[Mole of H+ eq.]	2.54E-02	8.97E-04	2.52E-04
Eutrophication, freshwater [kg P eq.]	[kg P eq.]	9.23E-07	1.33E-07	4.11E-06
Eutrophication, marine [kg N eq.]	[kg N eq.]	4.68E-03	2.61E-04	9.29E-05
Eutrophication, terrestrial [Mole of N eq.]	[Mole of N eq.]	5.13E-02	2.87E-03	1.03E-03
Photochemical ozone formation, human health [kg NMVOC eq.]	[kg NMVOC eq.]	1.38E-02	6.82E-04	2.68E-04
Resource use, mineral and metals [kg Sb eq.]*	[kg Sb eq.]	3.68E-07	4.39E-09	5.53E-09
Resource use, fossils [MJ]*	[MJ]	6.00E+01	7.24E-01	4.16E-01
Water use [m^3 world equiv.]*	[m^3 world equiv.]	6.26E-01	4.41E-04	1.07E-01

* 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 according to EN 15804+A2:2019 chapter 7.2.3.2.

Aluminium alloy billet RE.AL.E – C4 [EN AW 6060(6063)]

Environmental Impact for 1kg				
Environmental impacts indicators	**Unit**	**A1**	**A2**	**A3**
Climate Change - total	[kg CO2 eq.]	1.37E+00	3.18E-02	2.80E-01
Climate Change, fossil	[kg CO2 eq.]	1.37E+00	3.15E-02	2.80E-01
Climate Change, biogenic	[kg CO2 eq.]	2.54E-03	8.89E-05	1.48E-04
Climate Change, land use and land use change [kg CO2 eq.]	[kg CO2 eq.]	2.16E-04	1.69E-04	1.14E-05
Ozone depletion [kg CFC-11 eq.]	[kg CFC-11 eq.]	1.80E-12	2.83E-15	2.08E-13
Acidification [Mole of H+ eq.]	[Mole of H+ eq.]	8.00E-03	3.18E-04	2.52E-04
Eutrophication, freshwater [kg P eq.]	[kg P eq.]	3.36E-07	9.10E-08	4.11E-06
Eutrophication, marine [kg N eq.]	[kg N eq.]	1.50E-03	1.00E-04	9.29E-05
Eutrophication, terrestrial [Mole of N eq.]	[Mole of N eq.]	1.64E-02	1.11E-03	1.03E-03
Photochemical ozone formation, human health [kg NMVOC eq.]	[kg NMVOC eq.]	4.44E-03	2.48E-04	2.68E-04
Resource use, mineral and metals [kg Sb eq.]*	[kg Sb eq.]	1.28E-07	2.76E-09	5.53E-09
Resource use, fossils [MJ]*	[MJ]	2.27E+01	4.05E-01	4.16E-01
Water use [m^3 world equiv.]*	[m^3 world equiv.]	2.05E-01	2.92E-04	1.07E-01

*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 according to EN 15804+A2:2019 chapter 7.2.3.2.

Aluminium alloy billet RE.AL.E – C5 [EN AW 6060(6063)]

