# Befesa Aluminio, S.L.

# Les Franqueses del Vallés plant

**Befesa Aluminio, S.L.**
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This document contains the environmental declaration of Befesa Aluminio, S.L. – Les Franqueses del Vallés plant for 2016. It has been drawn up as per environmental management standard ISO 14001:2004 and regulation (EC) 1221/2009 on the European Eco-Management & Audit Scheme (EMAS).

**Contents**

# 1. EMAS registration

## 1.1 Regulation (EC) nº 1221/2009

Regulation nº 1221/2009 on the EMAS (Eco-Management and Audit Scheme) enables organisations to sign up voluntarily to a community environmental management and audit system.

This regulation envisages three main undertakings:

- Internal control of environmental impacts of processes and registration under the basic assumption of compliance with the environmental legislation applicable.
- Continual reduction in impacts, defining, publishing and meeting goals and targets and monitoring results via regular environmental audits.
- Full transparency with regard to society and institutions.

## 1.2 Environmental declaration

This is the core element of the system, since it means making the company's environmental data available to society:

- Consumption of raw materials, water, electricity and fuel; emissions, effluents, waste, etc.
- Corporate environmental policy for assuring compliance with applicable regulations and a commitment to continuous improvement based on quantifiable targets and the prevention of pollution.

- Validation of system audits and certification of compliance with the said Regulation by an accredited certification organisation.

In short, it means telling society what we do, providing key data and assuring that we comply with environmental requirements.

### 1.3 Befesa Aluminio, S.L. as a member of the system

Befesa Aluminio, S.L. with NACE Code 2453 (casting of light metals) joined the system voluntarily as a way of demonstrating to society that it is committed to the environment in its day-to-day operations. Those operations comprise the following:

"Solid and liquid aluminium alloys production. Aluminium waste treatments. Trading of by-products of aluminium and other non-ferric metals".

## 2. The company's activities, products and services

Befesa Aluminio, S.L. comprises 4 internationally renowned plants in Erandio (Bizkaia), Les Franqueses del Vallés (Barcelona), Bernburg (Germany) and Valladolid. The first three ones are aluminium refineries and the fourth one a salt slag recovery company. All these plants work in the eco-industry sector, recycling, recovering and valorising aluminium industry waste of all types. The total recycling process operated enables the free metal to be recovered from all the materials processed, along with the oxide always found with it. This provides an important alternative to primary aluminium (which takes a great deal of energy to obtain) and an endless source of metals that do not need to be mined, thus helping slow the depletion of the earth's natural resources.

Operations at Befesa Aluminio, S.L. are an essential step in the life-cycle of aluminium. Operations at primary aluminium production, processing and finishing plants and aluminium foundries in general would be unviable without firms such as Befesa Aluminio, S.L. to treat, recover and recycle the waste that they produce. Befesa Aluminio, S.L. turns that waste into usable raw materials. From the outset, it has focused on producing aluminium alloys to a wide range of specifications for the injection moulding of parts for the automotive industry, domestic appliances and construction.

All this has made Befesa Aluminio, S.L. the leading company in its field in Spain and one of the biggest in Europe. The company's links with world-renowned corporations and groups and its use of the knowledge that it has acquired has

helped it to secure suppliers and customers all over the world, including automotive manufacturers and the foundries that act as their suppliers.

## 3. Environmental management system

Our EMS comprises the following:

- Environment policy: this formally describes the guidelines and targets of Befesa Aluminio, S.L. in regard to the environment.

- Environmental management programme: this lists the operations required for those targets to be met.

- EMS documentation, consisting of:

  - Environment manual: this describes the company's responsibilities and how checks are run on all operations and parties that have or may potentially have an impact on the environment.

  - Procedures: these describe how the operations listed in the environment manual must be carried out.

- Internal environmental audits as a way of helping the management to assess the implementation and effectiveness of the EMS in place and to identify opportunities for improvement.

- Annual management reviews of the system to assess its implementation and effectiveness and set new targets for continuous improvement. Assessment of environmental aspects.

- A list of legislation and an indication and assessment of all the applicable requirements of law.

And there are three main objectives:

- An undertaking to comply with the legal and other requirements applicable to the plant.
- To conduct our recycling operations in an environmentally-friendly manner, paying particular attention to those activities and products that may entail risks for the environment.
- Continuous improvement in environmental terms.

These objectives are drawn from the guidelines laid down in our management policy

**Quality, safety, environment and energy policy**

**Values**

We promote the Quality of our products and processes, the Safety and Health of our employees and subcontractors and the defend and sustainable development of our environment.

**Policy**

Befesa Aluminio, S.L. aims for becoming a global reference in the aluminium industry sector in relation to Quality, Safety, Health, Environment and Energy Management, considering that like the only way to excellence productivity.

**Principles**

The General Manager of the company and all the Processes Responsible must be the first example of compromise, image and zero tolerance and we assume the final responsibility in the Quality, Health, Safety, Environment and Energy Management of the company.

We consider our human resources the main and key factor of our economical business so we train them and give them action availability in the Quality, Health, Safety, Environment and Energy Management. of the company.

We assume all employees' involvement as the main question for the company´s success, pushing the dialog and continuous and active participation.

To keep Health and Safety of our employees and the preservation of our Environment is part of the diary work of each of our employees.

We do never put ahead Production of Economic benefit to Health and Safety.

We assume as objective of the company the principle of "Zero accidents".

We consider that all accidents are avoidable and that all accidents and incidents must be communicated and investigated as a way to the continuous improvement.

We assume the compromise of getting all the necessary human and technical resources to ensure the continuous protection of our Environment and the development of a safety and free accidents place of work.

We ensure the fulfilment of all the applicable legislation as well as all the s external and internal stablished standards and requirements,

We develop a Quality, Health, Safety, Environment and Energy integrated management system which is periodically revised and audited according to well-known international standards.

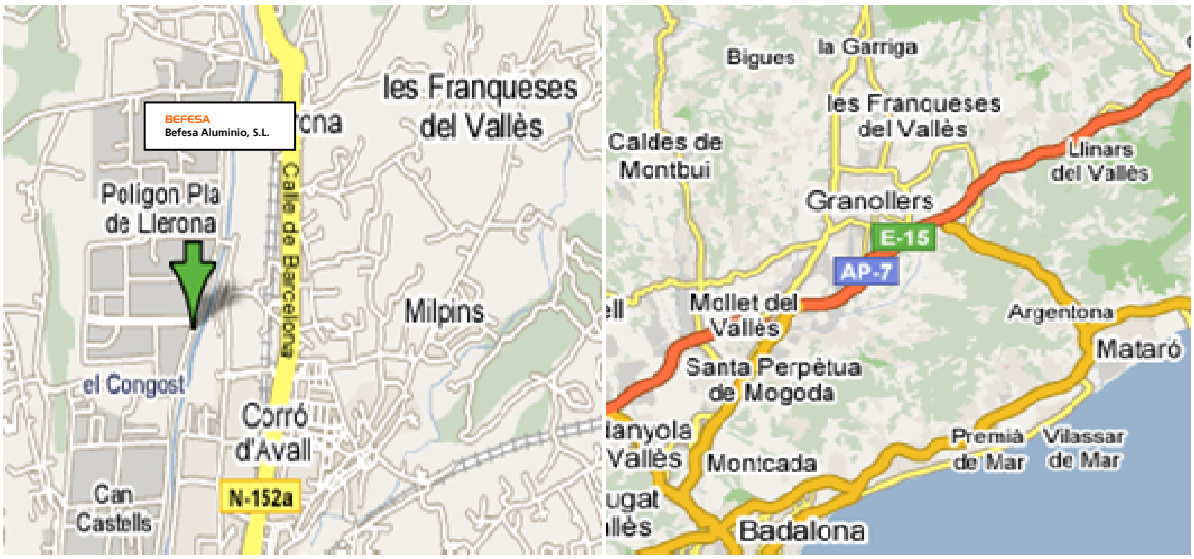
Erandio 2016

Pursuant to ISO standard 14001: 2004, the managing director of Befesa Aluminio, S.L. has appointed the following person to oversee the application and maintenance of the environmental management system in place:

- **Oskar de Diego Rodríguez, Environmental Manager,** as the management representative in the establishment, implementation and upkeep of the environmental management system, with responsibility for ensuring compliance with all applicable environmental requirements.

