

Coproduct Catalog

Turning waste into value for
your business.

Sumário

Calcium Carbonate



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Smelter Waste Storage Facility

1. Introduction

Transformation is at the heart of CBA. Throughout our operating history, we have turned bauxite—one of the most abundant minerals on Earth—into innovative solutions that enhance the sustainability of our customers' products and create value for people.

We are constantly working to deliver low-carbon aluminum to the market and to co-create new approaches that increase aluminum circularity by recycling and resupplying the metal to the market. This is the circular economy in action!

We've launched a new approach to how we manage waste. We identify waste impacts across our operations and design optimal disposal routes, recognizing that together we can turn this waste into value for your business: by lowering your company's costs, increasing your revenue, and helping to generate positive environmental impacts.

That's why we've put together this catalog, so you can explore all the valuable coproducts available by CBA. These materials are generated during the manufacture of our main product and meet the quality and performance standards needed to support your production process with excellence.

Browse through the catalog, identify opportunities, and count on our experts to develop customized collaborations that can improve your profits.

Aurelio Vaz
Potroom Operator – Aluminum Plant (SP)

2. Coproduct Management

CBA has a high-caliber, multidisciplinary team managing coproducts, comprising professionals from the Environment, Procurement, Engineering, and Technology departments. Coproduct-related activities follow a strategy based on six pillars:

- ✓ Role and responsibility management
- ✓ Decision-making
- ✓ Suppliers and customers
- ✓ Indicators, systems, and infrastructure
- ✓ Expansion of marketable coproduct portfolio
- ✓ Opportunity prospecting

Our goal is to optimize co-product utilization, value and positive impact in industry through both internal initiatives and strategic partnerships.

This is how we build the best solutions on the market, delivering products that meet each partner's specifications.

3. Aluminum Plant

3.1 Alumina Refinery

In the refinery, bauxite is blended to achieve desired physical and chemical properties. The first production step is extracting the aluminum oxide from bauxite through chemical reactions with alkaline solutions under high pressure and temperature, in what is known as the Bayer process.



Dienefer Goncalves Parlandino
Potroom Operator

This process generates the following coproducts with potential market applications:





Bauxite Residue

Bauxite residue is generated at an average rate of 56,000 metric tons per month and is primarily composed of aluminum oxide, iron, and silicon, as shown in the table below:

Substance	Concentration (mg/kg)
Iron	153.000,00
Aluminum	74.500,00
Potassium	57.400,00
Silicon	55.200,00
Sodium	37.600,00

	Concentration (%w/w)
Iron Oxide	35,60
Aluminum Oxide	18,00
Silicon Oxide	15,10
Sodium Oxide	8,40

Density	2,6 g/cm³
pH	12,10
Moisture (% w/w)	<25
Classification	Non-hazardous



Calcium Carbonate

Calcium carbonate is classified as non-hazardous and is generated at a rate of approximately 2,300 metric tons per month. This coproduct contains about 86% calcium carbonate.

Substance	Composition (%)
Calcium Oxide	86,50
Aluminum Oxide	5,80
Iron Oxide	2,40
Silicon Oxide	1,90
Sodium Oxide	1,50

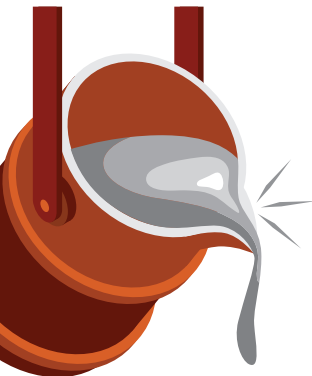
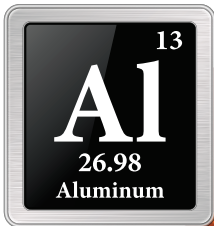
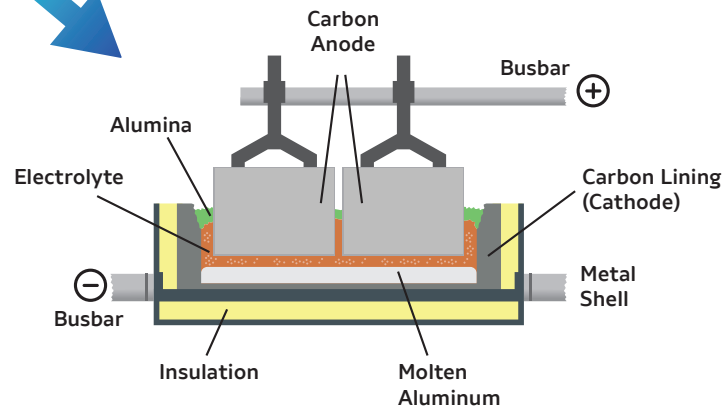
Density	2,30 g/cm³
pH	12,10
Moisture (% w/w)	31
Classification	Non-hazardous

3.2 Smelters

The alumina produced at the refinery is transported in silo trucks to smelting facilities. In what is referred to as a potline, the alumina is added into Soderberg cells, or “pots”, along with anode paste (a mix of coal-tar pitch and petroleum coke), aluminum fluoride and electrolyte bath.

Electrolytic reduction in Soderberg cells transforms the alumina into molten aluminum, which is then carried in trucks to different departments at the Casthouse.