Environmental Impact for 1kg				
Environmental impacts indicators	**Unit**	**A1**	**A2**	**A3**
Climate Change - total	[kg CO2 eq.]	1.41E+00	1.51E-02	2.80E-01
Climate Change, fossil	[kg CO2 eq.]	1.40E+00	1.50E-02	2.80E-01
Climate Change, biogenic	[kg CO2 eq.]	2.74E-03	4.86E-05	1.48E-04
Climate Change, land use and land use change [kg CO2 eq.]	[kg CO2 eq.]	3.81E-04	1.01E-04	1.14E-05
Ozone depletion [kg CFC-11 eq.]	[kg CFC-11 eq.]	8.34E-12	1.47E-15	2.08E-13
Acidification [Mole of H+ eq.]	[Mole of H+ eq.]	6.80E-03	5.00E-05	2.52E-04
Eutrophication, freshwater [kg P eq.]	[kg P eq.]	6.77E-07	5.34E-08	4.11E-06
Eutrophication, marine [kg N eq.]	[kg N eq.]	1.19E-03	2.29E-05	9.29E-05
Eutrophication, terrestrial [Mole of N eq.]	[Mole of N eq.]	1.31E-02	2.56E-04	1.03E-03
Photochemical ozone formation, human health [kg NMVOC eq.]	[kg NMVOC eq.]	3.56E-03	4.49E-05	2.68E-04
Resource use, mineral and metals [kg Sb eq.]*	[kg Sb eq.]	2.62E-07	1.51E-09	5.53E-09
Resource use, fossils [MJ]*	[MJ]	2.15E+01	1.96E-01	4.16E-01
Water use [m^3 world equiv.]*	[m^3 world equiv.]	1.75E-01	1.67E-04	1.07E-01

* 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 according to EN 15804+A2:2019 chapter 7.2.3.2.

Aluminium alloy billet RE.AL.E - C1 [EN AW 6005A]

Environmental Impact for 1kg				
Resource use indicators	**Unit**	**A1**	**A2**	**A3**
Use of renewable primary energy (PERE)	[MJ]	5.34E-01	4.19E-04	1.52E-01
Primary energy resources used as raw materials (PERM)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (PERT)	[MJ]	5.34E-01	4.19E-04	1.52E-01
Use of non-renewable primary energy (PENRE)	[MJ]	6.84E+00	6.07E-03	4.17E-01
Non-renewable primary energy resources used as raw materials (PENRM)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (PENRT)	[MJ]	6.84E+00	6.07E-03	4.17E-01
Input of secondary material (SM)	[kg]	1.02E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels (NRSF)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water (FW)	[m^3]	9.47E-04	4.84E-07	2.19E-03

Aluminium alloy billet RE.AL.E – C2 [EN AW 6082]

Environmental Impact for 1kg				
Resource use indicators	**Unit**	**A1**	**A2**	**A3**
Use of renewable primary energy (PERE)	[MJ]	5.31E-01	4.17E-04	1.52E-01
Primary energy resources used as raw materials (PERM)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (PERT)	[MJ]	5.31E-01	4.17E-04	1.52E-01
Use of non-renewable primary energy (PENRE)	[MJ]	6.82E+00	6.04E-03	4.17E-01
Non-renewable primary energy resources used as raw materials (PENRM)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (PENRT)	[MJ]	6.82E+00	6.04E-03	4.17E-01
Input of secondary material (SM)	[kg]	1.02E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels (NRSF)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water (FW)	[m^3]	9.35E-04	4.82E-07	2.19E-03

Aluminium alloy billet RE.AL.E – C3 [EN AW 6060(6063)]

Environmental Impact for 1kg				
Resource use indicators	**Unit**	**A1**	**A2**	**A3**
Use of renewable primary energy (PERE)	[MJ]	8.91E+00	3.38E-02	1.52E-01
Primary energy resources used as raw materials (PERM)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (PERT)	[MJ]	8.91E+00	3.38E-02	1.52E-01
Use of non-renewable primary energy (PENRE)	[MJ]	6.01E+01	7.27E-01	4.17E-01
Non-renewable primary energy resources used as raw materials (PENRM)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (PENRT)	[MJ]	6.01E+01	7.27E-01	4.17E-01
Input of secondary material (SM)	[kg]	6.13E-01	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels (NRSF)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water (FW)	[m^3]	3.10E-02	3.94E-05	2.19E-03

Aluminium alloy billet RE.AL.E – C4 [EN AW 6060(6063)]