Quality, risk prevention and environmental matters are currently managed as an integrated system at the company, to simplify efforts, to achieve joint progress in all three areas and at the same time maintain strict standards in all three individual concepts, so as not to compromise on welfare of future generations.

## 4. Befesa Aluminio, S.L.- Les Franqueses del Vallés plant




Befesa Aluminio S.L., is located in Les Franqueses del Valles (Barcelona) since 1985 and makes the following end products:

* 7-10 kg ingots of aluminium and aluminium alloys for moulding.

Following, a layout of the facilities at the Les Franqueses del Vallés plant is shown:

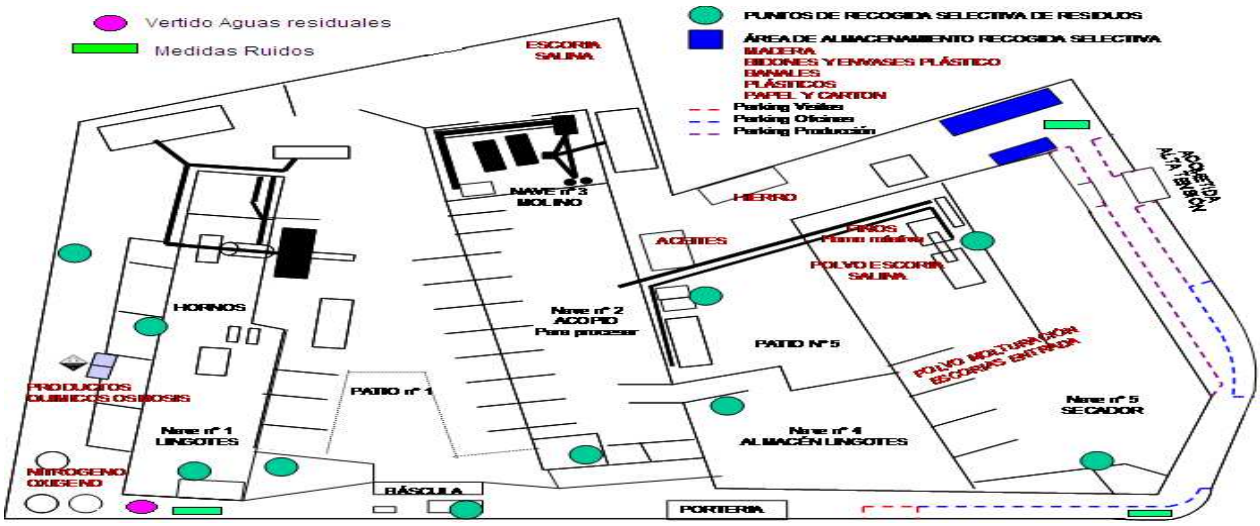



**Illustration 1: Layout of the facilities at the Les Franqueses del Vallés plant.**

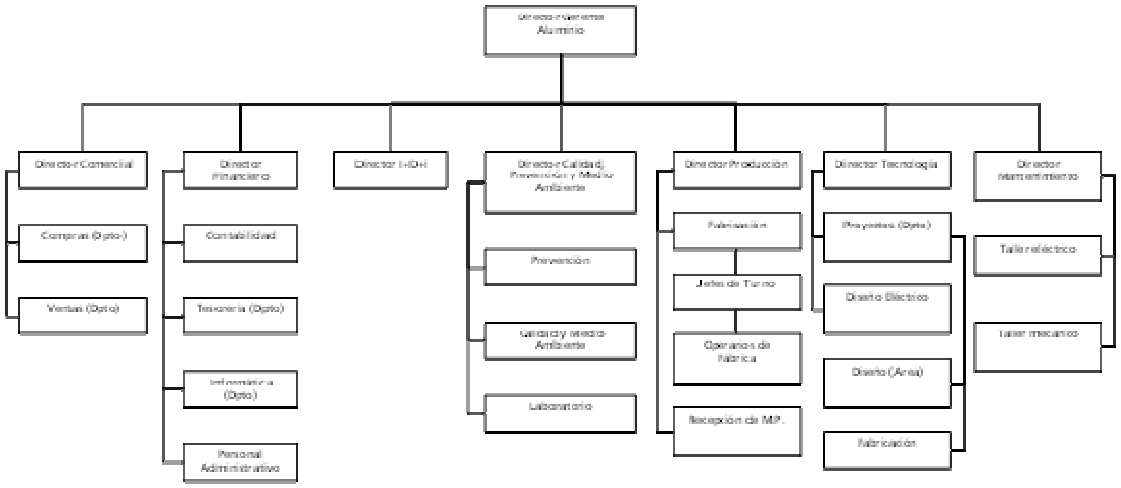



**Illustration 2: Organization chart of Les Franqueses del Vallés plant.**

The recycling and recovery operations at the Les Franqueses del Vallés plant comprise two main processes: smelting of material in rotary furnaces and then refining of the end products in reverberatory furnaces. Both these processes are carried out using equipment classed as BAT (Best Available Technology) in the European Commission's Reference Document on Best Available Technologies for non-ferrous metallurgy.

The first step in the production process is a correct selection of the right raw materials. These include offcuts, cables, sumps, pans, cans, foil, chippings, shavings and aluminium industry scrap and waste in general. After selection, these raw materials, and in the case of shavings, treated through the two shavings dryers, are smelted to the degree required to obtaining the approximate specification indicated by the end customer, using rotary furnaces designed in-house to which salts are added as flux and to protect the molten aluminium. This smelting does not just heat the raw materials to molten form: it also dissolved metal elements in suspension and fosters certain reactions that

clean the material. It is this last feature that distinguishes rotary furnaces from other types of furnace. Once it has been confirmed that the furnace temperature is correct, the material is in liquid form and the quality of the supernatant flux is as expected, the furnace is emptied in two stages: first the metal is drawn off and then the molten flux or salt slag.

The fumes produced during smelting are exhausted off by treatment systems that comprise coolers and bag filters where solid particles are retained and, at the same time, acidic combustion fumes are neutralised by the controlled addition of calcium hydroxide.

All the salt slag produced by the salts used in the smelting process is recycled and recovered to produce an aluminium oxide called Paval, which has numerous uses in the cement industry, thus completing the cycle of aluminium waste recovery.

