RAFFMETAL

Company Profile & ESG Abstract

Be the change.
Low-carbon aluminium
for a sustainable future.

CONTENTS

01. SILMAR GROUP

The Silmar Group is an integrated group of leading companies in the heating, aluminium recycling and plumbing sectors. The Group was founded in 1963 and is now recognised worldwide with a presence of more than 30 plants, while maintaining its headquarters in Italy, in the province of Brescia.

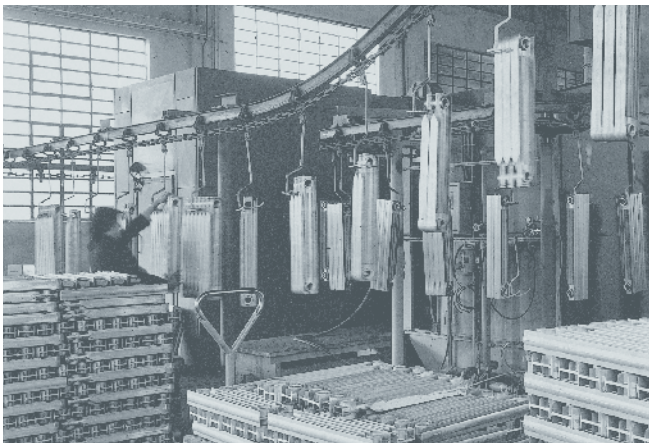
The successful companies belonging to Silmar Group are leaders in several sectors:

FONDITAL, manufacturer of aluminium radiators, alternative heating systems and energies and structural castings for the automotive sector;

RAFFMETAL, refinery of aluminium alloys from recycling;

VALSIR, manufacturer of water management and drainage systems;

The first factory in Vestone in 1970



The first packaging and coating plant in Vestone in 1970

AGGREGATED DATA*

TURNOVER

2021	2022
€	€
206.589.000	247.911.000
541.625.000	745.548.000
464.670.000	518.676.000
1.212.884.000	**1.512.135.000**

INVESTMENTS

2021	2022
€	€
19.281.000	35.567.000
8.985.000	23.300.000
34.707.000	56.715.000
62.973.000	**115.582.000**

EMPLOYEES

2021	2022
n°	n°
868	986
420	422
2.243	2.227
3.531	**3.635**

Heating sector

Aluminium recycling sector

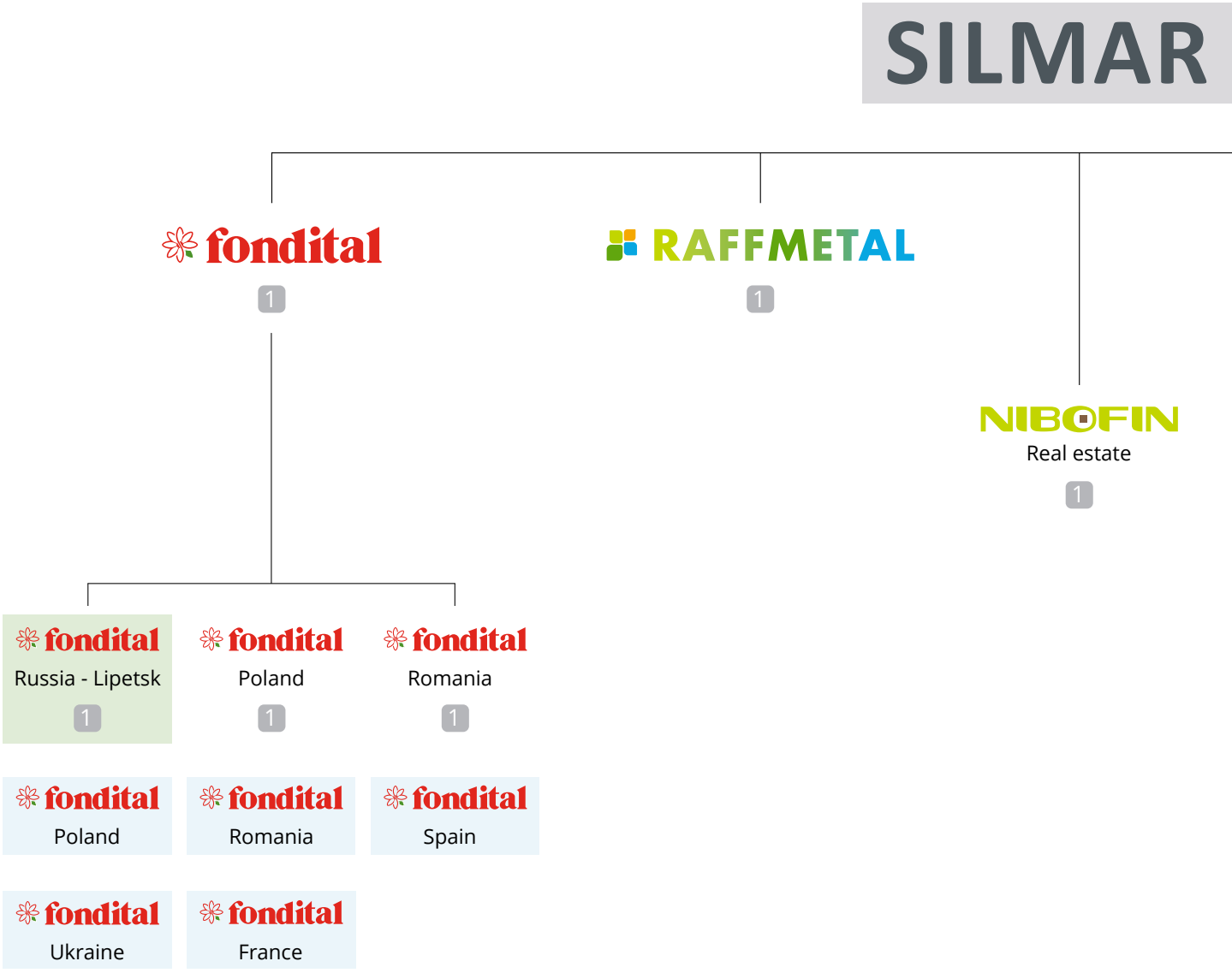
Plumbing sector

TOTAL SECTORS

		2021	2022
TURNOVER	€	1.212.884.000	1.512.135.000
INVESTMENTS	€	62.973.000	115.582.000
EMPLOYEES	n°	3.531	3.635

*aggregated data of the Group's production companies excluding real estate

SILMAR GROUP ORGANISATIONAL CHART



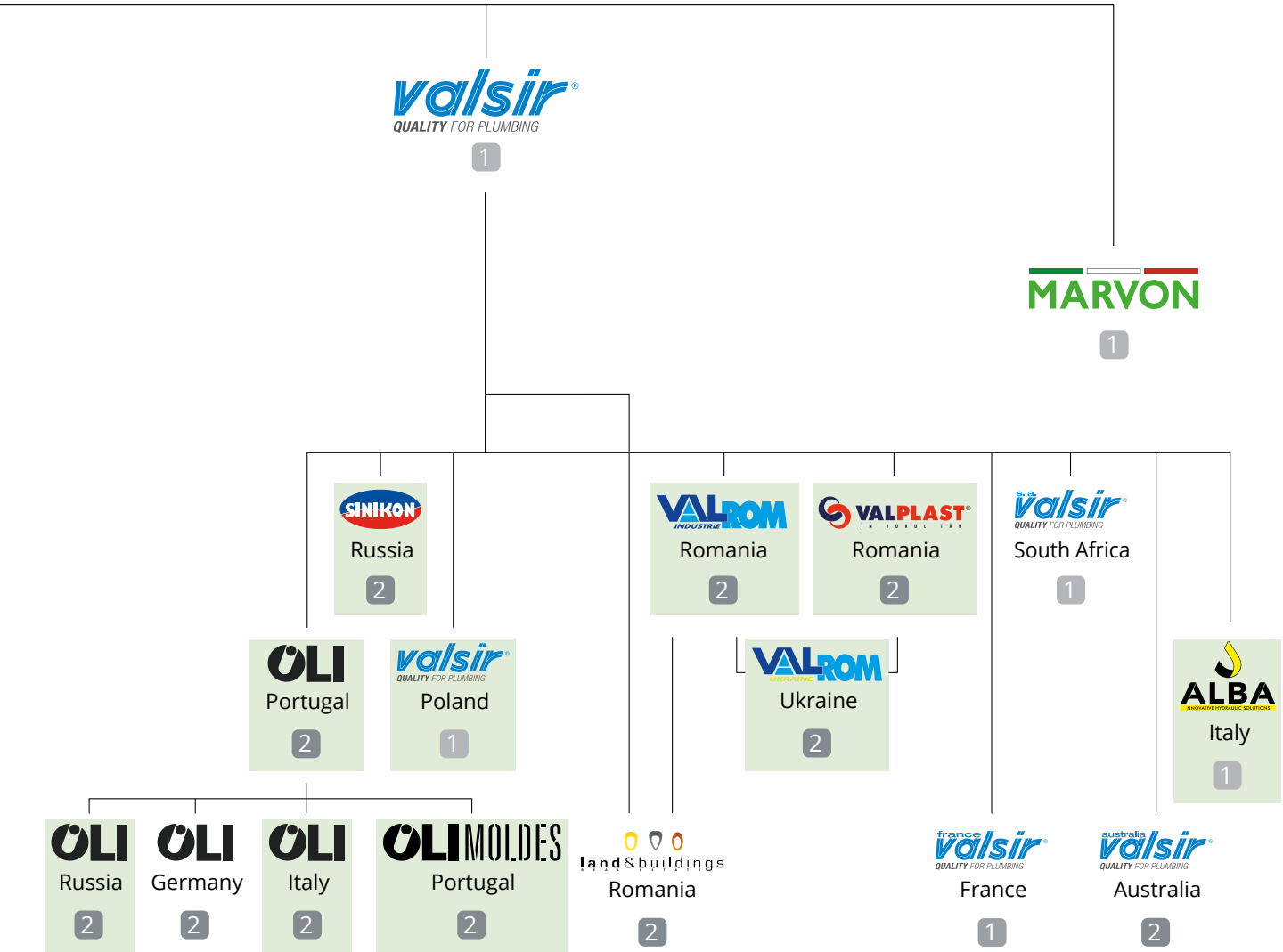
1 Subsidiary

2 Associate

Production company

Sales and service network

GROUP


valsir
QUALITY FOR PLUMBING
1
MARVON
1
SINIKON
Russia
2
VALROM
INDUSTRIE
Romania
2
VALPLAST
Romania
2
s.a. valsir
QUALITY FOR PLUMBING
South Africa
1
OLI
Portugal
2
valsir
QUALITY FOR PLUMBING
Poland
1
VALROM
UKRAINE
Ukraine
2
ALBA
Italy
1
OLI
Russia
2
OLI
Germany
2
OLI
Italy
2
OLI MOLDES
Portugal
2
land&buildings
Romania
2
france valsir
QUALITY FOR PLUMBING
France
1
australia valsir
QUALITY FOR PLUMBING
Australia
2

THE SILMAR GROUP STORY

The beginning of a dream ...