Al_2O_3
Alumina



Calcined
alumina
smelting
into molten
aluminum

Smelter Refractories

Refractories from the reduction pots are generated at an average rate of 600 metric tons per month and are classified as non-hazardous. Their main components are silicon, fluoride, potassium, and sodium, as shown in the table below:

Substance		Concentration (mg/kg)	
Silicon		364,52	
Fluoride		292,77	
Potassium		264,86	
Sodium		188,30	
Aluminum		5,508	
Iron		0,3937	
		Concentration (% w/w)	
Silicon Oxide		37,00	
Moisture		12,10	
Sodium Oxide		9,08	
Aluminum Oxide		8,72	

LHV

235 Kcal/kg

pH

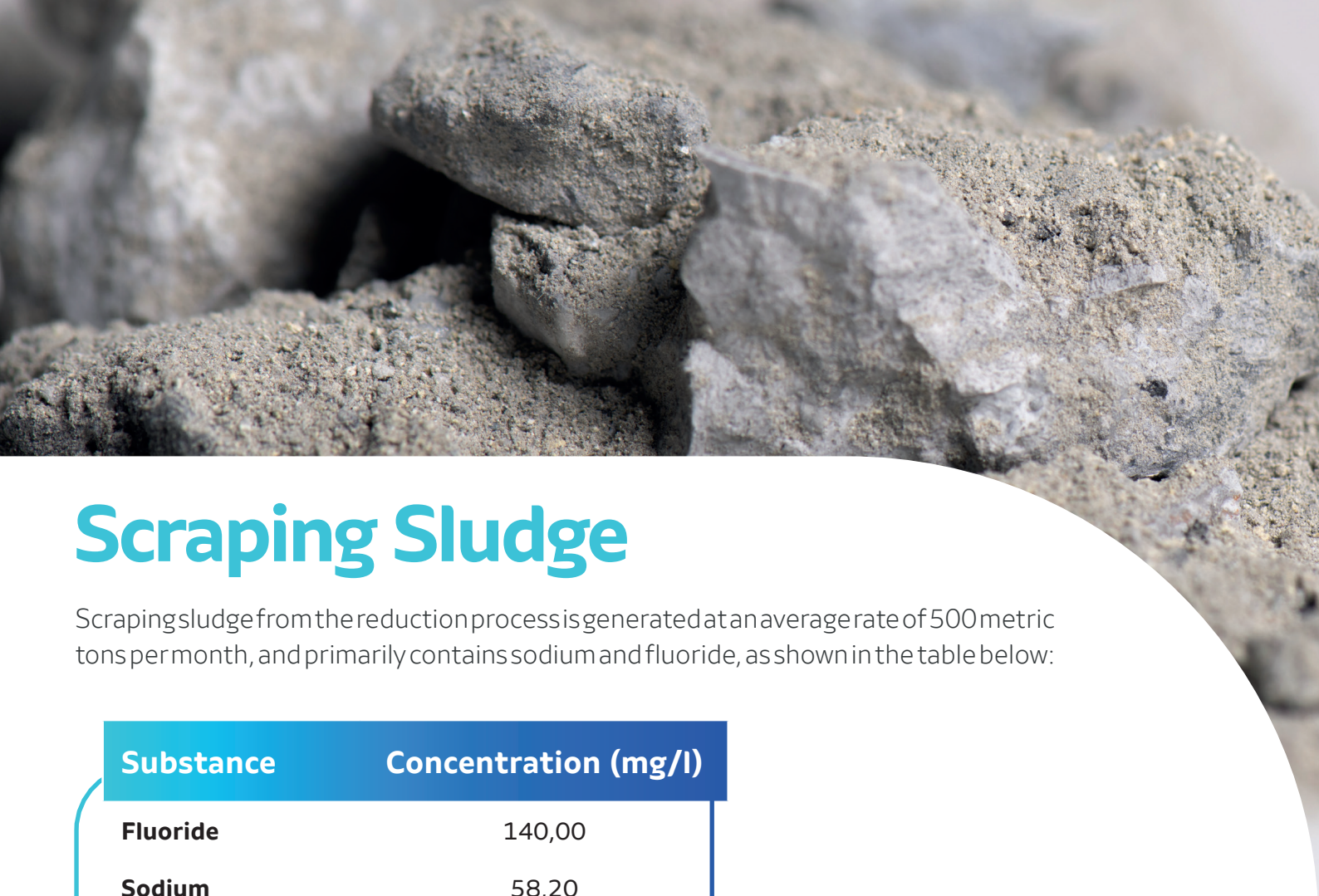
6,23

Classification

Non-hazardous

This process generates the following coproducts with potential market applications:



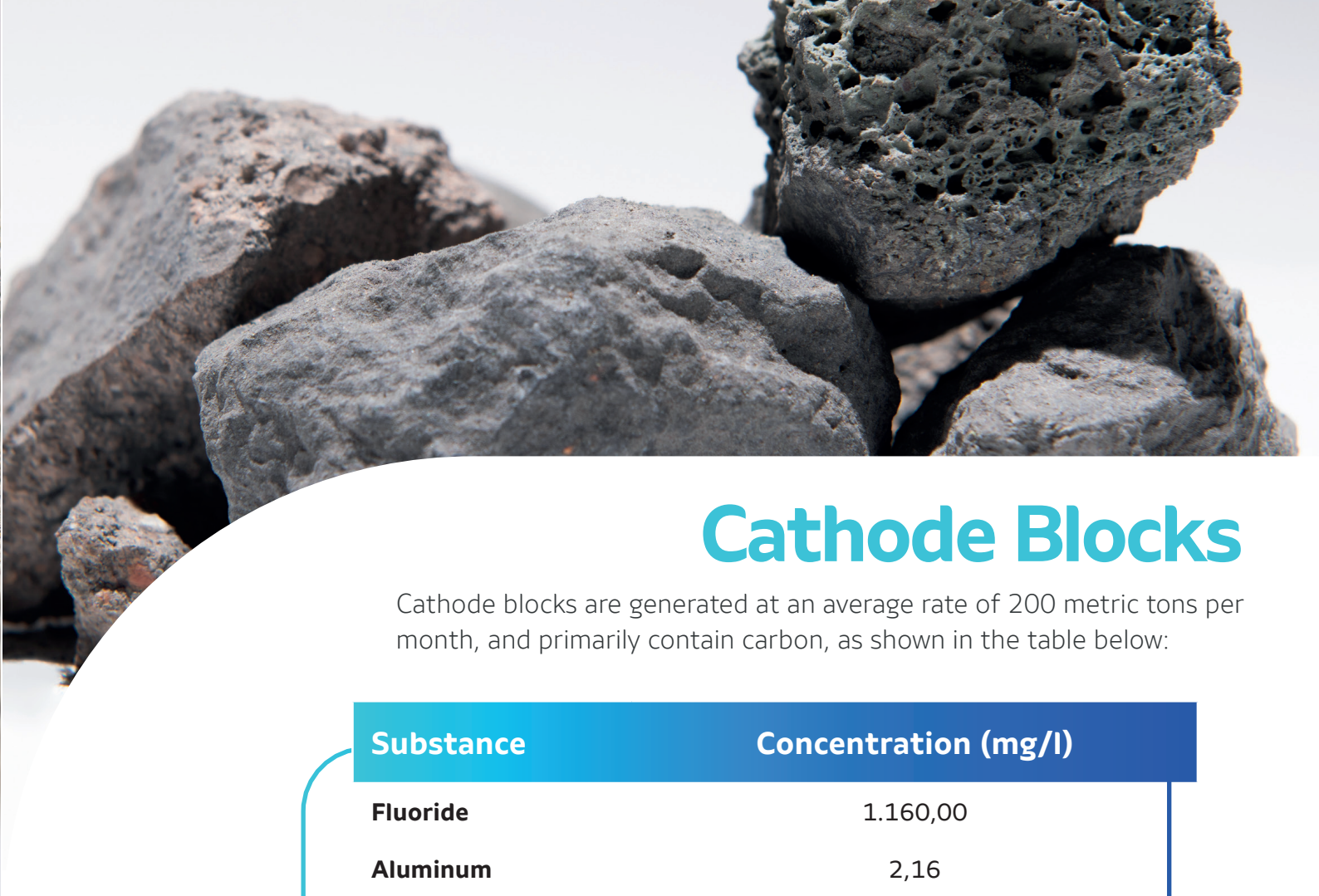


Scraping Sludge

Scrapingsludge from the reduction process is generated at an average rate of 500 metric tons per month, and primarily contains sodium and fluoride, as shown in the table below:

Substance	Concentration (mg/l)
Fluoride	140,00
Sodium	58,20
Aluminum	9,25
Iron	0,26
Concentration (%w/w)	
Aluminum Oxide	53,00
Sodium Oxide	20,00
Silicon Oxide	0,07

pH	5,97
Classification	Non-hazardous



Cathode Blocks

Cathode blocks are generated at an average rate of 200 metric tons per month, and primarily contain carbon, as shown in the table below:

Substance	Concentration (mg/l)
Fluoride	1.160,00
Aluminum	2,16
Iron	0,08
Composição %	
Carbon	66,90
Fluorine	16,40
Sodium Oxide	10,80
Hydrogen	0,80

LHV	5.828 Kcal/kg
pH	10,23
Classification	Non-hazardous



Anode Scrap

Anode scrap is generated at an average rate of 140 metric tons per month, and primarily consists of carbon, as shown in the table below:

Substance		Composition %
Carbon		85,00
Sulfur Dioxide		10,00
Aluminum Oxide		3,00

pH	5,80
Classification	Non-hazardous



Secondary Alumina

Secondary alumina is generated at an average rate of 600 metric tons per month, and is primarily composed of aluminum, as shown in the table below:

Substance		Concentration (mg/kg)
Aluminum		262.000,00
Sodium		42.900,00
Calcium		3.100,00
Iron		2.280,00
Fluoride		1.170,00
Silicon		657,00

		Concentration (% w/w)
Aluminum Oxide		59,60

Moisture	30,00
pH	7,50
Classification	Non-hazardous

Refractory Fines

Refractory fines are generated at an average rate of 300 metric tons per month, and primarily consist of sodium and silicon, as shown in the table below:

Substance	Concentration (mg/kg)
Silicon	35.000,00
Sodium	23.600,00
Iron	12.600,00
Fluorine	11.900,00
Aluminum	4.160,00
Fluorine	3.140,00
Potassium	2.090,00
Concentration % p/p	
Aluminum Oxide	41,20
Silicon Oxide	8,53
Sodium Oxide	3,63