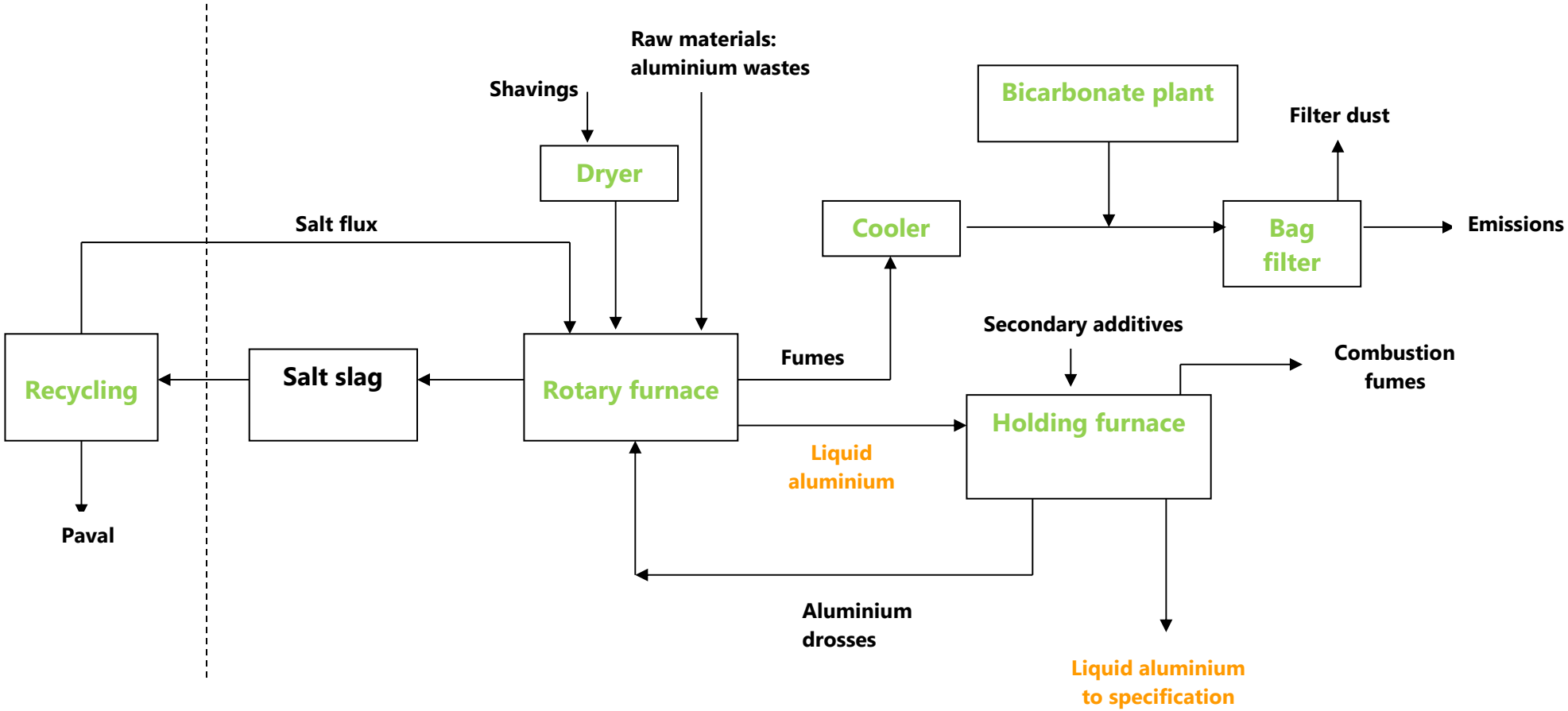



**Illustration 3: Flow diagram of the process for obtaining aluminium in liquid form.**

Once they have been melted in the rotary furnaces, the raw materials go on to phase two in reverberatory furnaces, where they are adjusted to the exact target specifications by adding secondary additives such as Si, Cu or Mg. Furnaces of this type are particularly suited to this last phase of production, since they provide metal that is at rest and the quality parameters of which can be adjusted under controlled heat conditions.

Once the slag has been skimmed off and the temperature adjusted, the metal is ready for pouring. The molten metal is sent to the pouring wheel for pouring into ingots. The pouring wheel comprises a chain of ingot moulds that guarantee the reliable, rapid production of ingots with high surface quality. The ingots are cooled, tipped out and conveyed to a machine that stacks them fully automatically in tiers, using a powerful computer that can form packages of different shapes to meet the requirements of each customer.

The water used during the cooling process is recirculated via three cooling systems fitted with parallel filters. The water used to bleed the filter systems during cleaning is treated to the same standard as run-off water and evacuated to the municipal main sewer via a single discharge point, which meets all the constraints imposed by the relevant integrated environmental authorization.

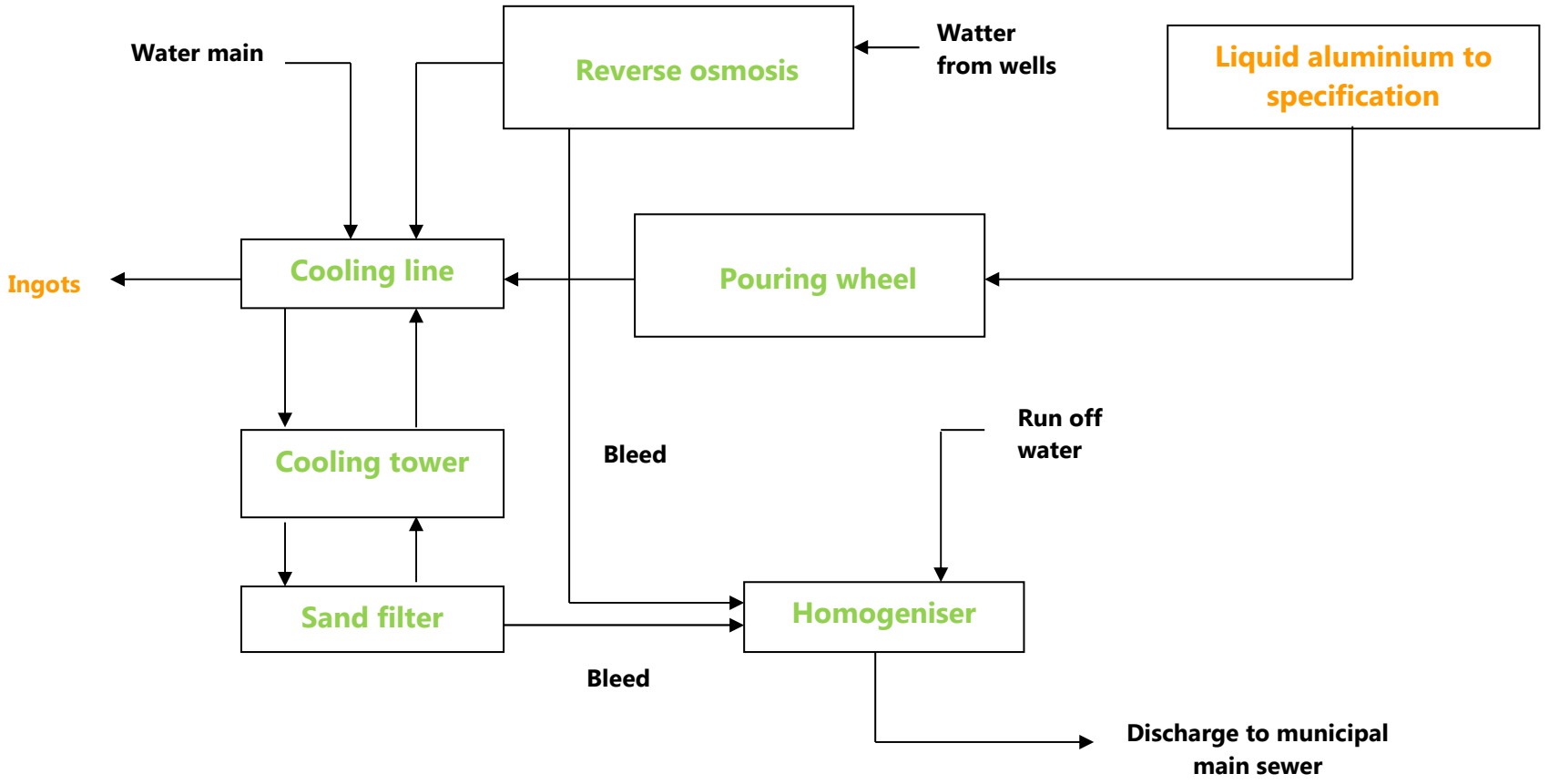



**Illustration 4: Flow diagram of the ingot and liquid aluminium manufacturing process.**

The average annual output at the Les Franqueses del Vallés plant from 2014 to 2016 was 64,147 t of finished product (see page 30), 20 % of it destined for national foundries and 80 % for foreign customers.