1963
FREDDI & NIBOLI

1970
fondital
RADIATORS

1979
RAFFMETAL
ALUMINIUM ALLOY FROM RECYCLING

2003
fondital
BOILERS
RENEWABLE ENERGIES

2006
VALROM UKRAINE
UKRAINE

land&buildings
ROMANIA

2009
NIBOFIN
ITALY

2012
fondital
HEAT PUMPS

2013
fondital
ELECTRICAL RADIATORS

RAFFMETAL
ENERGY RECOVERY

valsir
SOUTH AFRICA

2015
valsir
INDIA

OLI
RUSSIA

OLI
GERMANY

2016
valsir
AUSTRALIA

2018
ALBA
ITALY

GROUP SILMAR

1987

valsir
ITALY

1989

RAFFMETAL
SALT SLAG TREATMENT PLANT

1992

NOVA FLORIDA

1993

OLI
PORTUGAL

OLI
ITALY

OLIMOLDES
PORTUGAL

1995

RAFFMETAL
SCRAP MATERIAL CRUSHING AND SELECTION

1996

VALROM INDUSTRIE
ROMANIA

1999

valsir
POLAND

valsir
FRANCE

2002

MARVON
ITALY

VALPLAST
ROMANIA

SINIKON
RUSSIA

2019

fondital
RUSSIA

2020

fondital
AUTOMOTIVE STRUCTURAL PARTS

RAFFMETAL
SPECIAL ALLOYS

2022

fondital
AUTOMOTIVE ELECTRIC CARS

2024

fondital
FAN COIL

that looks to the future

02. RAFFMETAL

Today, Raffmetal is Europe's largest manufacturer of recycled aluminium alloys.

With an annual production capacity of over 350,000 tons/year and plants in Valle Sabbia, in the province of Brescia, the company is able to meet the requirements of international customers operating in different industrial sectors.

The total control of the supply chain, the application of technological solutions among the most advanced in the industry in the treatment and selection of scrap and the strict control of the production process, allow us to offer high quality alloys with a low carbon footprint.

RAFFMETAL AUXILIARY INFORMATION			
	YEAR	2021	2022
REVENUE	€	541.625.000	745.548.000
INVESTMENTS	€	8.985.000	23.300.000
EMPLOYEES (average number)	n°	420	422

Via Malpaga 82, 25070 Casto (BS) Italia

Loc. Ferriera 5, 25070 Casto (BS) Italia

Via Brescia 60, 25076 Odolo (BS) Italia

160.000 m² of which 97.000 m² are covered

THE PRODUCT RANGE

Raffmetal is the reference point and benchmark of the circular economy. The policy of continuous improvement allows the recycling capacity of each type of aluminium scrap to be increased, enhancing its chemical and physical components, ensuring high quality alloys.

Raffmetal offers its customers **a range of recycled and low carbon footprint products**:

- **100% recycled aluminium alloys (continuous casting ingots and in liquid state)**, which are produced at the Casto plant.
- **Primary-grade alloys from recycling (in continuous casting)** ingots produced at the Special Alloys plant. Their distinctiveness lies in the fact that they are achieved with a high percentage of recycling performance comparable to primary alloys from bauxite. All this ensures a low carbon footprint, avoiding the exploitment of natural resources and resulting in a reduction of energy consumption.
- **Rapal 01**, thanks to the salt residue recovery plant, since 1989 Raffmetal has been recovering and valorising 100% of the residues generated from the melting process. Rapal 01 is aluminium oxide from the internal recovery process. It is used in the cement and mineral wool sector and in other processes acting as a secondary raw material to replace raw materials from ore. Plus, it is an interesting material for the development of old and new applications with a view to circular economy.

Nuvolera plant dedicated to final product storage

Special Alloys production plant dedicated to primary foundry alloys from recycling

THE ADVANTAGES OF RAFFMETAL'S 100% RECYCLED ALUMINIUM ALLOYS

CONTINUOUS CASTING ALUMINIUM INGOTS

- High **metal yield** of the product;
- A **finer and more homogeneous** structure;
- **Storage optimisation**;
- **Traceability** system.

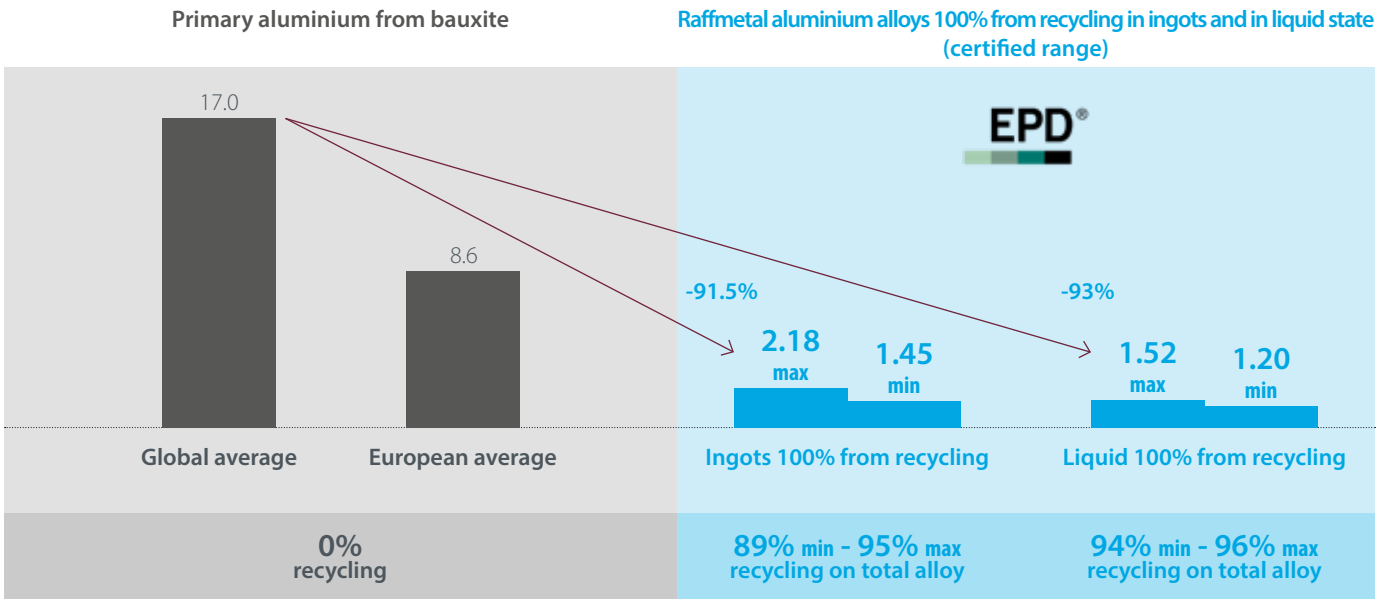
LIQUID ALUMINIUM

- Reduction of **156 kg of CO_2/ton of aluminium**;
- **Saving of 80 m^3 of natural gas/ton of aluminium**;
- **2% increase in metal yield** per ton of aluminium;
- **Less storage space .**

CARBON FOOTPRINT COMPARISON

(kg CO_2eq/kg Al produced)

CRADLE TO GATE



Data source: EPD Raffmetal, Università di Siena e INDACO2 srl / Database Ecoinvent 3.8 / Software SimaPro 9.3 / Method: EN15804 +A2

PCR: Basic aluminium products and special alloys, 2022:08 v.1- Central Product Classification: UN CPC 4153

www.environdec.com – S-P-06061 - S-P-06062 - S-P-06063

SILVAL®

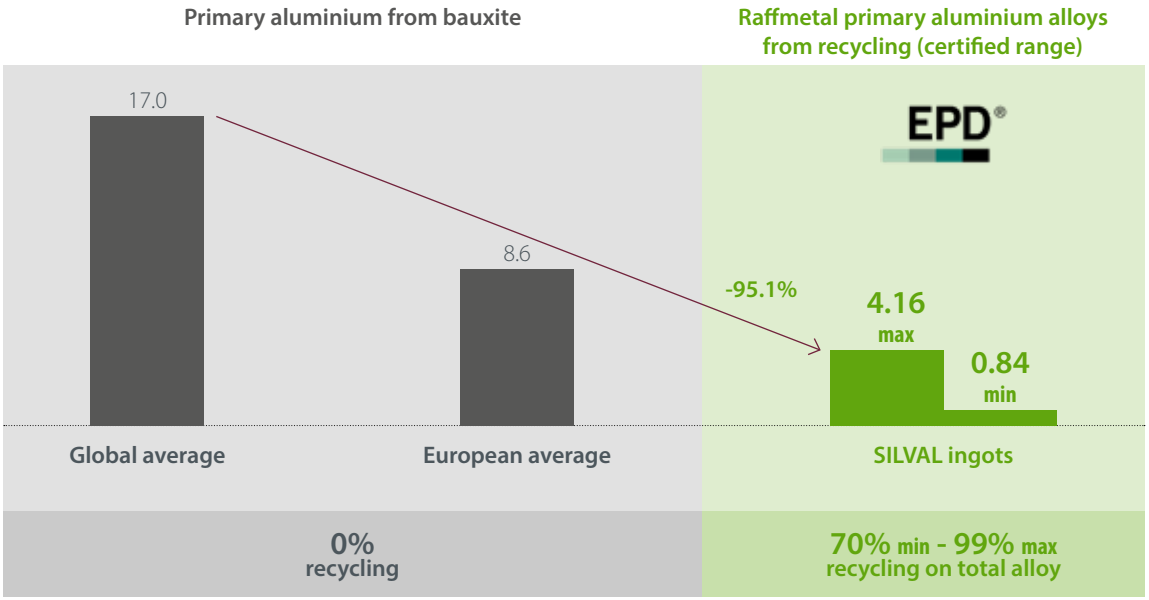
1. Up to **100% recycled aluminium content**;
2. **High-quality customisable alloys**;
3. **Low carbon footprint production**;
4. **Intra-group recovery of melting residues**;
5. **Continuous casting** production and **traceability**.