Classification Non-hazardous

Fines + ASN1 Blend

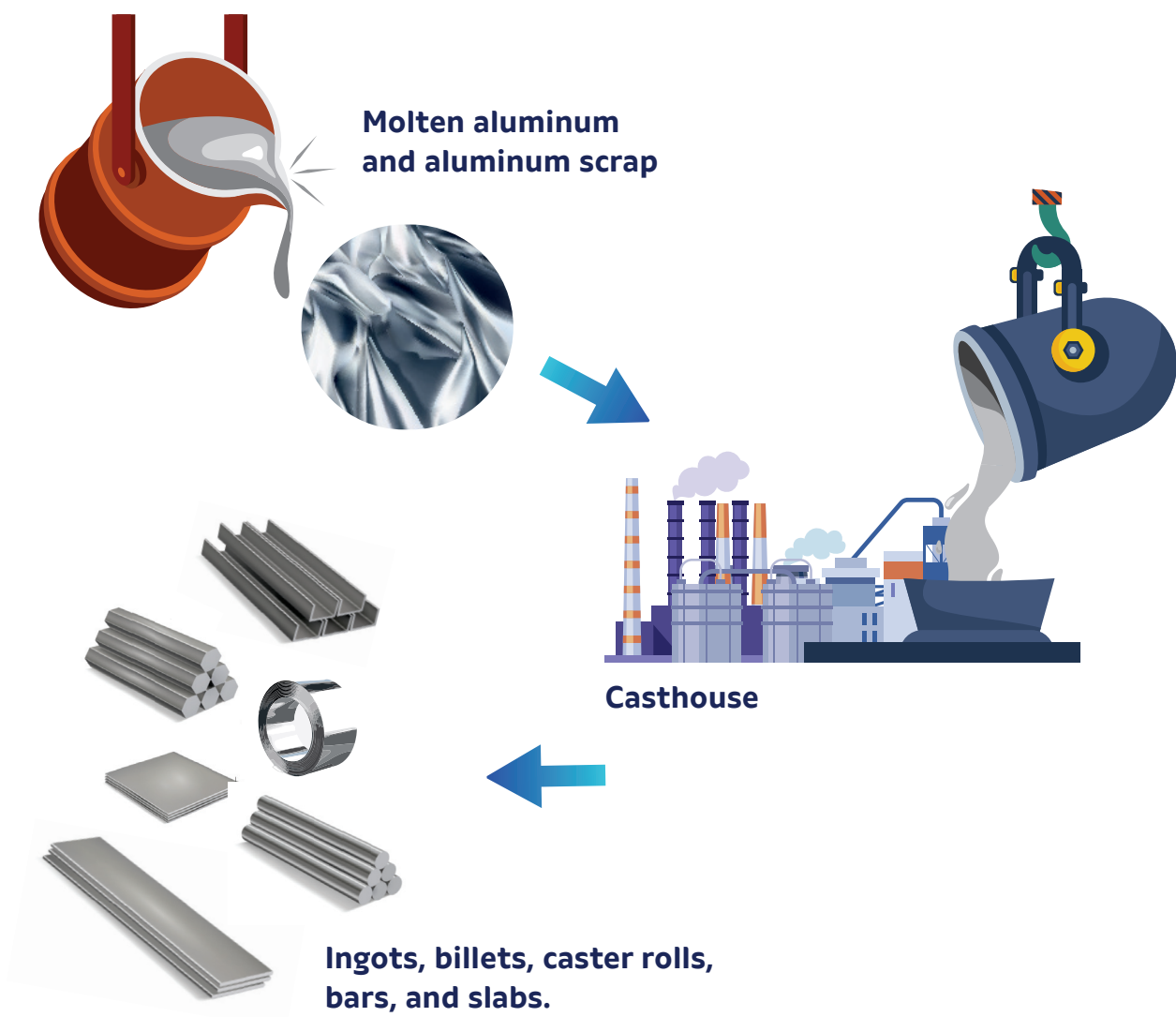
Os Blend de finos + ASN1 é uma composição da Alumina Secundaria com os Finos de Refratários. Desenvolvemos esse coproduto para atender às cimenteiras pois o resíduo contém características capazes de substituir as matérias-primas do processo. Esse coproduto tem a geração mensal aproximada de 600 toneladas, e suas principais características são alumínio e silício, conforme tabela abaixo:

Substância	Concentração mg/kg
Aluminum	174.000,00
Silicon	52.400,00
Iron	7.100,00
Calcium	3.930,00
Fluoride	3.140,00
Potassium	1.060,00
Fluorine	217,00
Concentration (% w/w)	
Aluminum Oxide	41,20
Silicon Oxide	14,00
Sodium Oxide	8,62

pH 10,37
Moisture (% w/w) 20,00
Classification Non-hazardous

3.3 Foundry

The molten aluminum is fed into the Casthouse furnaces, along with master alloys and scrap. Next, the product is cast into ingots, billets, slabs, caster rolls, and bars.



This process generates the following coproducts with potential market applications:



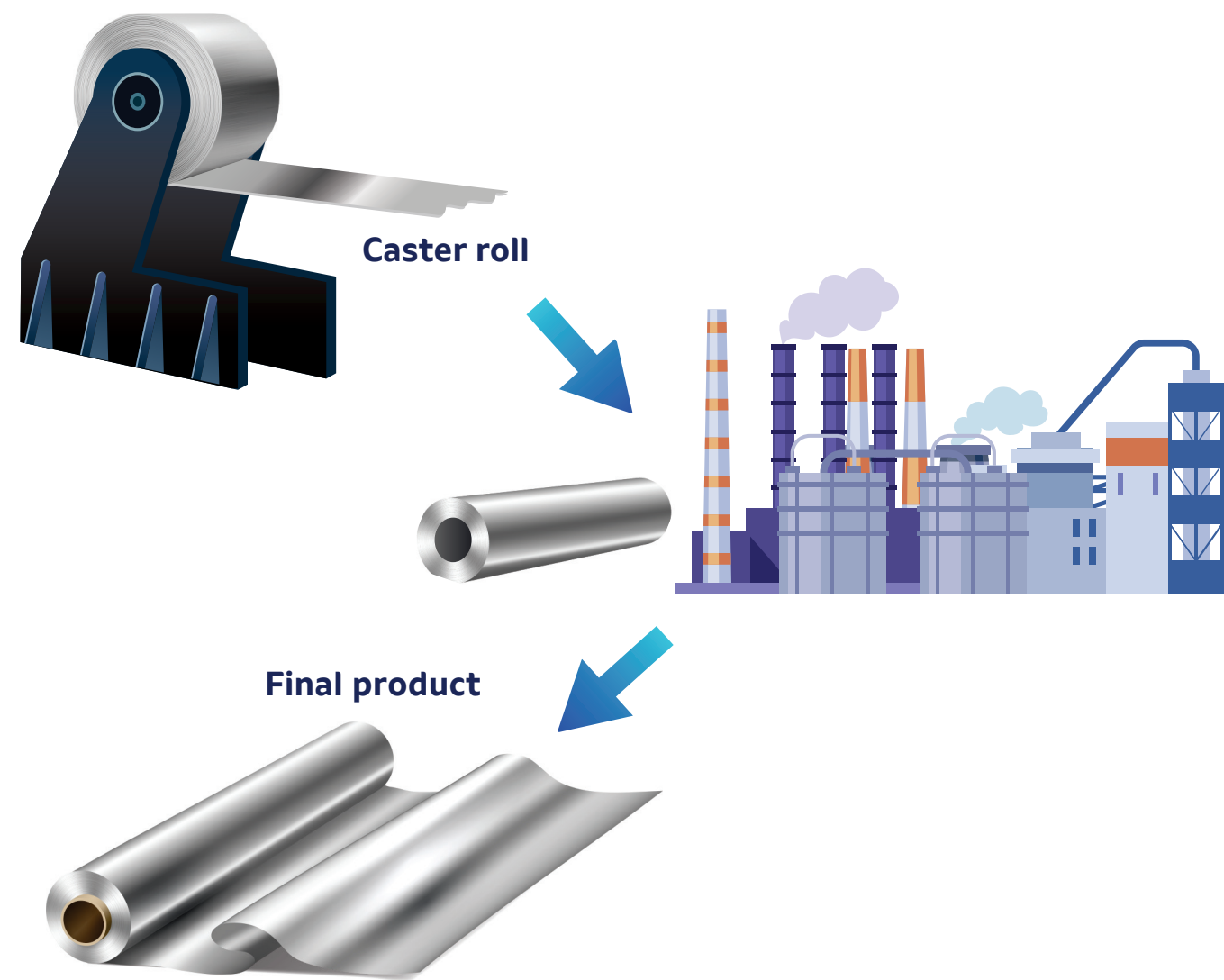
Primary Dross

Aluminum dross is generated at an average rate of 1,000 metric tons per month, and primarily consists of aluminum and sodium, as shown in the table below:

Substance	Concentration mg/kg		
Aluminum	255.000,00	pH	12,16
Iron	20.800,00	Moisture	1,00
Sodium	17.100,00	Classification	Non-hazardous
Fluoride	8.170,00		
Potassium	4.380,00		
Silicon	1.080,00		
		Concentration (% w/w)	
Aluminum Oxide	48,70		
Sodium Oxide	2,32		
Silicon Oxide	0,233		

3.4 Downstream

In the Downstream process, primary products (billets, caster coils, and slabs) undergo rolling, extrusion, and surface treatment processes. When necessary, products are custom-made for specific sector applications. Downstream products include sheet, foils, roof panels, and extruded profiles.



This process generates the following coproduct with potential market applications:



Cellulose Additive

Cellulose Additive is generated at a rate of approximately 100 metric tons per month, and primarily contains aluminum, as shown in the table below:

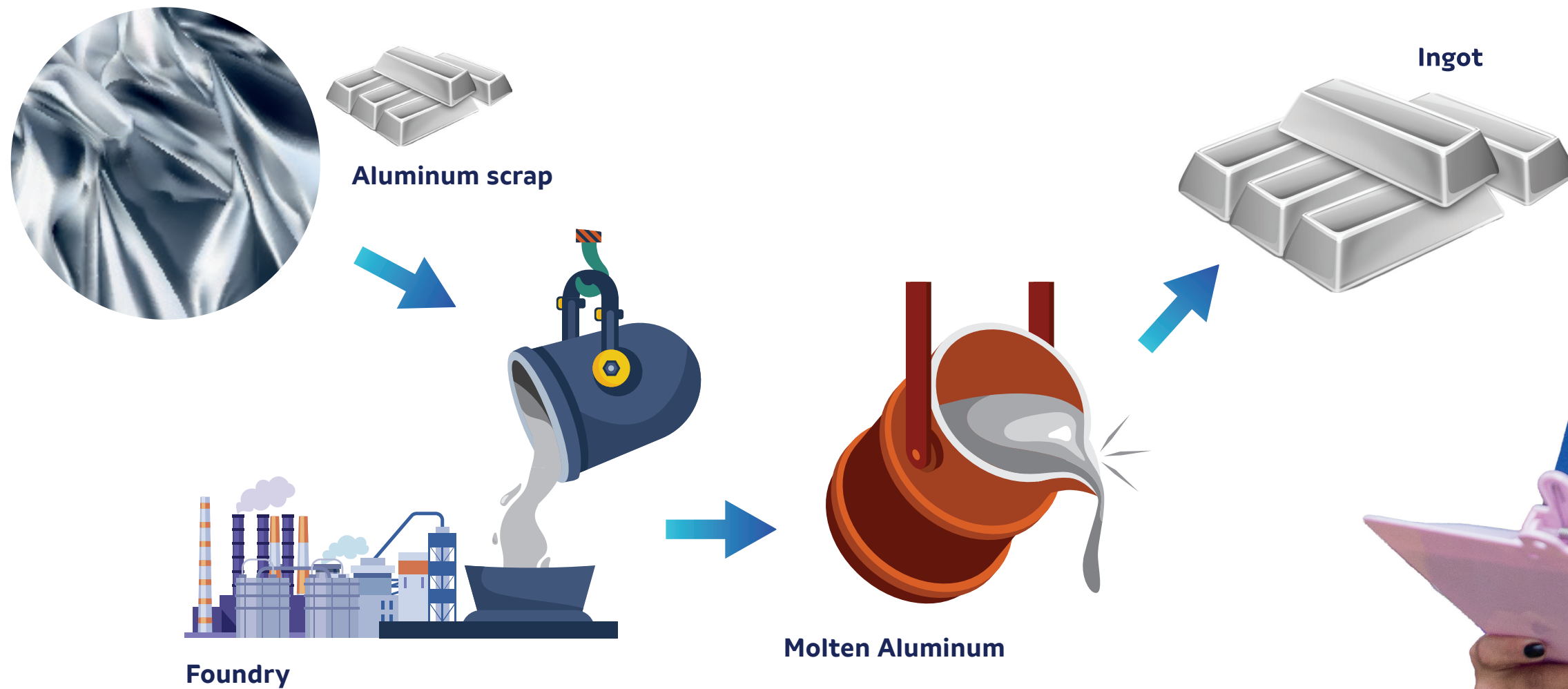
Substance	Concentration mg/L
Aluminum	2.500,00
Sodium	66,10
Composition %	
Aluminum Oxide	87,00
Silicon Dioxide	3,40
Calcium Oxide	1,50

pH	2,60
LHV (Kcal/kg)	56,20
Classification	Non-hazardous

4. Alux

Alux is a foundry located in Nova Odessa/SP, where we produce secondary alloy ingots.