All products supplied by the company undergo final quality checks before shipping and are perfectly identified to ensure full traceability in terms of manufacturing processes, raw materials used and checks made. All this is handled via the company's quality management system, which has been certified as ISO 9001.

Moreover, in line with efforts to conserve natural resources and protect the environment, we believe that our operations should have as little impact on the local area as possible. Accordingly, we decided in 2003 to implement an ISO 14001 compliant environmental management system (EMS). In 2005 this system was verified as per EMAS with registration number ES-CAT-00203.

## 5. Representative environmental aspects of the company

The following environmental aspects are classified as representative:

### A) Emissions into the atmosphere

There are currently nine hotspots at the plant, in the facilities where the production process takes place: the combustion fumes from shavings dryer nº 1, the combustion fumes from rotary furnace nº 1, fumes from the tilting furnace nº 2, fumes form rotary furnaces loading pit areas, fumes from shaving dryer, fumes from tilting furnace nº 3, fumes from laboratory furnaces, fumes from rotary furnace nº 2 and fumes from shavings dryer nº 2. A new hotspot has been recently installed and registered related to the loading area of the two holding furnaces to capture the solid particles emissions during the alloying processes.

An officially authorised certification laboratory (OCA) takes regular samples of emissions at these hot spots, and analyses the compounds required as per the integrated environmental authorization.

In-house procedures have been developed to ensure that the treatment systems associated with these hot spots work properly. These procedures, which form part of the integrated environmental management system, establish what continuous and periodic checks need to be made at plant level to detect any anomaly, and what corrective action is required.

### B) Waste production

The company holds an integrated environmental authorization (BA20120011) which includes the former hazardous and inert waste producer permit (P-03570.1).

- **Hazardous wastes**

The main hazardous wastes produced by the company are the following:

- Salt slag: This originates from the use of salts (ClNa, ClK) as a flux to prevent the molten aluminium from oxidising inside the furnaces on coming into contact with the atmosphere. All this salt slag is recycled in a fully integrated aluminium waste treatment process carried out at Befesa, giving rise to salts that can be reused in production processes and an inert waste rich in aluminium oxide, known as Paval, which has numerous applications in the industry.

- Filter dust: This originates from the combustion fumes run through the treatment systems placed at the plant and from the movement and loading processes of the raw materials in the furnaces and dryers. It is stored in big-bags in a roofed area until its removal by an authorised waste manager.

- Filter bags: These are part of the combustion gas treatment system. Damaged and spent bags are replaced and sent to an authorised waste manager.

- Spent oil: This comes from facility and machinery maintenance operations. It is stored in properly identified, dated drums to await shipment to an authorised waste manager.

- Empty metal and plastic packaging: Containers that once held paint, solvent, oil, etc. are stored in properly identified dated cages for shipment to an authorised waste manager.

- Absorbents, rags and contaminated clothing: These come from maintenance operations. They are stored in properly identified, dated drums to await final shipment to authorised waste manager.

The company holds all the relevant acceptance documents from each of the authorised waste managers that handle these hazardous wastes.

- **Inert wastes**

The inert industrial waste produced at the plant comes mainly from repair, renovation and improvement work. It is managed as follows:

- Scrap: This is stored in a designated container. When the container is full a company specialising in the collection of this type of material is called in.

- Refractory bricks, rubble, wood, plastic and rubber: Waste refractory bricks come from maintenance work on the linings of the rotary furnaces and the holding furnaces. Rubble, wood, plastic and rubber waste come from civil work done at the company. These types of waste are selectively storage and sent to an authorised waste manager.

- General wastes no selectively collected: these go to landfill.

**C) Depletion of natural resources**

The company's integrated management system includes a method for identifying, monitoring and controlling the resources used, so as to help manage natural resource consumption at the plant. These resources correspond to the consumption of natural gas, used in the operation of ovens and dryers, electric energy consumption, water consumption for sanitary and cooling of ingots, to diesel (mobile machinery and dryers chip), oxygen (ovens) and nitrogen (used in holding furnaces for homogenization and degassing of the liquid metal).

# 6. Significant environmental aspects of Les Franqueses del Vallés plant

Direct and indirect environmental aspects are assessed yearly as a basis for drawing up environmental targets. The criteria applied include the likelihood and severity, and the degree of significance of each individual aspect is determined. This helps reveal the areas where future efforts need to be focused so as to get environmental impact of the company to be minimised.

Taken into account the criteria of likelihood and severity mentioned before and the methodology used by the company in the internal evaluation process of their environment aspects, the significant aspects for 2016 are as follows:

- Confined emissions of CO, $NO_x$, COT, Particles, HCl and PCCD/F, as a consequence of usual combustion processes in rotary, holding and laboratory furnaces and dryers.
- Confined emissions of HCl and PCCD/F as consequence of usual combustion processes in the rotary furnaces.
- Nitrogen consumption used in holding furnaces for the homogenization and degassing of the liquid metal.

For all the significant aspects, Befesa Aluminio, S.L. defines a strict and periodic control, associating strategic objectives and environmental indicators of improvement so as to guarantee the present and the future environmental performance of the company.

## 7. Outline of environmental targets and goals 2016

Environmental targets are set annually and laid out in the annual environment plan, which also indicates the goals associated with each target and the human and material resources allocated. The environmental targets set for 2016 are listed below, with a brief outline of the extent to which they were met:

| Aspect | Target | Target value | Result |
|---|---|---|---|
| **$CO_2$ emissions** | To reduce 2 % for GHG emissions. | -2 % | +4.01 % |
| **CO, $NO_x$, PST y CO emissions** | To reduce 2 % for CO, $NO_x$, PST y CO emissions. | -2 % | +3.80 % |
| **HCl and PCCD/F emissions** | To reduce 2 % for HCl and PCCD/F | -2 % | -71.38 % |
| | | -2 % | 0 % |
| **Natural gas consumption** | To reduce 2 % consumption associated to production processes | -2 % | -4.20 % |
| **Natural gas consumption** | To reduce 2 % consumption associated to shavings dryers | -2 % | +6.57 % |
| **Electricity consumption** | To reduce 2 % consumption associated to production processes | -2 % | +0.77 % |
| **Gasoil consumption** | To reduce 2 % consumption associated to production processes | -2 % | -1.30 % |
| **Water consumption** | To reduce 2 % consumption associated to production processes | -2 % | -2.81 % |
| **Nitrogen consumption** | To reduce 2 % consumption associated to production processes | -2 % | -4.35 % |
| **Oxygen consumption** | To reduce 2 % consumption associated to production processes | -2 % | -4.55 % |
| **Lime consumption** | To reduce 2 % consumption associated to production processes | -2 % | 0 % |
| **Slat flux consumption** | To reduce 2% consumption associated to production processes | -2 % | +4.33 % |
| **Salt slag generation** | To reduce 2 % generation associated to production processes | -2 % | -6.71 % |
| **Filter dust generation** | To reduce 2 % generation | -2 % | -8.85 % |
| **Filter bags generation** | To reduce 2 % generation | -2 % | -1,93 % |