PRIMARY-GRADE ALUMINIUM ALLOYS FROM RECYCLING PRODUCTION PROCESS

CARBON FOOTPRINT COMPARISON

(kg CO_2eq/kg Al produced)

CRADLE TO GATE



Data source: EPD Raffmetal, Università di Siena e INDACO2 srl / Database Ecoinvent 3.8 / Software SimaPro 9.3 / Method: EN15804 +A2

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www.environdec.com – S-P-06061 - S-P-06062 - S-P-06063

THE ADVANTAGES OF RAFFMETAL'S CONTINUOUS CASTING INGOTS

1 BETTER QUALITY, LESS DEFECTS

Speed of solidification = fewer impurities, fewer intermetallic compounds.

A fine and homogeneous structure.

2 HIGHER METAL YIELD, LESS OXIDES

Solidification without contact with air = less oxides.

3 SPACE OPTIMISATION

Package compactness = 40% saving in the area dedicated to package storage.

Customisation of bar length and weight = faster unloading, storage and picking up of packages from the warehouse = shorter furnace package loading time.

4 INCREASED SAFETY

Furnace bar loading. Reduction of possible explosions from damp ingots loaded into the furnace. Reduced furnace maintenance time. Less ingot pre-heating time.

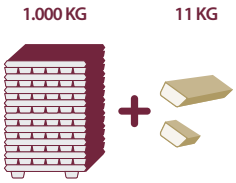
Package stability. Reduced package handling and storage times. Reduced package breakage during handling.

5 TRACEABILITY

Raffmetal's aluminium ingots have a traceability system: the casting number is engraved on each individual bar, giving the customer the guarantee that the entire aluminium production cycle can be traced at any time.

Traditional ingot section

Ingot section in continuous casting - Raffmetal technology

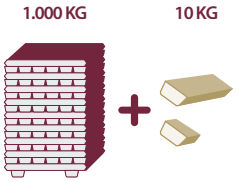


+1,1%

Oxide

Oxide

Hard spot

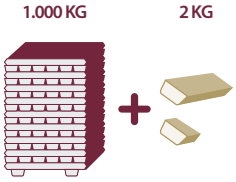


+1%

Standard packages

Examples of warehouse storage

Striko packages



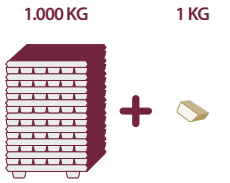
+0,2%

(1) 

(2) 

Package stability:

comparison between ingots for traditional casting (1) and ingots for continuous casting (2)



+0,1%

RM1: Identification of the production line

2024: Year of production

1179: Progressive casting number

+2,4%

AVAILABLE ALUMINIUM

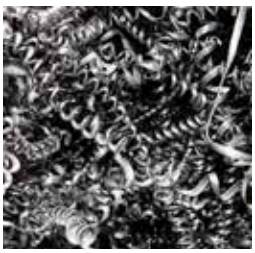
RAW MATERIALS

Recycling represents the heart of Raffmetal's production. The raw materials used in the production process result from the collection of processing scraps and components that have fulfilled their original function.

The scrap used is sourced throughout Europe and classified and processed by highly sophisticated and cutting-edge technological systems.

The knowledge acquired in over forty years of experience in the treatment of scrap, as well as the most modern sorting and separation technologies, have made it possible to start production in 2020 of the new range of primary aluminium alloys from recycling with a low carbon footprint.

The launch of this production allowed us to enlarge and complete the range of purchased scraps to bring forth also primary alloys: **the right scrap for the right alloy**.



TURNINGS

SHEETS/PLATES

CASINGS (ALUMINIUM TENSE - CAST)

FLOATED FRAG ALUMINIUM SCRAP (TWITCH)

SHREDDED MIXED METAL SCRAP

PRODUCTION WASTE

WHEEL RIMS (TROMA)

LITHOGRAPHIC SHEETS

SECTION BARS (ALUMINIUM TREAD - EXTRUSION)

WIRES AND CABLES

over 1.800 suppliers

Internal team dedicated to raw material purchasing

The Raffmetal Research and Development team, thanks to the competence, preparation and latest generation instrumentation present in the internal laboratories covering an area of over 860 m², works daily in order to:

- **Increase the exploitation of each type of scrap**, from a point of view of both chemical and physical composition. The team of metallurgical engineers and chemists monitors the whole procedure: **from the design to the proper functioning of the alloy in the customer's plant** in order to ensure its productivity in the long run;
- **Develop new alloys with better properties, sustainable and competitive** also offering a service dedicated to the **customisation of the alloy**.

Pre- and post-sales customer service
(both in the development and the use of new alloys)

Dialogue and collaboration with customers allow us to meet their needs in a constantly evolving market, developing high-performance, competitive and low carbon footprint products.

*Source: R&D of Raffmetal

SEM Microscope

Chemical laboratory

WHY CHOOSE RAFFMETAL'S RECYCLED ALUMINIUM?

The strengths of Raffmetal's internal production process allow for a sustainable product with a low carbon footprint.

RAW MATERIALS

Raffmetal's raw material is end-of-life scrap and processing waste. This brings benefits along the supply chain, as it allows:

• Upstream: to **avoid the exploitation of natural resources by mining**.

• Downstream: to **reduce to zero the cost of disposing of scrap metal** that would otherwise be sent to landfill and therefore considered waste.

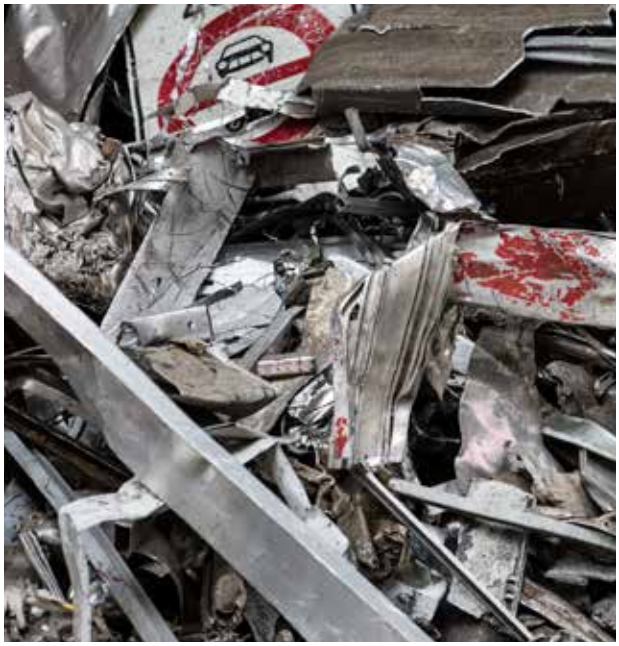
Thanks to the circular production of Raffmetal more than 2.200.000 tonnes of CO_2 are avoided each year *

=

Consumption/year of a city of about 380.000 inhabitants

*Compared to the European average of primary aluminium production

Scrap: Turnings



Scrap: Sheets/Plates

CONTINUOUS INNOVATION IN THE PRODUCTION PROCESS

Raffmetal's refining process generates zero waste.

All residues from the refining process are recycled and exploited thanks to the revolutionary **salt residue recovery system**, installed back in 1989, which has made it possible to outline the winning path to recycling and still represents **excellence in the circular economy**.

Salt recovered and reused in the refining process

The supply of aluminium alloys in the liquid form allows considerable energy savings to our customers avoiding the re-melting of ingots as well as an important reduction in terms of CO_2 emissions into the atmosphere, thereby lowering the carbon footprint of the finished product.

ENERGY EFFICIENCY

Raffmetal has always applied a company strategy aimed at the **recovery of all thermal waste available in the company**, constantly innovating systems and reducing the need for energy from fossil fuels.

The heat recovery plant, installed in 2014 with an investment of over 35 million €, provides for the recovery of the heat contained in the exhaust gases coming from the afterburners of the rotary kilns, from the plant for the recovery of the melting by-products and from the drying plant. The self-produced heat **saves natural gas equivalent to the emissions of 12.500 tons of CO_2 per year**.

ENVIRONMENTAL SUSTAINABILITY

The environmental policy reinforces the approach to sustainable development that Raffmetal has always pursued. Management procedures, system investments and actions to mitigate emissions, monitor water consumption and protect biodiversity and woodland flora are proof of this.

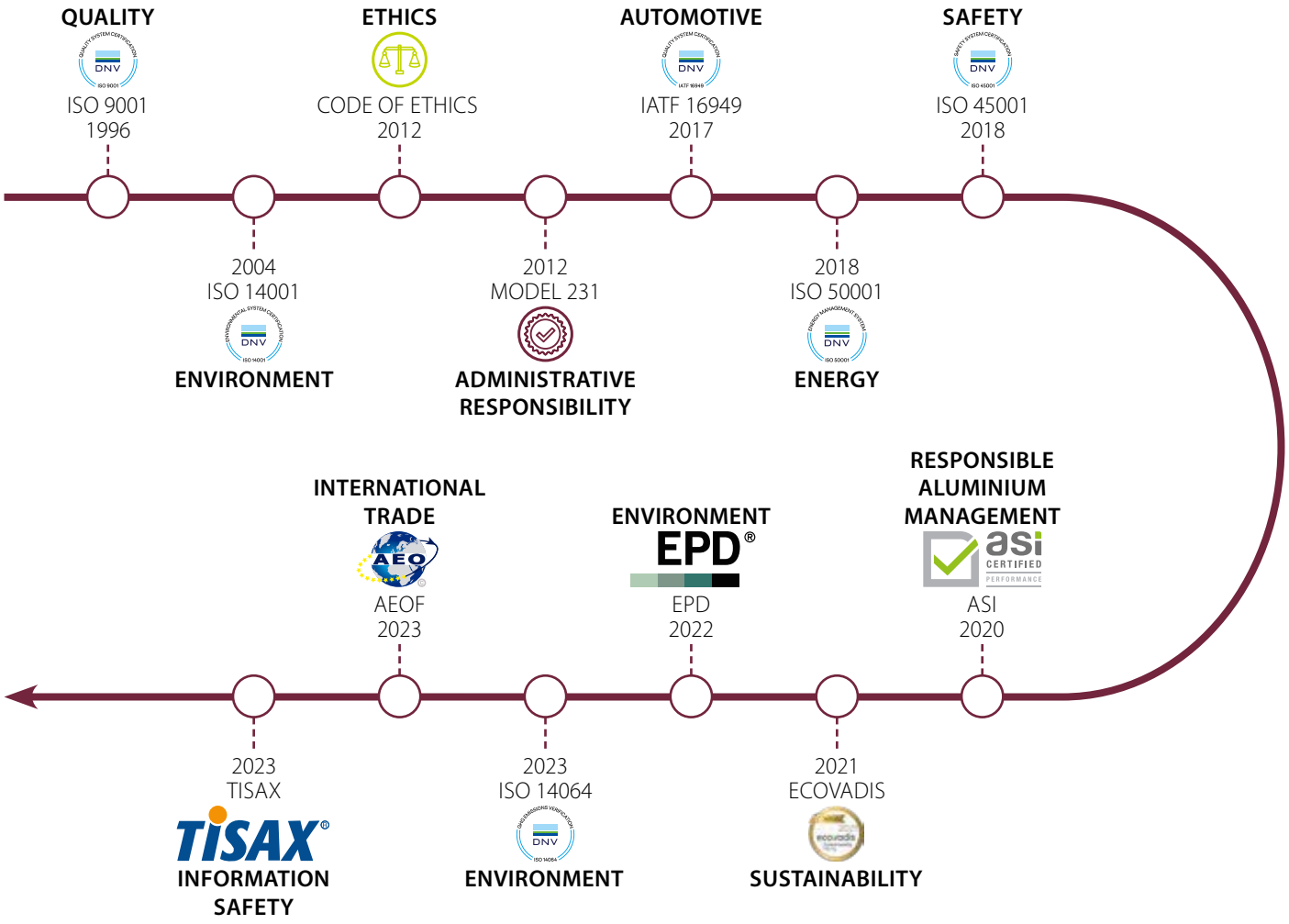
In 2013, an **oxygen pipeline** was built, with an investment of over 7 million €, which reduces CO_2 emissions and, in terms of safety, takes 2.500 trucks/year off the road.