The main process residues are black dross, furnace refractories, and dust from the baghouse filtration system, with the properties shown in the following tables:



Barbara Caroline Oliveira Ferreira
Production Supervisor | Alux (SP)





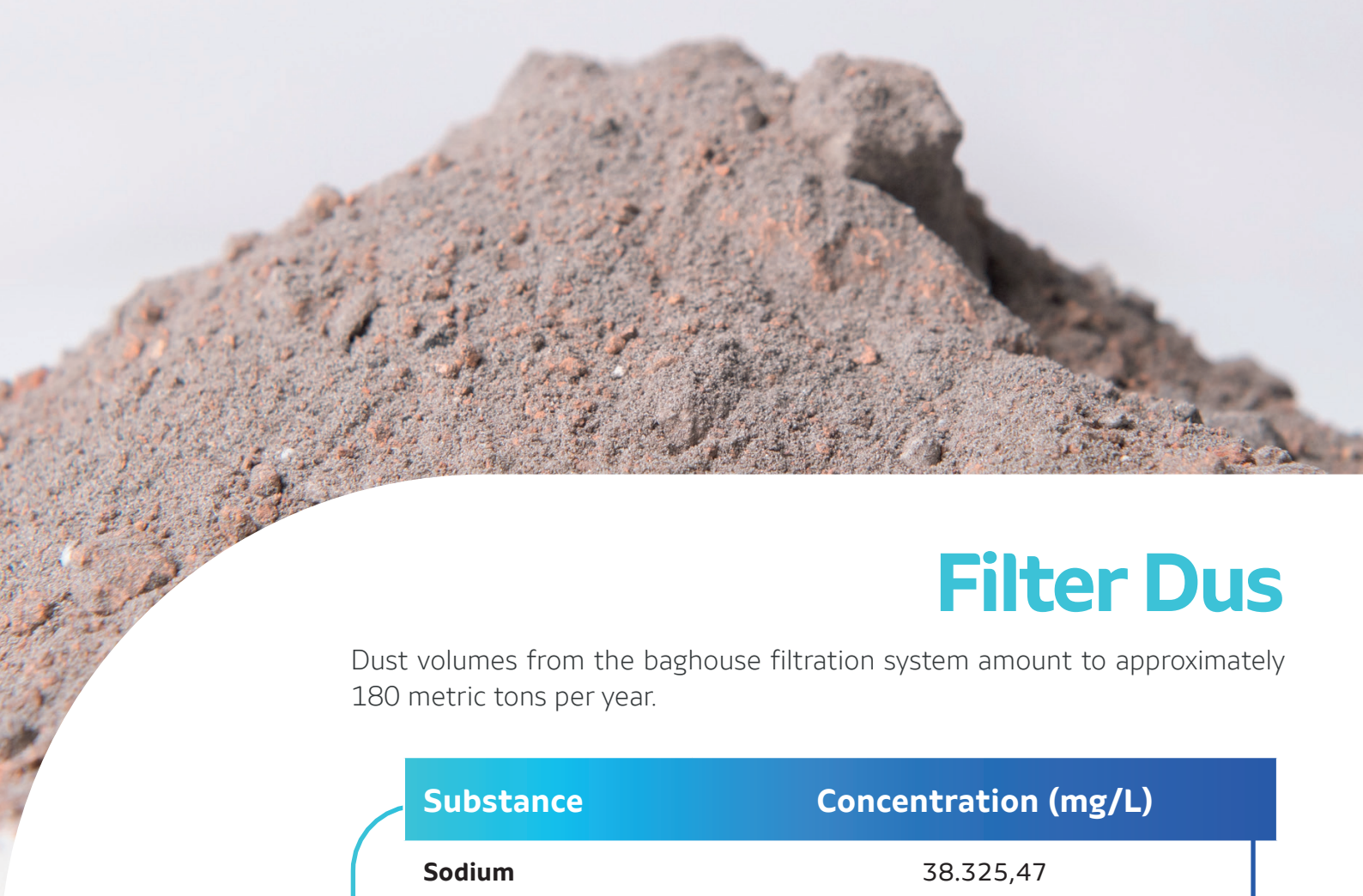
Smelter Refractories

Alux generates approximately 100 metric tons of refractories per year. This amount may vary depending on the furnace maintenance schedule.

Substance	Concentration (mg/kg)
Silicon	364,52
Potassium	264,86
Sodium	188,30
Aluminum	5,508
Iron	0,3937

Concentração % p/p	
Silicon Oxide	37,00
Sodium Oxide	9,08
Aluminum Oxide	8,72

LHV	235 Kcal/kg
Moisture	12,10
pH	6,23
Classification	Non-hazardous



Filter Dus

Dust volumes from the baghouse filtration system amount to approximately 180 metric tons per year.

Substance	Concentration (mg/L)
Sodium	38.325,47
Aluminum	26,26
Fluoride	6,79
Iron	0,05

pH	9,50
Moisture (% p/p)	0,40
Classification	Non-hazardous



Foundry Dross

Foundry dross consists of metals and salts used in the process as a protective/fluxing layer during the melting of metal scrap in rotary furnaces. Black dross volumes amount to approximately 6,300 metric tons per year.

Substance	Concentration (mg/kg)
Aluminum	29,62
Fluoride	11,40
Sodium	< 0,0600
Iron	0,0528

Concentration (% w/w)	
Aluminum Oxide	335.000,00
Sodium Oxide	143.000,00
Potassium Oxide	54.900,00
Silicon Oxide	1.930,00

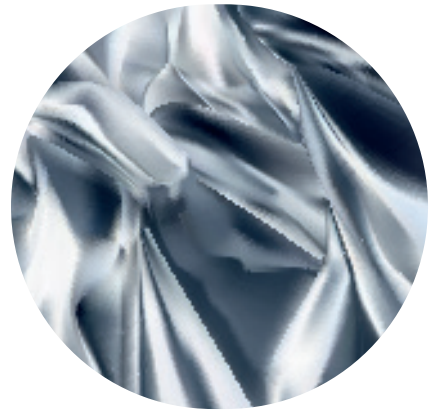
pH	8,84
Density	<0,1



Ingots (SP)

5. Metalex

Metalex (SP) is a foundry facility dedicated to the production of secondary billets with a higher scrap content. The main residues generated at Metalex are furnace refractories and aluminum dross.