- **To reduce 2 % for GHG emissions associated to secondary aluminium production.**

At the beginning of 2015 a join quantitative target was set for minimising GHG emissions at all Befesa Aluminio, S.L. plants. This target was associated with the two different scopes envisaged in the company's inventories: (1) direct emissions by the company and (2) indirect emissions by the company. The calculations for these emissions in 2016 show that the company has not met its emission reduction target, achieving a relative increasing percentage of 4.01 % (0.2954 t eq $CO_2$/ t in 2016 vs 0.2840 t eq $CO_2$/ t in 2015). This was due to the production levels of the company (lower than expected) which increased the residence time of the liquid aluminium inside the production furnaces.

- **To reduce 2 % for CO, $NO_x$, PST y CO total emission.**

The initial goal of reducing total emissions has not been reached. In 2015 the result was 1.58 kg $NO_x$ + CO + COT + PST / t product manufactured, while in 2016 was 1.64 kg $NO_x$ + CO + COT + PST / t. This increase is exactly of 3.80 %. The reason for this increase in emissions is directly related to the latest results obtained in the emissions from the different sources of the plant at the end of 2016, with the pollutant concentrations being slightly higher than the previous ones. That is why emissions have increased.

- **To reduce 2 % for HCl and PCCD/F emission.**

The initial goal of reducing total emissions has been partially reached. In 2015 the result for HCl emissions was 0.0304 kg HCl / t product manufactured, while in 2016 was 0.0087 kg HCl / t. This decrease is exactly of 71.38 %. In relation to PCCD/F

emissions, the objective has not been completely reached because the emissions have been maintained during the years 2015 and 2016 (0.0007 Kg PCCD/F / t produced product). The reason for this maintenance is because the controls of this pollutant are biennial and having worked practically the same hours and having obtained a similar production, the value is maintained.

- **To achieve a 2 % decrease in total natural gas consumption associated with the plant's production processes.**

The relative consumption of natural gas has been decreased substantially in 2016 (1.004 MWh / t product manufactured), with respect to the values obtained in 2015 (1.048 MWh / t product manufactured). This reduction of 4.20% manages to reach the 2% target set comfortably and its evolution is considered more than positive.

- **To achieve a 2 % drop in natural gas consumption associated to shavings dryers.**

The natural gas consumption associated to turnings dryers in 2016 has been of 0.373 MWh/ t treated which, compared with 0.350 MWh/ t treated in 2015, represents an increase of 6.57 %. The annual objective defined for the year has been definitely not achieved due to the higher humidity in the treated turnings.

- **To achieve a 2 % drop in electricity consumption associated with the plant's production processes.**

The relative consumption power in 2016 has increased with respect to the values reported in 2015, mainly due to reduced operational improvement actions that have

been carried out in all the facilities. The relative consumption in 2016 reaches values of 0.0926 MWh / t, which means an increase of 0.77 % compared to consumption in 2015 (0.0919 MWh / t).

- **To achieve a 2 % drop in the amount of gasoil used in the plant´s production processes.**

The proposed objective of reducing diesel consumption directly associated with mobile machinery and the manufactured product has not been achieved, but consumption has decreased by 1.30%. The relative value of 2016 has decreased with respect to that of 2015 (0.0908 GJ / t product manufactured in 2016, by 0.0920 GJ / t product manufactured in the previous year). The objective has not been reached since it does not reach the 2% initially defined.

- **To achieve a 2 % drop in the amount of water used in the plant's production processes.**

The relative water consumption throughout the year 2016 reaches a value of 0.7748 $m^3$ / t product manufactured, representing a total decrease of 2.81 % compared to the value of 2015 (0.7972 $m^3$ / t product manufactured). Therefore, the goal has been achieved. During this year the production of ingots and larger bundles has increased, thus decreasing the casting time and, in turn, the consumption. Efforts have also been focused on the cooling circuit, cleaning up possible losses or leaks of water.

- **To achieve a 2 % drop in the amount of nitrogen used in the plant's**

**production processes.**

Relative nitrogen consumption in 2016 was 0.022 t / t compared to 0.023 product manufactured t / t product manufactured in 2015. It means that the relative consumption decreases with respect to the previous year by 4.35%, thus achieving the initially marked goal of 2% reduction. This fact can be attributed to the reduction of alloying time during the process.

- **To achieve a 1 % drop in the amount of oxygen used in the plant's production processes.**

The relative oxygen consumption decreases from 0.132 t / t product made in 2015 to 0.126 t / t product manufactured in 2016, representing a decrease of 4.55 %. The initially established objective has been achieved mainly due to the fact that, due to circumstances of the scrap market, the same mix of materials is never maintained, being different during 2016 than in 2015, and this has caused a change in the melting process, whose fact more significant has been a higher metallic yield of the materials with respect to the previous year.

- **To achieve a 2 % drop in the amount of lime used in the plant's production processes.**

The relative lime consumption reached a value of 1.72 t / t product made in 2015 compares to 1.72 t / t product manufactured in 2016. This does not imply any increase or decrease in consumption and, therefore, the established goal of

reduction is not reached. This data is directly related to the dosage established in the rotary furnaces, being fixed and constant for each one of them.

- **To achieve a 2 % drop in the amount of salt slag produced in the course of the plant's production processes.**

The objective of reducing salt slag generation has been achieved, mainly due to the nature of the raw materials used in the production of final product and the quality of the salt flux used in production processes. The relative value in 2016 was 0.6071 t / t product made against the value of 0.6508 t / t product manufactured in 2015, representing a decrease of 6.71 %.

- **To achieve a 2 % drop in the amount of flux used in the plant's production processes.**

The relative consumption of salt flux has increased in the year 2016 (0.313 t / t) a total of 4.33 % compared to the value of 2015 (0.300 t / t). The objective has not been achieved, mainly due to the reasons stated in the objective associated with the generation of salt slag. That is, type of materials used and quality of the salt flux (lower percentage of KCl).

- **To decrease the amount of filter dust produced by 2 %.**

The relative amount of filter dust generated during the year 2016 has reached a value of 0.01937 t / t product produced, representing a decrease of 8.85 %

compared to the value of 2015 (0.02125 t / t product manufactured). This objective has been achieved due to the nature of the raw materials used, being this year less dusty.

- **To achieve a 2 % drop in filter bags generation**

The value for 2016 has been 0.04778 kg / t, compared to that of 2015 of 0.04872 kg / t. That means a decrease of 1.93 % not fulfilling in this way the target set for 2016 that was 2%. However, its evolution is considered positive.