CERTIFICATIONS

The certifications of its management and organisation systems and the certificates of responsibility and ethics give Raffmetal undisputed added value.

They are **synonymous with quality, attention, safety, prevention and responsibility.**

They are also a selection and preference tool for customers and suppliers, as a demonstration of the company's commitment.



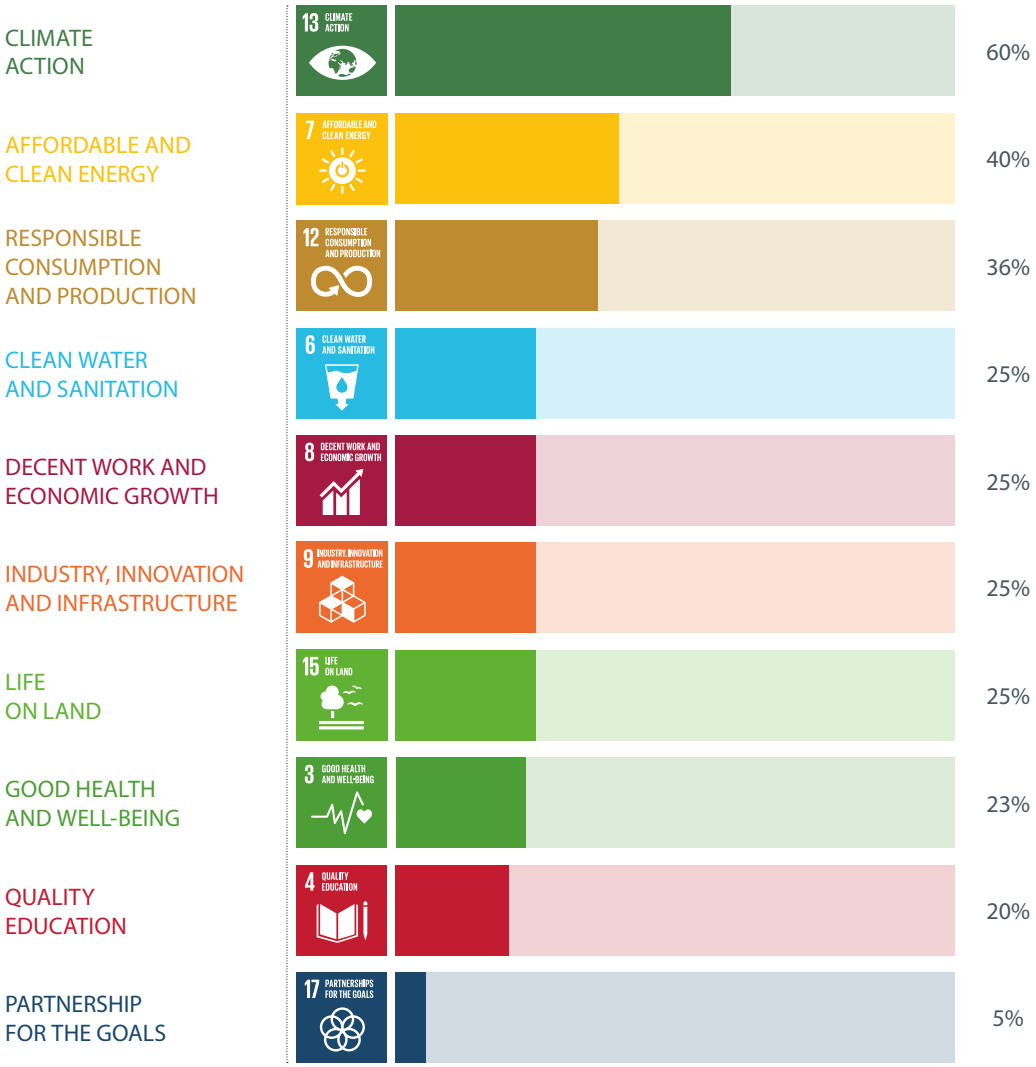
ESG Abstract 2021/2022

THE SUSTAINABLE DEVELOPMENT GOALS IN RAFFMETAL'S SUSTAINABILITY POLICY

In September 2015, the United Nations endorsed the 2030 Agenda consisting of 17 Sustainable Development Goals (SDGs) and 169 sub-goals or targets as a strategy "to achieve a better and more sustainable future for all".

Raffmetal, after having mapped in previous sustainability reports the adherence of the company's missions and projects to the objectives of sustainable development, in 2020 has decided to quantify in an objective way through a software program its commitment to achieve the targets established and shared at universal level.

HOW MUCH RAFFMETAL'S ACTIVITY CONTRIBUTES TO REACHING THE SDGS



Data source: DNV Tools

The percentage specifies how well the company fulfils, with its policy, the total of the targets for each goal.

THE PILLARS OF RAFFMETAL SUSTAINABILITY

ECOLOGICAL TRANSITION:

In 1989, Raffmetal began the ecological transition by installing the salt slag recovery system, which brings countless environmental benefits. Today, this plant is powered 100% by electricity generated from the recovery steam, ensuring a zero-waste and energy-circulating melting process.

ENERGY TRANSITION:

This process began in 2014 thanks to a heat recovery plant that today saves 18.000 tonnes of CO_2/year, equivalent to the consumption of 10.000 households per year.

In 2023, this plant will be further upgraded by means of a steam turbine, which will produce 7 MW/year. In addition, large investments are dedicated to green electricity from photovoltaics.

By 2024, 10 MW will be placed on-site and within the next three years in off-site photovoltaic parks aiming to cover 100% of energy needs with renewable electricity by 2030.

Research and Development of new green energy carriers are on the way.

DIGITAL TRANSITION:

Since 2000, Raffmetal has invested in the digitisation of all internal, management and IT processes, supervision and monitoring of all production, environmental and industrial aspects.

RECYCLING PERCENTAGE INCREASE:

Raffmetal has always been a leader in the recycling and circular economy sector. Thanks to continuous research and development and one-of-a-kind in-house laboratories, it aims to increase the alloy percentage of recycling, decreasing the use of critical raw materials in favour of the carbon footprint both of our products and of our company.

The four pillars of the last decade will make it possible to achieve the climate neutrality targets defined by Green Deal and Fit for 55%.

THE SUSTAINABILITY PATH OF RAFFMETAL

1989
Zero waste refining process

1996
ISO 9001 (Quality)

2000
Collaboration with Bicocca University

2004
ISO 14001 (Environment)

2016
Adhesion to the Workplace Health Promotion project

2017
IATF 16949 (Automotive)

2018
GRI certified sustainability report integrated with SDGs

2018
Collaboration with Siena University

2018
ISO 50001 (Energy)

2018
OHSAS 18001 (Safety)

2021
PCR Aluminium sector

2022
Environmental Product Declaration (EPD)

2023
ISO 14064 (Environment)

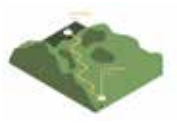
2023
TISAX (Information safety)

CARBON NEUTRALITY

2012

Code of Ethics and Model 231

2013



Oxygen pipeline

2013

Start CSR path

2015

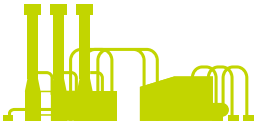
Certified sustainability report

2014

we ♥ sport
we ♥ schools

We love sport
We love schools

2014



Heat recovery plant

2019

RAFFMETAL
we ♥ 40

40th anniversary

2019

Life Cycle Assessment (LCA)

2020

ISO 45001 (Safety)

2021

LOW CARBON FOOTPRINT department

2020

SILVAL®

Primary alloys from recycling

2020

asi CERTIFIED PERFORMANCE

Aluminium Stewardship Initiative (ASI)

03. ENERGY

Over the years, Raffmetal has made constant investments in production systems and in efficiency works able to lead to an almost total replacement of the steam produced by methane with steam produced through the recovery of heat from thermal residues.

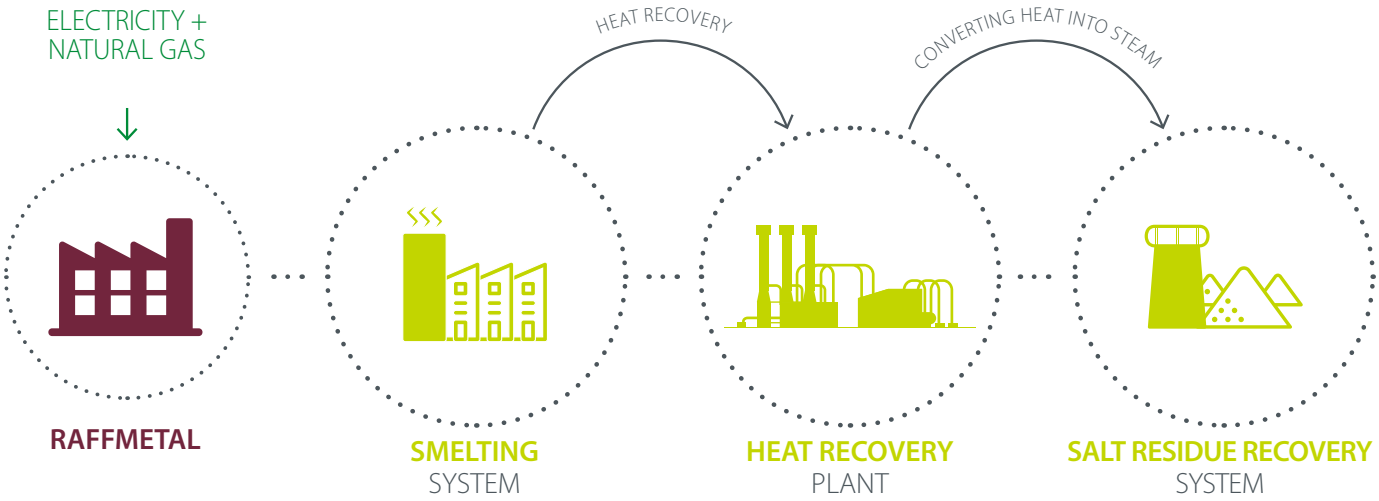
Following the European directives for climate neutrality by 2050, Raffmetal has put all its efforts and resources into Research and Development aimed at the energy transition of its production processes.