Aluminum scrap



Foundry



Billet



Jaqueline Sabino
Production Operator – Metalex (SP)



Smelter Refractories

Metalex generates approximately 150 metric tons of refractories per year.

Substance	Concentration (mg/kg)	
Silicon	364,52	
Fluoride	292,77	
Potassium	264,86	
Sodium	188,30	
Aluminum	5,508	
Iron	0,3937	
Concentration (% w/w)		
Silicon Oxide	37,00	
Sodium Oxide	9,08	
Aluminum Oxide	8,72	

LHV	235 Kcal/kg
Moisture	12,10
pH	6,23
Classification	Non-hazardous



Primary Dross

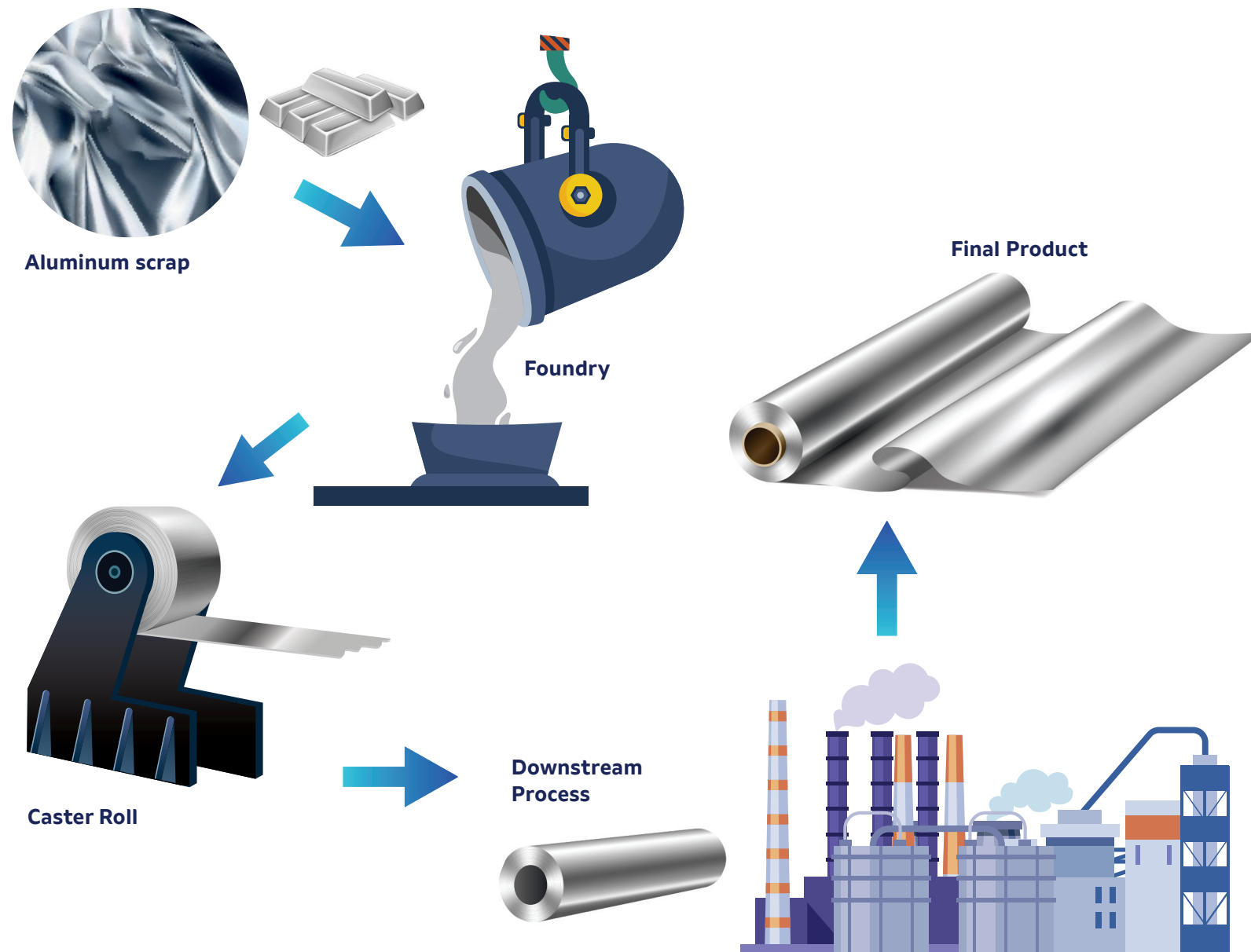
Dross is generated at an average rate of 4,500 metric tons per year.

Substance	Concentration (mg/kg)	
Aluminum	255.000,00	
Iron	20.800,00	
Sodium	17.100,00	
Fluoride	8.170,00	
Potassium	4.380,00	
Silicon	1.080,00	
Fluorine	< 100	
Concentration (% w/w)		
Aluminum Oxide	48,70	
Sodium Oxide	2,32	
Silicon Oxide	0,233	

pH	12,16
Umidade	1,00
Classificação:	Non-hazardous

6. Itapissuma

The Itapissuma mill is divided into two processes: downstream and foundry. The inputs used in this process are aluminum slabs and caster rolls. The main coproducts generated at this facility are arbocel and furnace refractories.