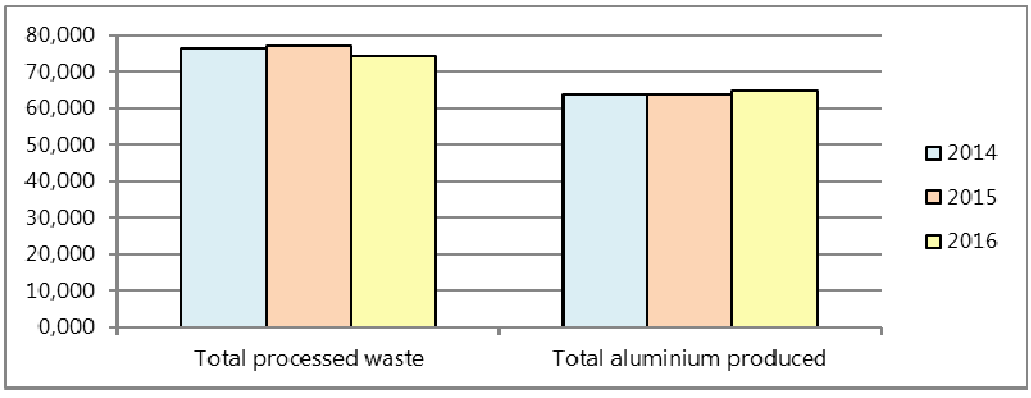
# 8. Environmental performance of the company

The environmental performance of the company is outlined below.

## 8.1 **Aluminium waste recycling for aluminium recovery**

All incoming materials except fluxes (NaCl and KCl) are classed as waste products under current Spanish and European regulations. They come mainly from other primary and secondary aluminium smelting facilities and from aluminium scrap dealers who obtain them from the machining, vehicle breaking, and domestic appliance and offcut markets. The underlying purpose of our whole production process is to recover all these secondary waste products as a direct alternative to primary aluminium obtained by processing natural resources.

The total quantity of waste processed in the last three years is indicated below, along with the quantity of secondary aluminium obtained from the company's recycling operations.




| | Total processed waste | Total aluminium produced |
| --- | --- | --- |
| 2014 | 76,407 | 63,719 |
| 2015 | 77,219 | 63,845 |
| 2016 | 74,237 | 64,877 |

**Graphic 1: Comparison of waste treated and aluminium produced (t) in the last 3 years.**

### 8.2 Energy consumption

Energy consumption in the production process over the past three years is indicated below in absolute terms (MWh) and relative terms (amount per tonne of product produced). In 2016 energy consumption from renewable sources accounted for 26.8 %. This is shown as part of the total electricity consumption.

- **Natural gas**

Natural gas is used as fuel in the smelting and refining processes in the rotary and reverberatory furnaces and in shavings dryers. It is supplied directly from main.

| Natural gas | 2014 | 2015 | 2016 |
|---|---|---|---|
| **Consumption (MWh)** | 82,447.5 | 83,915.3 | 82,801.0 |
| **Production (t)** | 63,719 | 63,845 | 64,877 |
| **Relative consumption (MWh/ t)** | 1.29 | 1.31 | 1.28 |

The relative consumption of natural gas has decreased substantially in 2016 (1.28 MWh / t product manufactured), with respect to the value reached in 2015 (1.31 MWh / t product manufactured). These values refer to the total consumption of natural gas of the plant.

Indicate that during 2016 there was monitoring of the natural gas consumed associated only with the production process, obtaining a value of 1,004 MWh / t manufactured product (year 2015: 1,048 MWh / t). On the other hand, the consumption associated with the treatment process of turnings obtained the value in 2016 of 373 KWh / t treated turning (2015 year: 350 KWh / t) due to the nature of the materials used in the dryers.

- **Electricity**

The company has two transformers located in buildings nº 5 and nº 1. These two transformers have an electrical power of 630 and 1,000 kV.

In relation to lighting, fluorescents are used mainly in offices, while in production and outside areas, mercury lamps are used. Maintenance is progressively changing these mercury lamps for metallic halide lamps.

| Electricity | 2014 | 2015 | 2016 |
|---|---|---|---|
| **Consumption (MWh)** | 5,602.7 | 5,869.8 | 6,002.1 |
| **Production (t)** | 63,719 | 63,845 | 64,877 |
| **Relative consumption (MWh/ t)** | 0.088 | 0.092 | 0.093 |

The electricity consumption per ton of manufactured product has increased slightly in 2016, due to the poor management success in the production processes and chip drying. For subsequent years, an attempt will be made to assess the indicator taking into account, separately, the consumption directly related to production and consumption related to the treatment of chips.

### 8.3 Ancillary material consumption

The absolute (t) and relative consumption (quantity per t of manufactured product) of the main auxiliary materials used in the productive process corresponding to the last 3 years are shown below.

- **Salt flux**

The flux used is mainly a blend of NaCl and KCl which is loaded into the rotary furnaces along with the main raw materials. Its job is to protect molten aluminium from unwanted oxidation and to absorb any impurities contained in the raw materials used. This flux gives rise to a hazardous waste known as salt slag which is recycled within Befesa to produce an aluminium oxide that has numerous applications in the cement industry.

| Salt flux | 2014 | 2015 | 2016 |
|---|---|---|---|
| **Consumption (t)** | 18,326 | 19,090 | 20,331 |
| **Production (t)** | 63,719 | 63,845 | 64,877 |
| **Relative consumption (t/ t)** | 0.29 | 0.30 | 0.31 |

The relative consumption of salt flux has lightly increased in 2016, with respect to the value reported in 2015, mainly due to the nature of the raw materials used to produce the final product and to the quality of salt flux with higher humidity and lower KCl content.

- **Oxygen and Nitrogen**

There are two oxygen storage tanks and one nitrogen storage tank at the plant, which are owned by the supplier. Oxygen is used as part of the fuel for the smelting process in the rotary furnaces. Nitrogen is used for degasification in holding furnaces.

| Oxygen | 2014 | 2015 | 2016 |
|---|---|---|---|
| **Consumption (t)** | 8,222 | 8,409 | 8,173 |
| **Production (t)** | 63,719 | 63,845 | 64,877 |
| **Relative consumption (t/ t)** | 0.129 | 0.132 | 0.126 |

The specific oxygen consumption has decreased with respect to the data reported in 2015. The same material mix has not been maintained as in the previous one and this has caused a change in the fusion process, whose most significant fact has been a greater metallic performance of materials compared to the previous year.

| Nitrogen | 2014 | 2015 | 2016 |
|---|---|---|---|
| Consumption (t) | 1,328 | 1,479 | 1,434 |
| Production (t) | 63,719 | 63,845 | 64,877 |
| Relative consumption (t/ t) | 0.021 | 0.023 | 0.022 |

The specific consumption of nitrogen has decreased compared to the year 2015. The actions carried out to improve the fusion processes carried out in 2016 have been effective, probably due to the reduction in the homogenization times of the aluminum when adding the alloying agents.

- **Gasoil**

Gasoil is used in small quantities in Befesa Aluminio, S.L. to wet turnings received before drying operations and mainly as fuel for mobile machinery (front loaders and forklift trucks). Gasoil consumption changes depending on the percentage of humidity of the raw material before drying.

| Gasoil | 2014 | 2015 | 2016 |
|---|---|---|---|
| Consumption (GJ) | 5,734 | 5,890 | 5,893 |
| Production (t) | 63,719 | 63,845 | 64,877 |
| Relative consumption (GJ/ t) | 0.090 | 0.092 | 0.091 |

As can be seen in the table, the specific consumption of diesel in 2016 has decreased slightly with respect to 2015. The reported data corresponds only to the consumption of diesel associated with the production process, that is, the consumption belonging to the mobile machinery, without that one used for the drying of the chips.