The strategy, which will be constantly implemented over the next few years, includes actions in the field of production and an increase in the purchase of renewable energy, as well as experiments in system upgrading for the use of new energy sources.

Heat Recovery Plant (IRC)

HEAT RECOVERY PLANT

From 2014, Raffmetal's Management has taken the brave and innovative decision to invest over 35 million € in a Heat Recovery Plant which involves the recovery of the heat contained in the exhaust gases from the afterburner of the rotary furnaces, from the by-product recovery system and from the drying system. The recovered heat is used to power the salt residue recovery system, thus eliminating the consumption of natural gas necessary for this process.



Thanks to our recovery plant, every year we save 18.,000 tonnes of CO_2

=

Emissions/year of 10.000 households*

*Per capita emission in Italy: 7,20 tons CO_2 / inhab*year

04. ENVIRONMENT

Raffmetal's commitment and dedication to contribute to the fight against climate change emerge from real actions that have accompanied the company's evolution since its inception. Management procedures, dedicated staff, continuous monitoring and innovative technologies applied throughout the production process are proof of this.

Today's world is highly interconnected and requires everyone to take responsibility for each other on a global level, which is why **Raffmetal attaches the utmost importance to environmental protection**.

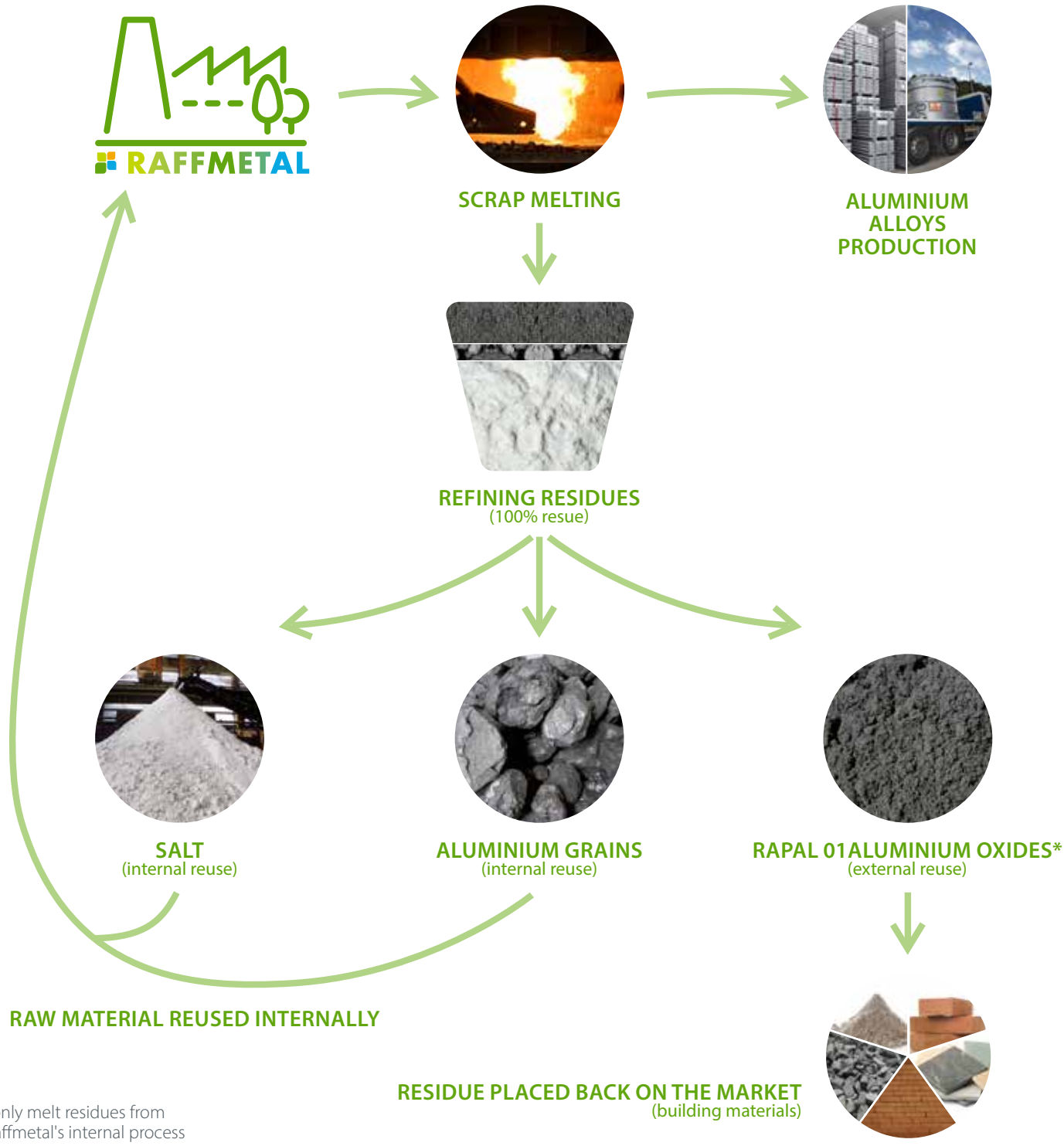
AIR PROTECTION

Raffmetal's systems comply with the Best Available Technology for the non-ferrous metals sector and are operated by experienced and qualified personnel; the application of an **environmental management system compliant with international ISO 14001** certification has over the years allowed the achievement **of emission values well below the legal limits**.

ZERO WASTE REFINING PROCESS

The production salt residue recovery system represents the first concrete action adopted by Raffmetal to achieve sustainability, efficiency and zero waste. The plant allows the recovery and exploitation of the chemical components present in the residues of the melting process: salt and aluminium granules are reintroduced in Raffmetal production cycle, while aluminium oxides are sold to third parties. Since 1989 Raffmetal has not landfilled tailings from the melting process.

RAFFMETAL ZERO WASTE REFINING PROCESS



*only melt residues from Raffmetal's internal process

WATER PROTECTION

The use of water in our production processes is of particular importance, especially during the casting and cooling phase of the metal. Significant quantities are also used in the pre-treatment of scrap and the recovery of melting by-products.

In order to protect the water resource, it has been chosen to include systems and technologies that minimise its consumption.

The water resource, currently drawn from the "delle Melie" spring in the Municipality of Casto and from the A2A waterworks in Vestone, is recycled several times through the cooling process in an evaporative tower, **limiting the withdrawal to the reintegration of the dispersed quantity due to evaporation**.

Currently, the only discharges are those from rain water that flow, after treatment, into the sewer system or into a surface water body.

These discharges are constantly analysed according to a monitoring plan in compliance with the Technical Annexes of the Integrated Environmental Authorisations.

PROTECTION OF BIODIVERSITY

Biodiversity is top priority in our environmental sustainability policy, to grant a sustainable local development.

Indeed, operating in a sustainable manner means being aware of, evaluating and protecting the natural heritage typical of mountain areas, including forests.

For this reason, since 2000, a multidisciplinary survey on the state of the vegetation in the territory of Casto and the nearby has been carried out. Research is delegated to the Department of Environmental and Land Sciences of the University Bicocca of Milan, coordinated by Prof. Demetrio Pitea.

Since 2000, and every two years:

- Remote sensing survey: with 2 satellites;
- On-site survey;
- Laboratory analysis through the study of samples picked from 17 types of trees.

05. SOCIAL

Any production business has an impact on the social fabric of the territory where it is located, going well beyond the economic and employment effects, becoming a driving force for the diffusion of culture and values for the population, especially towards the new generations.

Therefore, Raffmetal supports **territorial development initiatives in order to create value in the local community**.

DONATIONS TO THE LOCAL COMMUNITY

€ 3.000.000
DONATED TO THE REGION FROM 2014 TO 2022.

JUST IN 2021/2022 A FURTHER **€ 890.000**
FOR BRESCIA AND PROVINCE.

In particular, two projects were founded by Raffmetal with the aim of supporting high-quality school and sports education.

we ♥ schools

- Donation of state-of-the-art teaching materials and tools
- Vocational courses in the company for high schools and universities held by company technicians
- Initiatives for the dissemination of the culture of recycling
- Internships and dual education

we ♥ sport

- Donation of sports and recreational equipment and facilities
- Meetings with sports personalities and experts promoting a healthy lifestyle