Environmental Impact for 1kg				
Resource use indicators	**Unit**	**A1**	**A2**	**A3**
Use of renewable primary energy (PERE)	[MJ]	3.00E+00	2.31E-02	1.52E-01
Primary energy resources used as raw materials (PERM)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (PERT)	[MJ]	3.00E+00	2.31E-02	1.52E-01
Use of non-renewable primary energy (PENRE)	[MJ]	2.27E+01	4.06E-01	4.17E-01
Non-renewable primary energy resources used as raw materials (PENRM)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (PENRT)	[MJ]	2.27E+01	4.06E-01	4.17E-01
Input of secondary material (SM)	[kg]	8.98E-01	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels (NRSF)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water (FW)	[m^3]	9.83E-03	2.68E-05	2.19E-03

Aluminium alloy billet RE.AL.E – C5 [EN AW 6060(6063)]

Environmental Impact for 1kg				
Resource use indicators	**Unit**	**A1**	**A2**	**A3**
Use of renewable primary energy (PERE)	[MJ]	6.10E+00	1.36E-02	1.52E-01
Primary energy resources used as raw materials (PERM)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (PERT)	[MJ]	6.10E+00	1.36E-02	1.52E-01
Use of non-renewable primary energy (PENRE)	[MJ]	2.15E+01	1.97E-01	4.17E-01
Non-renewable primary energy resources used as raw materials (PENRM)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (PENRT)	[MJ]	2.15E+01	1.97E-01	4.17E-01
Input of secondary material (SM)	[kg]	9.21E-01	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels (NRSF)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water (FW)	[m^3]	1.47E-02	1.57E-05	2.19E-03

Aluminium alloy billet RE.AL.E - C1 [EN AW 6005A]

Wastes input/output flows for 1 kg				
Parameter	**Unit**	**A1**	**A2**	**A3**
Hazardous waste disposed (HWD)	[kg]	1.45E-09	3.21E-14	3.65E-11
Non-hazardous waste disposed (NHWD)	[kg]	1.01E-02	9.89E-07	3.43E-02
Radioactive waste disposed (RWD)	[kg]	8.35E-05	1.13E-08	1.75E-05
Components for re-use (CRU)	[kg]	0.00E+00	0.00E+00	0.00E+00
Materials for Recycling (MFR)	[kg]	0.00E+00	0.00E+00	0.00E+00
Material for Energy Recovery (MER)	[kg]	0.00E+00	0.00E+00	0.00E+00
Exported electrical energy (EEE)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (EET)	[MJ]	0.00E+00	0.00E+00	0.00E+00

Aluminium alloy billet RE.AL.E – C2 [EN AW 6082]

Wastes input/output flows for 1 kg				
Parameter	**Unit**	**A1**	**A2**	**A3**
Hazardous waste disposed (HWD)	[kg]	1.45E-09	3.20E-14	3.65E-11
Non-hazardous waste disposed (NHWD)	[kg]	9.39E-03	9.84E-07	3.43E-02
Radioactive waste disposed (RWD)	[kg]	8.29E-05	1.12E-08	1.75E-05
Components for re-use (CRU)	[kg]	0.00E+00	0.00E+00	0.00E+00
Materials for Recycling (MFR)	[kg]	0.00E+00	0.00E+00	0.00E+00
Material for Energy Recovery (MER)	[kg]	0.00E+00	0.00E+00	0.00E+00

Exported electrical energy (EEE)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (EET)	[MJ]	0.00E+00	0.00E+00	0.00E+00

Aluminium alloy billet RE.AL.E – C3 [EN AW 6060(6063)]

Wastes input/output flows for 1 kg				
Parameter	**Unit**	**A1**	**A2**	**A3**
Hazardous waste disposed (HWD)	[kg]	6.23E-09	3.56E-12	3.65E-11
Non-hazardous waste disposed (NHWD)	[kg]	1.41E+00	1.01E-04	3.43E-02
Radioactive waste disposed (RWD)	[kg]	7.70E-04	1.17E-06	1.75E-05
Components for re-use (CRU)	[kg]	0.00E+00	0.00E+00	0.00E+00
Materials for Recycling (MFR)	[kg]	0.00E+00	0.00E+00	0.00E+00
Material for Energy Recovery (MER)	[kg]	0.00E+00	0.00E+00	0.00E+00
Exported electrical energy (EEE)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (EET)	[MJ]	0.00E+00	0.00E+00	0.00E+00