### 8.4 Water consumption

Water is taken from municipal main network and from three legalized wells. The main uses of water are as follows:

- Cooling water: Evaporated water in the cooling systems, auto-cleaning operations of sand filters used to regulate the quality of the water, reverse osmosis to reduce the conductivity of fresh water and water for industrial boilers.
- Domestic water: Toilets and changing rooms.
- General cleaning: Cleaning under pressure.
- Irrigation and fire-fighting systems.

Water coming from wells is used mainly for cooling the molten metal poured in the aluminium ingot manufacturing line. It is recycled through an enclosed circuit where it is cooled in three independent cooling towers to ready it for reuse. Almost 100 % of this water is recirculated (the exception being that used for back-washing the sand filters parallel to the cooling towers). The water consumption figures in the table below thus reflect the amount of water that evaporates during the process

described. It is calculated that 90 % of the water used in cooling processes evaporates.

Water coming from municipal main network includes the water consumed at offices, the workshop, laboratory and the changing rooms.

The company has a general water meter, meters for each well and a number of subsidiary meters distributed around the plant that indicate the total amount of incoming water and how much is used by each separate facility or process.

| Water | 2014 | 2015 | 2016 |
|---|---|---|---|
| Consumption ($m^3$) | 46,108 | 50,898 | 50,269 |
| Production (t) | 63,719 | 63,845 | 64,877 |
| Relative consumption ($m^3$/ t) | 0.72 | 0.80 | 0.77 |

The relative consumption of water during the year 2016 has been significantly lower than the previous year. During this year, the production of higher weight and larger packaging ingots has been increased and the cooling of ingots has also been optimized, thus reducing water consumption.

### 8.5 Waste management

The tendencies for the main waste produced and managed over the past three years are shown in the following table:

| Waste managed | 2014 | 2015 | 2016 |
|---|---|---|---|
| Salt slag produced (t) | 37,991 | 41,552 | 39,292 |
| Ratio of salt slag to end product (t/ t) | 0.61 | 0.65 | 0.61 |
| Filter dust produced (t) | 1,347 | 1,357 | 1,257 |
| Ratio of filter dust to end product (t/ t) | 0.021 | 0.021 | 0.019 |
| Aluminium dross produced (t) (*) | 2,600 | 2,600 | 2,650 |
| Ratio of aluminium dross to end product (t/ t) (*) | 0.041 | 0.041 | 0.041 |
| Filter bags produced (t) | 4.224 | 3.110 | 3,100 |
| Ratio of filter bags to end product (t/ t) | $6.63 \times 10^{-5}$ | $4.87 \times 10^{-5}$ | $4.78 \times 10^{-5}$ |

**(*) estimated figure.**

The specific amounts generated by filter dust are reduced, due to the optimization in the bag filters and the less pulverulent nature of the raw materials used during 2016.

As for salt slags, we can say that there is also a reduction compared to the values of the previous year, as a consequence of the lower consumption of slag.

Regarding the filter bags, there has been a similar production to that of the previous year, reducing slightly.

## 8.6 Impact on the biodiversity

The total surface area of the plant is 20,275 $m^2$. It has no impact on biodiversity, since the site is not part of a protected area or closed enough to such an area to have any environmental effect on it. The size of the site has not changed in the past three years, and the ratio of land area occupied per tonne of product manufactured is as shown below.

| **Land area** | **2014** | **2015** | **2016** |
|---|---|---|---|
| **Relative land area ($m^2$/ t)** | 0.32 | 0.32 | 0.31 |

## 8.7 Emission of pollutants into the atmosphere

### 8.7.1 Greenhouse gases (GHGs)

Befesa Aluminio, S.L. set up an overall GHG emission inventory in 2008 for its three aluminium plants (Erandio, Les Franqueses del Vallés and Valladolid). This inventory calculates both direct and indirect emissions using a method based on ISO standard 14064. An independent verification report is available for this inventory.

"Direct emissions" are defined as emissions from sources under the control of the company, e.g. from the combustion process in its furnaces, from vehicles and machinery, from process equipment and leaks from equipment and facilities.

The figures for direct emissions over the past three years are shown in the following table:

| GHG emissions | 2014 | 2015 | 2016 |
|---|---|---|---|
| **Annual total for direct emissions (t $CO_2$ eq)** | 31,377.4 | 32,447.9 | 48,199.4 |
| **Relative annual total for direct emissions (t $CO_2$ eq/ t)** | 0.2481 | 0.2615 | 0.2645 |

### 8.7.2 Emissions of other pollutants into atmosphere

Total $NO_x$, particles, total emissions, HCl and PCCD/F emissions for the past 3 years and the ratio of emissions per tonne of product manufactured are shown in the following table:

| Emissions of other pollutants | 2014 | 2015 | 2016 |
|---|---|---|---|
| **$NO_x$ emissions (t)** | 41.78 | 20.90 | 25.07 |
| **$NO_x$ relative emissions (kg/ t)** | 0.66 | 0.33 | 0.39 |
| **Solid particles emissions (t)** | 9.27 | 15.36 | 15.11 |
| **Solid particles relative emissions (kg/ t)** | 0.15 | 0.24 | 0.23 |
| **CO + COT + $NO_x$ + Particles total emissions (t)** | 240.579 | 100.27 | 106.06 |
| **CO + COT + $NO_x$ + Particles relative emissions (kg/ t))** | 3.78 | 1.57 | 1.64 |
| **HCl emissions (t)** | 824.511 | 1,952.211 | 568.539 |
| **HCl relative emissions (kg/ t)** | 0.0129 | 0.0304 | 0.0087 |
| **PCCD/F emissions (ng)** | 415.443 | 42.099 | 38.38 |

| | | | |
|---|---|---|---|
| **PCCD/F relative emissions (ng/ t)** | 0.0065 | 0.0007 | 0.0007 |

## 8.8 Fulfillment of environmental provisions of law

### 8.8.1 Emission hotspots

The tables below show the last measurements taken at all the hotspots present at the plant for the parameters subject to limits as per the integrated environmental authorization, and a comparison with the maximum permitted levels. The integrated environmental authorization gives a periodicity of 2 years, corresponding the last ones to 2016.

- **Combustion fumes from rotary furnaces nº 1 and nº 2**

  The treated fumes from the rotary furnaces are expelled through these hotspots. These furnaces use a blend of natural gas and oxygen to smelt materials and adjust process temperatures. The first part of the treatment systems comprises a cooler which brings down the temperature of the fumes from the combustion process. In the second part, the cooled fumes are sent through a bag filter where solid particles are retained and acid fumes are neutralised by the controlled addition of calcium hydroxide and active carbon for PCCD/F.

| Hotspot identification | Number of registration | Limits as per integrated environmental authorization 2012 | Values for the last measurements 2016 |
|---|---|---|---|
| **Rotary nº 1** | 11,027 | Solid particles: 50mg/Nm$^3$ | 2.32 |
| | | $NO_x$: 450 mg/Nm$^3$ | 52.66 |
| | | COT: 100 mg/Nm$^3$ | 3.47 |

| | | | |
|---|---|---|---|
| | | HCl: 30 mg/Nm$^3$ | 0.77 (informe BA-MAI-16-0039) |
| | | *Dioxines and Furanes: 0.5 ng/ EQT-I/Nm3 | 0.02379 (informe BA-MAI-16-0016) |
| **Rotary nº 2** | 18,497 | Solid particles: 50 | 1.85 |
| | | $NO_x$: 450 | 43 |
| | | COT: 100 | 10.33 |
| | | *HCl: 30 mg/Nm$^3$ | 1.49 (informe BA-MAI-16-0039) |
| | | *Dioxines and Furanes: 0.5 ng/ EQT-I/Nm3 | 0.0252 (informe BA-MAI-15-0144) |