Standard EN 1676:2020

Alloy designation			Chemical composition (as a % of mass)							
Alloy type	Numerical designation	Chemical symbols	Si		Fe		Cu		Mn	
	EN AB		Min	Max	Min	Max	Min	Max	Min	Max
AlCu	21000	Al Cu4MgTi	-	0.15	-	0.30	4.2	5.0	-	0.10
	21100	Al Cu4Ti	-	0.15	-	0.15	4.2	5.2	-	0.55
AlSiMgTi	41000	Al Si2MgTi	1.6	2.4	-	0.50	-	0.08	0.30	0.50
AlSi7Mg	42000	Al Si7Mg	6.5	7.5	-	0.45	-	0.15	-	0.35
	42100	Al Si7Mg0.3	6.5	7.5	-	0.15	-	0.03	-	0.10
	42200	Al Si7Mg0.6	6.5	7.5	-	0.15	-	0.03	-	0.10
	42300	Al Si7(Mg)	6.5	7.5	-	0.15	-	0.03	-	0.10
	42400	Al Si7MnMg	6.5	8.5	-	0.20	-	0.03	0.35	0.75
AlSi10Mg	43000	Al Si10Mg	9.0	11.0	-	0.40	-	0.03	-	0.45
	43200	Al Si10Mg(Cu)	9.0	11.0	-	0.55	-	0.30	-	0.55
	43300	Al Si9Mg	9.0	10.0	-	0.15	-	0.03	-	0.10
	43400	Al Si10Mg(Fe)	9.0	11.0	0.45	0.9	-	0.08	-	0.55
	43500	Al Si10MnMg	9.0	11.5	-	0.20	-	0.03	0.40	0.80
AlSi	44000	Al Si11	10.0	11.8	-	0.15	-	0.03	-	0.10
	44100	Al Si12 (b)	10.5	13.5	-	0.55	-	0.10	-	0.55
	44200	Al Si12 (a)	10.5	13.5	-	0.40	-	0.03	-	0.35
	44300	Al Si12(Fe) (a)	10.5	13.5	0.45	0.9	-	0.08	-	0.55
	44400	Al Si9	8.0	11.0	-	0.55	-	0.08	-	0.50
	44500	Al Si12(fe) (b)	10.5	13.5	0.45	0.90	-	0.18	-	0.55
	44600	Al Si10Mn	9.5	11.5	0.10	0.20	-	0.03	0.30	0.75
AlSi5Cu	45000	Al Si6Cu4	5.0	7.0	-	0.9	3.0	5.0	0.20	0.65
	45100	Al Si5Cu3Mg	4.5	6.0	-	0.50	2.6	3.6	-	0.55
	45300	Al Si5Cu1Mg	4.5	5.5	-	0.55	1.0	1.5	-	0.55
	45400	Al Si5Cu3	4.5	6.0	-	0.50	2.6	3.6	-	0.55
	45500	Al Si7Cu0.5Mg	6.5	7.5	-	0.25	0.2	0.7	-	0.15
	45600	Al Si7Cu1Mg0.6	6.5	7.5	-	0.15	0.8	1.6	-	0.10
AlSi9Cu	46000	Al Si9Cu3(Fe)	8.0	11.0	0.6	1.1	2.0	4.0	-	0.55
	46100	Al Si11Cu2(Fe)	10.0	12.0	0.45	1.0	1.5	2.5	-	0.55
	46200	Al Si8Cu3	7.5	9.5	-	0.7	2.0	3.5	0.15	0.65
	46300	Al Si7Cu3Mg	6.5	8.0	-	0.7	3.0	4.0	0.20	0.65
	46400	Al Si9Cu1Mg	8.3	9.7	-	0.7	0.8	1.3	0.15	0.55
	46500	Al Si9Cu3(Fe)(Zn)	8.0	11.0	0.6	1.2	2.0	4.0	-	0.55
	46600	Al Si7Cu2	6.0	8.0	-	0.7	1.5	2.5	0.15	0.65
AlSi(Cu)	47000	Al Si12(Cu)	10.5	13.5	-	0.7	-	0.9	0.05	0.55
	47100	Al Si12Cu1(Fe)	10.5	13.5	0.6	1.1	0.7	1.2	-	0.55
	47200	Al Si12(Fe)	10.5	13.5	0.6	1.1	-	0.4	0.10	0.50
AlSiCuMg	48000	Al Si12CuMgNi	10.5	13.5	-	0.6	0.8	1.5	-	0.35
	48100	Al Si17Cu4Mg	16.0	18.0	-	1.00	4.0	5.0	-	0.50
	48200	Al Si15Cu3MgFe	14.5	16.5	0.7	1.2	3.0	4.0	0.40	0.60
AlMg	51100	Al Mg3	-	0.45	-	0.4	-	0.03	-	0.45
	51200	Al Mg9	-	2.5	0.45	0.9	-	0.08	-	0.55
	51300	Al Mg5	-	0.35	-	0.45	-	0.05	-	0.45
	51400	Al Mg5(Si)	-	1.3	-	0.45	-	0.03	-	0.45
	51500	Al Mg5Si2Mn	1.8	2.6	-	0.20	-	0.03	0.4	0.8
AlZnSiMg	71100	Al Zn10Si8Mg	7.5	9.5	-	0.40	-	0.08	-	0.45

Mg		Cr		Ni		Zn		Pb	Sn	Ti		Others	
Min	Max	Min	Max	Min	Max	Min	Max	Max	Max	Min	Max	Single	Total
0.20	0.35	-	-	-	0.05	-	0.10	0.05	0.05	0.15	0.25	0.03	0.10
-	-	-	-	-	-	-	0.07	-	-	0.15	0.25	0.03	0.10
0.50	0.65	-	-	-	0.05	-	0.10	0.05	0.05	0.07	0.15	0.05	0.15
0.25	0.65	-	-	-	0.15	-	0.15	0.15	0.05	-	0.20	0.05	0.15
0.30	0.45	-	-	-	-	-	0.07	-	-	-	0.18	0.03	0.10
0.50	0.70	-	-	-	-	-	0.07	-	-	-	0.18	0.03	0.10
0.10	0.30	-	-	-	-	-	0.07	-	-	-	0.18	0.03	0.10
0.15	0.45	-	-	-	-	-	0.03	-	-	-	0.15	0.05	0.15
0.25	0.45	-	-	-	0.05	-	0.10	0.05	0.05	-	0.15	0.05	0.15
0.25	0.45	-	-	-	0.15	-	0.35	0.10	0.05	-	0.15	0.05	0.15
0.25	0.45	-	-	-	-	-	0.07	-	-	-	0.15	0.03	0.10
0.25	0.50	-	-	-	0.15	-	0.15	0.15	0.05	-	0.15	0.05	0.15
0.15	0.60	-	-	-	-	-	0.07	-	-	-	0.15	0.05	0.15
-	0.45	-	-	-	-	-	0.07	-	-	-	0.15	0.03	0.10
-	0.10	-	-	-	0.10	-	0.15	0.10	-	-	0.15	0.05	0.15
-	-	-	-	-	-	-	0.10	-	-	-	0.15	0.05	0.15
-	-	-	-	-	-	-	0.15	-	-	-	0.15	0.05	0.25
-	0.10	-	-	-	0.05	-	0.15	0.05	0.05	-	0.15	0.05	0.15
-	0.40	-	-	-	-	-	0.30	-	-	-	0.15	0.05	0.25
-	0.15	-	-	-	-	-	0.03	-	-	-	0.15	0.05	0.15
-	0.55	-	0.15	-	0.45	-	2.0	0.29	0.15	-	0.20	0.05	0.35
0.20	0.45	-	-	-	0.10	-	0.20	0.10	0.05	-	0.20	0.05	0.15
0.40	0.65	-	-	-	0.25	-	0.15	0.15	0.05	-	0.20	0.05	0.15
-	0.05	-	-	-	0.10	-	0.20	0.10	0.05	-	0.20	0.05	0.15
0.25	0.45	-	-	-	-	-	0.07	-	-	-	0.20	0.03	0.10
0.50	0.70	-	-	-	-	-	0.07	-	-	-	0.18	0.03	0.10
0.15	0.55	-	0.15	-	0.55	-	1.2	0.29	0.15	-	0.20	0.05	0.25
-	0.30	-	0.15	-	0.45	-	1.7	0.25	0.15	-	0.20	0.05	0.25
0.15	0.55	-	-	-	0.35	-	1.2	0.25	0.15	-	0.20	0.05	0.25
0.35	0.60	-	-	-	0.30	-	0.65	0.15	0.10	-	0.20	0.05	0.25
0.30	0.65	-	-	-	0.20	-	0.8	0.10	0.10	-	0.18	0.05	0.25
0.15	0.55	-	0.15	-	0.55	-	3.0	0.29	0.15	-	0.20	0.05	0.25
-	0.35	-	-	-	0.35	-	1.0	0.25	0.15	-	0.20	0.05	0.15
-	0.35	-	0.10	-	0.30	-	0.55	0.20	0.10	-	0.15	0.05	0.25
-	0.35	-	0.10	-	0.30	-	0.55	0.20	0.10	-	0.15	0.05	0.25
0.10	0.40	-	0.05	-	0.20	-	0.50	0.20	0.10	-	0.15	0.05	0.25
0.9	1.5	-	-	0.7	1.3	-	0.35	0.05	0.05	-	0.20	0.05	0.15
0.45	0.65	-	-	-	0.3	-	1.5	-	0.15	-	0.20	0.05	0.25
0.55	0.95	0.05	0.30	-	0.30	-	1.0	-	0.30	-	0.15	0.05	0.25
2.7	3.5	-	-	-	-	-	0.10	-	-	-	0.15	0.05	0.15
8.5	10.5	-	-	-	0.10	-	0.25	0.10	0.10	-	0.15	0.05	0.15
4.5	6.8	-	-	-	-	-	0.10	-	-	-	0.15	0.05	0.15
4.8	6.5	-	-	-	-	-	0.10	-	-	-	0.15	0.05	0.15
5.0	6.0	-	-	-	-	-	0.07	-	-	-	0.20	0.05	0.15
0.25	0.50	-	-	-	-	9.0	10.5	-	-	-	0.15	0.05	0.15

Comparison of characteristics

Comparison of casting, mechanical, and other characteristics of castings

Alloy designation			Casting method				Castability					
Alloy type	Numerical designation	Chemical symbols	Sand-casting	Permanent mould casting	Pressure casting	Waste-wax process	Flowability	Resistance to shrinkage cracks	Compression strength	Foundry raw material	After heat treatment	Corrosion strength
	EN AC											
AlCu	21000	Al Cu4MgTi	*	*		*	C	D	D	-	A	D
	21100	Al Cu4Ti	*	*			C	D	D	-	A	D
AlSiMgTi	41000	Al Si2MgTi	*	*			C	C	C	C	B	B
AlSi7Mg	42000	Al Si7Mg	*	*		*	B	A	B	B/C	B	B/C
	42100	Al Si7Mg0.3	*	*		*	B	A	B	-	B	B
	42200	Al Si7Mg0.6	*	*		*	B	A	B	-	B	B
	42300	Al Si7(Mg)	*	*		*	B	A	B	-	B	B
	42400	Al Si7MnMg			*		B	A	B	-	B	B
AlSi10Mg	43000	Al Si10Mg	*	*			A	A	B	B/C	B	C
	43200	Al Si10Mg(Cu)	*	*			A	A	B	B/C	B	B/C
	43300	Al Si9Mg	*	*			A	A	B	B/C	B	B
	43400	Al Si10Mg(Fe)			*		A	A	C	B	-	B/C
	43500	Al Si10MnMg			*		A	A	C	B/C	B	B
AlSi	44000	Al Si11	*	*			A	A	A	C	-	B
	44100	Al Si12	*	*		*	A	A	A	C	-	B/C
	44200	Al Si12	*	*			A	A	A	C	-	B
	44300	Al Si12(Fe)			*		A	A	C	C	-	B/C
	44400	Al Si9	*	*	*		A	A	C	C	-	B/C
	44500	Al Si12(Fe)			*		A	A	C	C	-	B/C
	44600	Al Si10Mn			*		A	A	B	B/C	B	B
AlSi5Cu	45000	Al Si6Cu4	*	*			B	B	B	B	-	D
	45100	Al Si5Cu3Mg		*			B	B	B	B	A	D
	45300	Al Si5Cu1Mg	*	*			C	B	C	B	B	D
	45400	Al Si5Cu3		*			B	B	B	B	B	D
	45500	Al Si7Cu0.5Mg	*	*			B	B	B	B	B	B/C
	45600	Al Si7Cu1Mg0.6	*	*			B	B	B	B	B	C
AlSi9Cu	46000	Al Si9Cu3(Fe)			*		B	B	C	B	-	D
	46100	Al Si11Cu2(Fe)			*		A	B	C	C	-	D
	46200	Al Si8Cu3	*	*	*		B	B	B	B	-	D
	46300	Al Si7Cu3Mg		*			B	B	B	C	-	D
	46400	Al Si9Cu1Mg	*	*			B	B	B	B	B	D
	46500	Al Si9Cu3(Fe)(Zn)			*		B	B	C	B	-	D
	46600	Al Si7Cu2	*	*			B	B	B	B	-	D
AlSi(Cu)	47000	Al Si12(Cu)	*	*			A	A	A	C	-	C
	47100	Al Si12Cu1(Fe)			*		A	A	C	C	-	C
	47200	Al Si12Cu1(Fe)			*		A	A	C	C	-	B/C
AlSiCuMg	48000	Al Si12CuMgNi		*	*		A	A	A	B	B	C
	48100	Al Si17Cu4Mg			*	*	A	C	B	E	B	D
	48200	Al Si15Cu3MgFe	*	*	*		A	B	B	C	-	D
AlMg	51100	Al Mg3	*	*			C	D	D	A	-	A
	51200	Al Mg9			*		C	D	D	A	-	A
	51300	Al Mg5	*	*		*	C	D	D	A	-	A
	51400	Al Mg5 (Si)	*	*			C	D	D	A	-	A
	51500	Al Mg5Si2Mn			*		B	D	C	A	-	A
AlZnSiMg	71100	Al Zn10Si8Mg	*	*	*		B	A	B	A	-	C