Aluminium alloy billet RE.AL.E – C4 [EN AW 6060(6063)]

Wastes input/output flows for 1 kg				
Parameter	**Unit**	**A1**	**A2**	**A3**
Hazardous waste disposed (HWD)	[kg]	2.88E-09	2.06E-12	3.65E-11
Non-hazardous waste disposed (NHWD)	[kg]	4.30E-01	6.10E-05	3.43E-02
Radioactive waste disposed (RWD)	[kg]	2.83E-04	7.00E-07	1.75E-05
Components for re-use (CRU)	[kg]	0.00E+00	0.00E+00	0.00E+00
Materials for Recycling (MFR)	[kg]	0.00E+00	0.00E+00	0.00E+00
Material for Energy Recovery (MER)	[kg]	0.00E+00	0.00E+00	0.00E+00
Exported electrical energy (EEE)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (EET)	[MJ]	0.00E+00	0.00E+00	0.00E+00

Aluminium alloy billet RE.AL.E – C5 [EN AW 6060(6063)]

Wastes input/output flows for 1 kg				
Parameter	**Unit**	**A1**	**A2**	**A3**
Hazardous waste disposed (HWD)	[kg]	1.59E-08	1.04E-12	3.65E-11
Non-hazardous waste disposed (NHWD)	[kg]	3.60E-01	3.21E-05	3.43E-02
Radioactive waste disposed (RWD)	[kg]	8.87E-04	3.66E-07	1.75E-05
Components for re-use (CRU)	[kg]	0.00E+00	0.00E+00	0.00E+00
Materials for Recycling (MFR)	[kg]	0.00E+00	0.00E+00	0.00E+00
Material for Energy Recovery (MER)	[kg]	0.00E+00	0.00E+00	0.00E+00
Exported electrical energy (EEE)	[MJ]	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (EET)	[MJ]	0.00E+00	0.00E+00	0.00E+00

LCA results – Biogenic carbon content of product and packaging for 1kg

Aluminium alloy billet RE.AL.E - C1 [EN AW 6005A]

Biogenic carbon content of product and packaging for 1 kg				
Biogenic carbon content	**Unit**	**A1**	**A2**	**A3**
Biogenic carbon content in product	[kg]	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content in packaging	[kg]	0.00E+00	0.00E+00	0.00E+00

Aluminium alloy billet RE.AL.E – C2 [EN AW 6082]

Biogenic carbon content of product and packaging for 1 kg				
Biogenic carbon content	**Unit**	**A1**	**A2**	**A3**
Biogenic carbon content in product	[kg]	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content in packaging	[kg]	0.00E+00	0.00E+00	0.00E+00

Aluminium alloy billet RE.AL.E – C3 [EN AW 6060(6063)]

Biogenic carbon content of product and packaging for 1 kg				
Biogenic carbon content	**Unit**	**A1**	**A2**	**A3**
Biogenic carbon content in product	[kg]	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content in packaging	[kg]	0.00E+00	0.00E+00	0.00E+00

Aluminium alloy billet RE.AL.E – C4 [EN AW 6060(6063)]

Biogenic carbon content of product and packaging for 1 kg				
Biogenic carbon content	**Unit**	**A1**	**A2**	**A3**
Biogenic carbon content in product	[kg]	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content in packaging	[kg]	0.00E+00	0.00E+00	0.00E+00

Aluminium alloy billet RE.AL.E – C5 [EN AW 6060(6063)]

Biogenic carbon content of product and packaging for 1 kg				
Biogenic carbon content	**Unit**	**A1**	**A2**	**A3**
Biogenic carbon content in product	[kg]	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content in packaging	[kg]	0.00E+00	0.00E+00	0.00E+00

Calculation rules

Declared unit

The calculation refers to the declared unit of 1 kg of METRA RE.AL.E alloys (RE.AL.E - C1, RE.AL.E – C2, RE.AL.E – C3, RE.AL.E – C4, RE.AL.E – C5).