Primary Dross

Aluminum dross is generated at an average rate of 200 metric tons per month, and primarily consists of aluminum and sodium, as shown in the table below:

Substance	Concentration (mg/kg)		
Aluminum	255.000,00	pH	12,16
Iron	20.800,00	Classification	Non-hazardous
Sodium	17.100,00	Moisture	1,00
Fluoride	8.170,00		
Potassium	4.380,00		
Silicon	1.080,00		
Fluorine	< 100		
Concentration (% w/w)			
Aluminum Oxide	48,70		
Sodium Oxide	2,32		
Silicon Oxide	0,233		



Cellulose Additive

Cellulose Additive is generated at a rate of approximately 100 metric tons per month, and primarily contains aluminum, as shown in the table below:

Substance		Concentration (mg/L)
Aluminum		2.500,00
Sodium		66,10
		Composition %
Aluminum Oxide		87,00
Silicon Dioxide		3,40
Calcium Oxide		1,50

pH	2,60
LHV (Kcal/kg)	5.620,00
Classification	Non-hazardous



Smelter Refractories

Furnace refractories are generated in an approximate amount of 100 metric tons per year.

Substance		Concentration (mg/kg)	
Silicon		364,52	
Fluoride		292,77	
Potassium		264,86	
Sodium		188,30	
Aluminum		5,508	
Iron		0,3937	
		Concentration (% w/w)	
Silicon Oxide		37,00	
Sodium Oxide		9,08	
Oxide Aluminum		8,72	

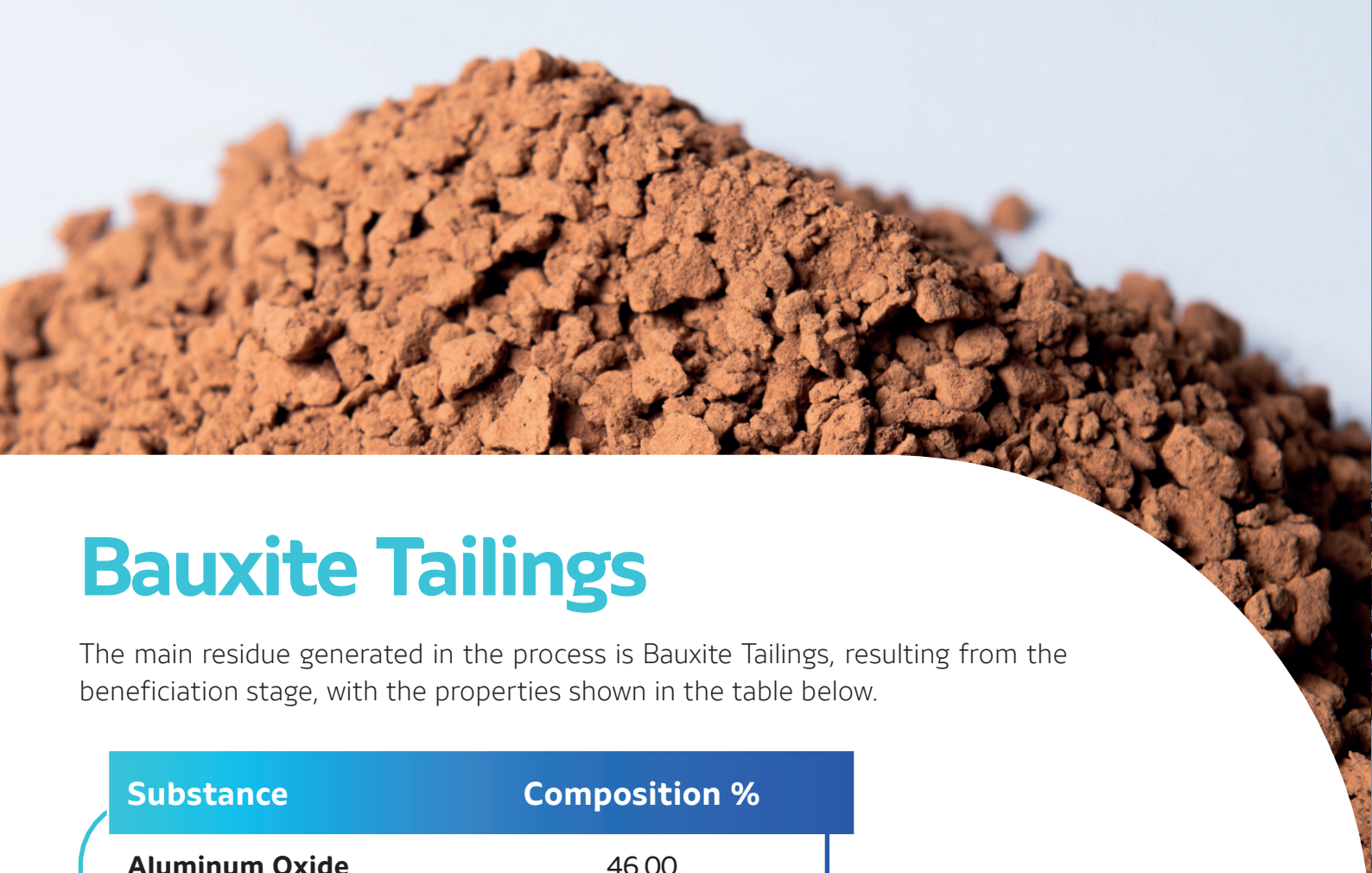
LHV	235 Kcal/kg
pH	6,23
Classification	Non-hazardous
Moisture	12,10



7. Mining

Bauxite is mined using CBA's Sustainable Mining process, which reclaims the mined land to its previous use with environmental and productivity benefits. After beneficiation, the bauxite is transported by road and rail to the plant in Alumínio (SP).





Bauxite Tailings

The main residue generated in the process is Bauxite Tailings, resulting from the beneficiation stage, with the properties shown in the table below.

Substance	Composition %
Aluminum Oxide	46,00
Iron Oxide	28,00
Silicon Oxide	21,00

Moisture (% w/w)	15,00
pH	5,30
Classification	Non-hazardous

The main markets for this residue are: bricks, paving, and other products currently undergoing testing and analyses.





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