Other workability characteristics								Mechanical characteristics				
Decorative anodising	Weldability	Sanding ability	Linear thermal expansion	Electric conductivity E mS/m		Thermal conductivity W/mK		Resistance to ambient temperature	Resistance to a temperature up to 200°C	Ductility (resistance to impacts)	Fatigue resistance MPa	
				Min	Max	Min	Max				Min	Max
C	D	B	23	16	23	120	150	A	B	A	80	110
C	D	B	23	16	23	120	150	A	B	A	80	110
B	B	B	23	19	25	140	160	B	-	B	-	-
D	B	C	22	19	25	150	170	B	C	C	80	110
D	B	C	22	20	27	160	180	A	C	A	80	110
D	B	C	22	20	26	150	180	A	C	A	80	110
D	B	C	22	20	27	160	180	A	C	A	80	110
E	B	C	22	18	25	140	170	B	C	A	80	110
E	A	D	21	18	25	140	170	B	C	C	80	110
E	A	C	21	16	24	130	170	B	C	C	80	110
E	A	D	21	20	26	150	180	A	C	A	80	110
E	C	B/C	21	16	21	130	150	B	C	C	60	90
E	B	D	21	19	25	140	170	A	C	A	80	90
E	A	D	21	18	24	140	170	D	C	A	60	90
E	A	D	20	16	23	130	160	D	C	B	60	90
E	A	D	20	17	24	140	170	D	C	A	60	90
E	D	D	20	16	22	130	160	B	C	C	60	90
E	D	D	21	16	22	130	150	C	C	C	60	90
E	D	D	20	16	22	130	160	B	C	C	60	90
E	A	D	21	20	25	145	170	B	C	A	80	110
D	C	B	22	14	17	110	120	D	A	C	60	90
D	C	B	22	16	19	-	130	A	A	C	80	110
D	C	B	22	19	23	140	150	B	B	B	70	100
D	C	B	22	16	19	120	130	B	A	A	70	100
D	B	C	22	16	22	150	165	A	B	A/B	80	110
D	B	C	22	16	22	150	165	A	A/B	A/B	80	110
E	F	C	21	13	17	110	120	B	B	D	60	90
E	F	C	20	14	18	120	130	B	B	D	60	90
E	B	C	21	14	18	110	130	B	A	C	60	90
E	B	C	21	14	17	110	120	D	A	C	60	90
E	B	D	21	16	22	130	150	A	B	C	60	90
E	F	C	21	13	17	110	120	B	B	D	60	90
E	C	C	21	15	19	120	130	D	B	C	50	70
E	A	C	20	16	22	130	150	D	B	C	60	90
E	F	C	20	15	20	120	150	B	B	C	60	90
E	F	C	20	15	20	120	150	B	B	C	60	90
E	A	C	20	15	23	130	160	A	A	D	80	110
D	D	D	18	14	17	120	130	B	B	E	60	90
-	D	D	19	10	15	100	120	A	A	D	90	110
A	C	A	24	14	16	130	140	B	B	A	80	110
B	E	A	24	11	14	60	90	C	B	C	60	90
A	C	A	24	15	21	110	130	D	B	B	60	90
B	C	A	24	15	21	110	140	D	B	B	60	90
E	C	A	24	14	16	110	130	B	B	A	80	110
E	A	C	21	17	20	120	130	B	C	C	80	110

It indicates the most commonly used casting process for each alloy:
A = Excellent; B = Good; C = Sufficient; D = Poor; E = Not recommended; F = Not suitable.

Comparison of aluminium alloy designations

Tab. C.1- EN, Din, Uni, BS, AA, Jis, UNE

Alloy numerical designation - EN	Alloy symbolic designation - EN	Alloy designation - DIN	Alloy designation - UNI	Alloy designation - BS 1490:1988	Alloy designation - AA	Alloy designation - JIS
21000	Al Cu4MgTi	DIN 220	-	-	204.0	AC1B.1
21100	Al Cu4Ti	DIN 220	-	-	-	Al-Cu4Ti
41000	Al Si2MgTi	-	UNI 3055	-	-	-
42000	Al Si7Mg	-	UNI 3599	LM25	356.0	AC4C
42100	Al Si7Mg0.3	-	UNI 8024	-	A356.0	AC4CH
42200	Al Si7Mg0.6	-	UNI 8392	-	357.0	-
42300	Al Si7(Mg)	-	-	-	-	-
42400	Al Si7MnMg	-	-	-	-	-
43000	Al Si10Mg	DIN 239 A	UNI 3051	-	-	AC4A, Al-Sil0Mg
43200	Al Si10Mg(Cu)	DIN 233	-	-	-	Al-Si10Mg(Cu)
43300	Al Si9Mg	-	-	-	-	Al-Si9Mg
43400	Al Si10Mg(Fe)	DIN 239 D	-	-	-	ADC3
43500	Al Si10MnMg	-	-	-	365.0	AC4A.2
44000	Al Si11	-	-	-	-	Al-Si11
44100	Al Si12 (b)	DIN 230 A	UNI 4515	LM6	B413.0	AC3A, Al-Si12(b)
44200	Al Si12 (a)	DIN 230 A	UNI 4515	LM6	-	Al-Si12(a)
44300	Al Si12(Fe)(a)	DIN 230 D	UNI 4514	-	A413.2	ADC1
44400	Al Si9	-	-	-	-	-
44500	Al Si12(Fe)(b)	-	-	-	413.0	-
44600	Al Si10Mn	-	-	-	375.0	-
45000	Al Si6Cu4	DIN 225	UNI 7369/5	LM21	A319.0	AC2B, Al-Si6Cu4
45100	Al Si5Cu3Mg	-	UNI 3052	LM4	-	Al-Si5Cu3Mg
45300	Al Si5Cu1Mg	-	UNI 3600	LM16	355.0	AC4D, Al-Si5Cu1Mg
45400	Al Si5Cu3	-	-	LM22	-	Al-Si5Cu3
45500	Al Si7Cu0.5Mg	-	-	-	-	-
45600	Al Si7Cu1Mg0.6	-	-	-	-	-
46000	Al Si9Cu3(Fe)	DIN 226 D	UNI 5075	LM26	A380.0	ADC10
46100	Al Si11Cu2(Fe)	-	UNI 7363 - UNI 5076	LM2	383.0	ADC12Z
46200	Al Si8Cu3	DIN 226 A	-	-	333.0	AC4B, Al-Si8Cu3
46300	Al Si7Cu3Mg	-	-	-	320.0	Al-Si7Cu3Mg
46400	Al Si9Cu1Mg	-	UNI 7369/3	-	-	Al- Si9Cu1Mg
46500	Al Si9Cu3(Fe)(Zn)	-	-	LM24	E380, 383.0	ADC10Z
46600	Al Si7Cu2	-	-	LM27	328.0	-
47000	Al Si12(Cu)	DIN 231 A	UNI 7369/2	LM20	-	Al-Si12Cu
47100	Al Si12Cu1(Fe)	DIN 231 D	UNI 5079	LM20	-	ADC1C
47200	Al Si12(Fe)	-	-	-	-	-
48000	Al Si12CuNiMg	DIN 260	-	LM13	-	AC8A
48100	Al Si17Cu4Mg	-	-	-	B390.0	ADC14, Al-Si17Cu 4Mg
48200	Al Si15Cu3MgFe	-	-	-	-	-
51100	Al Mg3	DIN 242	UNI 3059	-	-	-
51200	Al Mg9	DIN 349	-	-	518.0	-
51300	Al Mg5	DIN 244	UNI 3058	LM5	-	Al-Mg5
51400	Al Mg5(Si)	DIN 245	-	-	-	Al-Mg5Si1
51500	Al Mg5Si2Mn	-	-	-	-	-
71100	Al Zn10Si8Mg	-	-	-	-	Al-Zn10Si8Mg

Russia - CIS

Chemical composition expressed in percentage

	Si		Fe		Cu		Mn		Mg		Cr		Ni		Zn		Pb		Sn		Ti		Other impurities	
Alloy group	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	*Each*	*Total*
AK4M4	3.0	5.0	-	1.20	3.5	5.0	0.2	0.6	-	0.50	-	-	-	0.50	-	2.00	-	-	-	-	-	-	-	4.00
AK5M2	4.0	6.0	-	1.00	1.5	3.5	0.2	0.8	0.2	0.85	-	-	-	0.50	-	1.50	-	-	-	-	0.05	0.20	-	2.00
AK7M2	6.0	8.0	-	1.10	1.5	3.0	0.2	0.6	0.2	0.6	-	-	-	0.30	-	0.50	-	-	-	-	-	-	-	1.80
AK8M3	7.5	10.0	-	1.30	2.0	4.0	-	0.5	-	0.45	-	-	-	0.05	-	1.20	-	-	-	-	-	-	-	4.1
AK9	8.0	11.0	-	0.80	-	1.0	0.2	0.5	0.25	0.45	-	-	-	0.30	-	0.50	-	-	-	-	-	-	-	2.40