Assumptions

Where possible, a conservative approach has been adopted. In other cases, proxy data were selected based on scientific experience, in order to improve the accuracy of the model. Where it was not possible to know the precise composition of materials in the supply chain (due to commercial or industrial confidential suppliers' reasons or due to missing datasets), these have been approximated with LCIs of similar materials, estimated by the combination of available dataset.

1. In particular for a few components a detailed technical sheet and dataset was not available and then assumption have been made:
    - Boron Ti stick: Considered 100% boron as a proxy.
    - Boron Ti bobine: Considered 100% boron as a proxy.
2. The demand for auxiliary materials, water and energy as input and the production of emissions and waste as output are considered the same for all scenarios.
3. Where the exact starting point of the primary aluminium is unknown, it was decided to consider the distance between the capital of the production country and Metra's production site and to calculate the average of the distances, weighted on the quantity of primary aluminium purchased in 2021.
4. In general, where not a defined value of emissions is provided, but only a range of values is provided, as conservative approach the maximum value is considered.
5. In the billets production PCDD-PCDF emission is declared as a unique emission. This has been modelled as an equal division between polychlorinated dibenzo-p-dioxins and polychlorinated dibenzo-p-furans.
6. The data for the following two groups of air emissions were collected as aggregated:
    - Ni, Co, As, Cd, CrVI
    - Mn, Pb, Sn, V, Zn, Se, Cu

    Since it was not possible to determine the amount emitted for each individual flow, it was decided, to considered just CrVI in the first group (conservatory approach) and to equally distribute the overall amount provided to each individual flow in the second group.
7. Data available from different timeframe suggest that an average loss of material during the production process is equal approximately to 3% of the input mass. Note that this represents an average estimation based on historical data in the absence of specific values. Considering this assumption it was decided to add in the input elements the necessary quantity to compensate the loss during the production process. Being the 1% of this quantity already compensated by the presence of the alloying elements the remaining quantity (2%) has been added in the aluminium mass. In the case of RE..AL..E - C1 and RE..AL..E – C2 the additional 2% has been added only to secondary aluminium because there is no primary aluminium. In all the other cases the quantity of 2% has been split between primary aluminium (1%) and secondary aluminium (1%).
8. The primary aluminium is provided by different suppliers. For certain suppliers ASI certification was available. ASI certifies that the CO_2 eq. emission for the primary aluminium production is lower than 8 ton of CO_2 equiv./ton. This specific value, a result of an international recognized

evaluation, is significantly lower than the one characterizing the dataset in managed LCA content that should be selected for the geographical representativeness. Indeed, the latter represents the average emission of the aluminium production of an entire geographical area and not a specific case of supplier. Therefore, to take into account the benefit provided by the effort of the suppliers in providing the certification to assess the effective quantity of CO_2 equiv./ton emission derived from the process, it was selected a more representative dataset. It means that it was decided to apply a different criterion of selection of the dataset: where the ASI certification was available the dataset closer to the Climate change values has been selected (in any case with CO_2 equiv./ton higher than 8 ton of CO_2 equiv./ton to be conservative) rather than the dataset geographically closer. It was possible to apply this type of selection only for the Climate Change indicator because ASI certification is only related to this impact category, for all the other indicators it applies the concept of geographical match of the datasets.

Cut off rules

EN 15804:2012+A2:2019 requires that where there are data gaps or insufficient input data for a unit process the cut-off criteria shall be 1% of renewable and non-renewable primary energy usage and 1% of the total mass of this unit process. The total neglected flows from a product stage must be no more than 5% of product inputs by mass or 5% of primary energy contribution.

No flows have been omitted in the study.

Data quality

The foreground data collected by the manufacturer are based on yearly production amounts and extrapolations of measurements on specific machines and plant. The production data refer to an average of the year 2021.

The data quality can be considered as good. The LCA models have been checked and most relevant flows are considered. Technological, geographical and temporal representativeness is appropriate.

Allocation – upstream data

Information about single datasets is documented in https://sphera.com/product-sustainability-gabi-data-search/.

Allocation – foreground data

Data were only available on an annual basis. Data used for all alloy billets production (except the data for primary and secondary aluminium) have been allocated based on the amount of total annual foundry production and total hours worked, referring manufacturing data to 1kg of product. On the other hand, primary and secondary aluminium for the individual products covered by EPDs were allocated on specific production volumes for the year 2021, again referring to 1kg of product.

As Metra mainly uses own production waste as secondary material, the majority of the secondary aluminium considered comes from Metra's three production plants: Metra Ragusa S.p.a. (Ragusa), IMET S.p.a. (Alessandria) and Metra S.p.a. (Brescia). Since the exact quantity associated with the origin of secondary material divided by alloy produced was not available, but only the total quantity coming from the various plants, we proceeded by allocating the origin of secondary aluminium for the various alloys based on the mass considered for the individual production. This procedure was only done for scenarios C, D and E because for scenarios A and B all secondary aluminium was considered by Metra S.p.a (Brescia).

Scenarios and additional technical information

For the products covered by this EPD, being in line with the three conditions specified in EN15804+A2, cradle-to-gate system boundaries were considered, that is, they consider the stage of raw material extraction, transportation and product creation. Specifically:

- Module A1 refers to all raw materials' impacts production, pre-products manufacturing and all types of energy inputs
- Module A2 includes the raw materials (also auxiliary's and packaging) transports to factory gate
- Module A3 comprises all production activities, wastes treatment and process emissions (both to air and to water).

The directive /EN 15804+A2/ outlines three conditions that must be simultaneously met to consider the boundaries of the cradle-to-gate system without considering end-of-life modules.
The three conditions are:

- the product or material is physically integrated with other products during installation so they cannot be physically separated from them at end of life
- the product or material is no longer identifiable at end of life as a result of a physical or chemical transformation process
- the product or material does not contain biogenic carbon.

The aluminium alloy billet product undergoes further various mechanical processing (e.g. extrusion) that will lead to the creation of a new product (e.g. window, curtain walls, sliding windows, etc.). Billet processing, however, is to be considered as another system not to be confused with the one under consideration. For this reason, the aluminium alloy billet product is no longer identifiable as such at the end of its life. Furthermore, the product does not contain biogenic carbon as it consists of aluminium and other metals in smaller quantities.

All subsequent modules (A4, A5, C1-C4 and D) are not considered in this study.

References

EN ISO 14044:2006 Environmental Management – Life Cycle Assessment – Requirements and Guidelines.

EN ISO 14025:2011-10, Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

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

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LCA for Expert 2022. Life cycle assessment software (version 10), by Sphera Solutions GmbH, Leinfelden-Echterdingen, 2022 https://sphera.com/life-cycle-assessment-lca-software/.

Managed LCA Content. Life cycle assessment database, by Sphera Solutions GmbH, Leinfelden-Echterdingen, 2022 https://sphera.com/life-cycle-assessment-lca-database/.

REACH Registration, Evaluation, Authorization and Restriction of Chemical, 2007Bibliographic sources for test descriptions, standards or other documents referenced in the EPD.

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REGOLAMENTO EPDITALY V.5.2 Regolamento del Programma EPDItaly. Data di emissione: 16/02/2022

EPD Background Report for METRA RE.AL.E alloys

ISO 14001:2015 Sistemi di gestione ambientale