Japan - JIS

Chemical composition expressed in percentage

	Si		Fe		Cu		Mn		Mg		Cr		Ni		Zn		Pb		Sn		Ti		Other impurities	
Alloy group	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	*Each*	*Total*
AC3A	10.0	13.0	-	0.70	-	0.25	-	0.35	-	0.15	-	0.15	-	0.10	-	0.30	-	0.10	-	0.10	-	0.20	-	-
AC4B	7.0	10.0	-	0.80	2.0	4.0	-	0.50	-	-	-	0.20	-	0.35	-	1.00	-	0.20	-	0.10	-	0.20	-	-
AC4C	6.5	7.5	-	0.40	-	0.25	-	0.35	0.25	0.45	-	0.10	-	0.10	-	0.35	-	0.10	-	0.05	-	0.20	-	-
AC2B.1	5.0	7.0	-	0.80	2.0	4.0	-	0.50	-	0.50	-	0.20	-	0.35	-	1.00	-	0.20	-	0.10	-	0.20	-	-
ADC1	11.0	13.0	-	0.90	-	1.00	-	0.30	-	0.30	-	-	-	0.50	-	0.50	-	-	-	0.10	-	-	-	-
ADC3	9.0	10.0	-	0.90	-	0.60	-	0.03	0.4	0.6	-	-	-	0.50	-	0.50	-	-	-	0.10	-	-	-	-
AC4B.1	7.0	10.0	-	0.80	2.0	4.0	-	0.50	-	0.50	-	0.20	-	0.35	-	1.00	-	0.20	-	0.10	-	0.20	-	-
AD14.1	16.0	18.0	0.6	1.0	4.0	5.0	-	0.50	0.50	0.65	-	-	-	0.30	-	1.50	-	0.20	-	0.30	-	0.30	-	-
ADC10	7.5	9.5	-	0.90	2.0	4.0	-	0.50	-	0.30	-	-	-	0.50	-	1.00	-	-	-	0.20	-	-	-	-
ADC12	9.6	12.0	-	0.90	1.5	3.5	-	0.50	-	0.30	-	-	-	0.50	-	1.00	-	-	-	0.20	-	-	-	-
ADC10Z	7.5	9.5	-	0.90	2.0	4.0	-	0.50	-	0.30	-	-	-	0.50	-	3.00	-	-	-	0.20	-	-	-	-
ADC12Z	9.6	12.0	-	0.90	1.5	3.5	-	0.50	-	0.30	-	-	-	0.50	-	3.00	-	-	-	0.20	-	-	-	-

USA - AA

Chemical composition expressed in percentage

	Si		Fe		Cu		Mn		Mg		Cr		Ni		Zn		Sn		Ti		Sr		Other impurities	
Alloy group	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	*Each*	*Total*
356.1	6,5	7,5	-	0,5	-	0,25	-	0,35	0,25	0,45	-	-	-	0,35	-	-	-	0,25	-	-	-	-	-	0,15
356.2	6,5	7,5	-	0,15	-	0,10	-	0,05	0,25	0,45	-	0,05	-	0,05	-	0,10	-	0,05	-	0,2	-	0,05	0,05	0,15
360.1	9,0	10,0	-	1,00	-	0,6	-	0,35	0,45	0,6	-	-	-	0,50	-	0,40	-	0,15	-	-	-	-	-	0,15
365	9,5	11,5	-	0,20	-	0,03	0,30	0,80	0,25	0,35	-	0,02	-	0,03	-	0,07	-	0,03	0,02	0,15	0,01	0,02	0,03	0,10
380.1	7,5	9,5	-	1	3,0	4,0	-	0,5	-	0,1	-	-	-	0,5	-	2,9	-	0,35	-	-	-	-	-	0,5
383.1	9,5	11,5	-	1	2,0	3,0	-	0,5	-	0,10	-	-	-	0,3	-	2,9	-	0,15	-	-	-	-	-	0,5
413.1	11,0	13,0	-	1	-	1	-	0,35	-	0,1	-	-	-	0,5	-	0,4	-	0,15	-	-	-	-	-	0,1
413.2	11,0	13,0	-	0,6	-	0,1	-	0,05	-	0,05	-	-	-	0,05	-	0,05	-	0,05	-	-	-	-	-	0,1

United Kingdom - ENGLISH BS

Chemical composition expressed in percentage

	Si		Fe		Cu		Mn		Mg		Cr		Ni		Zn		Pb		Sn		Ti		Other impurities	
Alloy group	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	*Each*	*Total*
LM 2	9.0	11.5	-	1.00	0.7	2.5	-	0.5	-	0.3	-	-	-	0.50	-	2.0	-	0.30	-	0.20	-	0.20	-	0.50
LM 4	4.0	6.0	-	0.8	2.0	4.0	0.2	0.6	-	0.2	-	-	-	0.30	-	0.5	-	0.10	-	0.10	-	0.20	0.05	0.15
LM 5	-	0.3	-	0.6	-	0.1	0.3	0.7	3.0	6.0	-	-	-	0.1	-	0.1	-	0.05	-	0.05	-	0.2	0.05	0.15
LM 6	10	13.0	-	0.6	-	0.10	-	0.5	-	0.1	-	-	-	0.1	-	0.10	-	0.1	-	0.05	-	0.20	0.05	0.15
LM 9	10	13.0	-	0.6	-	0.2	0.3	0.7	0.2	0.6	-	-	-	0.1	-	0.10	-	0.1	-	0.05	-	0.20	0.05	0.15
LM 16	4.5	5.5	-	0.6	1.0	1.5	-	0.5	0.4	0.6	-	-	-	0.25	-	0.1	-	0.10	-	0.05	-	0.20	0.05	0.15
LM 20	10	13.0	-	1	-	0.40	-	0.5	-	0.2	-	-	-	0.1	-	0.20	-	0.1	-	0.1	-	0.20	0.05	0.2
LM 21	5.0	7.0	-	1	3.0	5.0	0.2	0.6	0.1	0.3	-	-	-	0.3	-	2.00	-	0.2	-	0.1	-	0.20	0.05	0.15
LM 22	4.0	6.0	-	0.6	2.8	3.8	0.2	0.6	-	0.05	-	-	-	0.15	-	0.15	-	0.1	-	0.05	-	0.20	0.05	0.15
LM 24	7.5	9.5	-	1.3	3.0	4.0	-	0.5	-	0.3	-	-	-	0.5	-	3.00	-	0.3	-	0.2	-	0.20	-	0.5
LM 25	6.5	7.5	-	0.50	-	0.2	-	0.30	0.2	0.6	-	-	-	0.1	-	0.1	-	0.1	-	0.05	-	0.2	0.05	0.15

Turkey - ETIAL

Chemical composition expressed in percentage

	Si		Fe		Cu		Mn		Mg		Cr		Ni		Zn		Pb		Sn		Ti		Other impurities	
Alloy group	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	*Each*	*Total*
ETIAL-140	11.50	13.50	-	0.6	-	0.1	-	0.4	-	0.1	-	-	-	0.1	-	0.1	-	0.1	-	0.05	-	0.15	-	-
ETIAL-141	11.50	13.50	-	1	-	0.2	-	0.3	-	0.2	-	-	-	0.1	-	0.1	-	0.1	-	0.05	-	0.15	-	-
ETIAL-150	11.00	13.00	-	1	1.75	2.50	-	0.5	-	0.4	-	-	-	0.3	-	0.7	-	0.1	-	0.1	-	0.15	-	-
ETIAL-160	7.5	9.00	-	1	3.00	4.00	-	0.5	-	0.3	-	-	-	0.2	-	1	-	0.1	-	0.1	-	0.2	-	-
ETIAL-171	9.00	10.00	-	0.5	-	0.1	0.40	0.60	0.30	0.45	-	-	-	0.1	-	0.1	-	0.05	-	0.05	-	0.15	-	-
ETIAL-180	9.00	11.50	-	1	0.7	2.50	-	0.50	-	0.3	-	-	-	0.5	-	2	-	0.1	-	0.2	-	0.2	-	-

SILVAL: MAIN PRIMARY-GRADE ALUMINIUM ALLOYS FROM RECYCLING

Alloy name		Chemical composition (%)																	
Numerical name	Chemical symbols	Si		Fe		Cu		Mn		Mg		Zn		Ti	Sr	Other		% Recycling on total alloy	Carbon footprint (Cradle to Gate) kg CO_2eq/kg Al
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Max	Max	Sing.	Tot.		
EN AB 42100	AlSi7Mg0,3	6,5	7,5	-	0,15	-	0,03	-	0,10	0,30	0,45	-	0,07	0,18	optional	0,03	0,10	**70**	**3,10**
EN AB 42200	AlSi7Mg0,6	6,5	7,5	-	0,15	-	0,03	-	0,10	0,50	0,70	-	0,07	0,18	-	0,03	0,10	**70**	**3,15**
EN AB 42400	AlSi7MnMg	6,5	8,5	-	0,20	-	0,03	0,35	0,75	0,15	0,45	-	0,03	0,15	optional	0,05	0,15	**78**	**2,51**
EN AB 43300	AlSi9Mg	9,0	10,0	-	0,15	-	0,03	-	0,10	0,25	0,45	-	0,07	0,15	-	0,03	0,10	**68**	**3,42**
EN AB 43500	AlSi10MnMg	9,0	11,5	-	0,20	-	0,03	0,40	0,80	0,15	0,60	-	0,07	0,15	optional	0,05	0,15	**75**	**2,81**
EN AB 44000	AlSi11	10,0	11,8	-	0,15	-	0,03	-	0,10	-	0,45	-	0,07	0,15	-	0,03	0,10	**67**	**3,43**
EN AB 45500	AlSi7Cu0,5Mg	6,5	7,5	-	0,25	0,2	0,7	-	0,15	0,25	0,45	-	0,07	0,20	optional	0,03	0,10	**95**	**1,19**
EN AB 51100	AlMg3	-	0,45	-	0,40	-	0,03	-	0,45	2,7	3,5	-	0,10	0,15	-	0,05	0,15	**96**	**1,81**
EN AB71100	AlZn10Si8Mg	7,5	9,5	-	0,40	-	0,08	-	0,45	0,25	0,50	9,0	10,5	0,15	-	0,05	0,15	**81**	**1,86**
SILVAL 7	AlSi7Mg0,3	6,5	7,5	-	0,23	-	0,05	0,10	0,15	0,25	0,40	-	0,05	0,15	optional	0,02	0,05	**97**	**1,02**
SILVAL 10	AlSi10MnMg	9,5	11,0	-	0,35	-	0,05	0,40	0,55	0,25	0,35	-	0,10	0,15	optional	0,05	0,15	**89**	**2,14**

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