- **Combustion fumes from tilting holding furnaces**

Tilting holding furnaces also use a blend of natural gas and oxygen as fuel. The combustion fumes produced in the combustion chambers of tilting rotary furnaces are exhausted directly to the atmosphere, because only clean raw materials with high metal content are smelted in them. This makes completely unnecessary to cool the fumes and to retain solid particles through filter bags.

| **Hotspot identification** | **Number of registration** | **Limits as per integrated environmental authorization 2012 (mg/ Nm$^3$)** | **Values for the last measurements 2016** |
|---|---|---|---|
| **38.38 Tiltin0.0007g holding nº 2** | 4,509 | Solid particles: 50 | 26.83 |
| | | CO: 100 | 54.1 |
| | | $NO_x$: 450 | 25.6 |

| | | | |
|---|---|---|---|
| **Tilting holding nº 3** | 17,253 | Solid particles: 50 | 30.17 |
| | | CO: 100 | 2.77 |
| | | $NO_x$: 450 | 13.4 |

- **Holding furnace loading pit area and dryers**

In view of the type of emissions produced at the holding furnace loading pits and dryers, the filter system comprises merely a bag filter to eliminate any solid particles in suspension. There is no need for preliminary cooling of fumes.

| **Hotspot identification** | **Number of registration** | **Limits as per integrated environmental authorization 2012 (mg/ $Nm^3$)** | **Values for the last measurements 2016** |
|---|---|---|---|
| **Holding furnace loading pit area** | 11,019 | Solid particles: 50 | 6.95 |
| **Dryer hotspot** | 17,275 | Solid particles: 50 | 4.4 |

- **Laboratory furnaces**

The laboratory facility has three small crucible furnaces which are used to characterise raw materials on arrival. The treatment system in place comprises a bag filter that retains solid particles.

| Hotspot identification | Number of registration | Limits as per integrated environmental authorization 2012 (mg/ $Nm^3$) | Values for the last measurements 2016 |
|---|---|---|---|
| **Laboratory furnaces** | 17,274 | Solid particles: 50 | 1.99 |
| | | CO: 100 | 3.22 |
| | | $NO_x$: 450 | 4 |

- **Turnings dryers**

The turning drying system is compound by two dryers (nº 1 and nº 2). Dryers use a blend of natural gas and oxygen to dry materials and adjust process temperatures. The first part of the treatment systems comprises a cooler which brings down the temperature of the fumes from the drying process. In the second part, the cooled fumes are sent through a bag filter where solid particles are retained.

| Hotspot identification | Number of registration | Limits as per integrated environmental authorization 2012 (mg/ $Nm^3$) | Values for the last measurements 2016 |
|---|---|---|---|
| **Dryer nº 1** | 5,374 | Solid particles: 50 | 2.71 |
| | | $NO_x$: 450 | 2.90 |
| | | COT: 100 | 0.497 |

| | | | |
|---|---|---|---|
| **Dryer nº 2** | 29,351 | Solid particles: 50 | 0.84 |
| | | $NO_x$: 450 | 4.33 |
| | | COT: 100 | 54.63 |

### 8.8.2 Emissions discharge to mains drainage

The water outlets from the plant are grouped by water type as follows:

- Industrial water

  This is water from the semi-enclosed cooling circuits (occasional back-wash bleeds to clean cooling tower filter) and run-off water collected in the plant.

- Domestic water

  This is from the sanitary facilities in the offices and changing rooms.

The company now has a single discharge point for industrial and domestic water, which flows directly into the municipal sewer.

Befesa Aluminio, S.L. has an authorization to discharge, granted by the Consorcio del rio Besos on 30th of October 2006 and validated on 15th of September 2007. This authorization has to be renewed every year (next 30th September 2016). In this authorization, some limits are defined:

- Conductivity < 8,000 uS/ cm
- Soluble salts < 9,500 uS/ cm

- Chlorides < 2,500 mg/ L

A continuous measurement of the conductivity is made in order to check the characteristics of water discharge in the waters coming from cleaning operations of sand filters. Besides, water is analysed every three months, to control the presence of legionnaire.

Next, values for the three-last analysis of water discharge are shown:

| Parámetros | Limits | Average values of discharge | | |
|---|---|---|---|---|
| | | 2014 | 2015 | 2016 |
| **Conductivity at 20ºC** | 8,000 uS/ cm | 2,520 | 3,950 | 664 |
| **Chlorides** | 2,500 mg/ L Cl | - | - | - |
| **Solid particles** | 750 mg/ L | 37 | 17 | 55 |
| **No decanted DQO** | 1,500 mg/ L $O_2$ | 102 | < 50 | 89 |
| **Decanted DQO** | 1,500 mg/ L $O_2$ | 82 | < 50 | - |
| **Inhibiting materials** | 50 Equitox/ $m^3$ | <1.1 | < 2.0 | < 2.0 |
| **Total phosphorus** | 50 mg/ L P | 1.5 | 0.52 | 4.46 |
| **Ammonia** | - | 21.7 | 10 | < 5 |

| | | | | |
|---|---|---|---|---|
| **Aluminium** | 20 mg/ L | - | - | < 0.5 |

All data have been reported by the Consorcio del rio Besos and as it can be observed, none of the parameters analysed exceeds the limits set.

### 8.8.3 Other environmetal performance indicators

The factory makes a periodic control of its external noise as a consequence of its activity. It has to be mentioned that the factory is located in an industrial area (with other manufacturing companies and storages closed) and as a result of the proximity of traffic in the area, the noise associated to the activity goes unnoticed. Besides, the activity of the company is quite far away from the closer village of Les Franqueses del Vallés.

The current legislation related to external noise is order 176/2009 annex A. The company has made different changes in its activity after measurement in 2007, with the stop of its aluminium drosses mill and the decrease of some other heavy machinery. Because of that reason, new measurements have been made to check out again the real noise emissions. These measurements have been made in May 2011 and limits have not been exceeded.

# 9. Environmental targets 2017

To meet the company's commitment to continuous improvement in its environmental performance, as per its environment policy and in line with the environmental aspects identified as relevant, the following environmental targets have been set for 2017:

- To achieve a 2 % decrease in GHG emissions associated to the secondary aluminium production.
- To achieve a 2% decrease in the total emissions of the company.
- To achieve a 2 % decrease in HCl and dioxins and furanes emissions < 0.5associated to the secondary aluminium production.
- To achieve a 2 % decrease in total natural gas consumption associated with the plant's production processes.
- To achieve a 2 % decrease in total natural gas consumption associated with the plant's turning treatment processes.
- To achieve a 2 % drop in electricity consumption associated with the plant's production processes.
- To achieve a 2 % drop in the amount of gas-oil used in the plant's production processes.
- To achieve a 2 % drop in the amount of water used in the plant's production processes.
- To achieve a 2 % drop in the amount of nitrogen used in the plant's production processes.

- To achieve a 2 % drop in the amount of calcium hydroxide used in the plant's production processes.

- To achieve a 2 % drop in the amount of oxygen used in the plant's production processes.

- To achieve a 2 % drop in the amount of flux used in the plant's production processes.

- To achieve a 2 % drop in the amount of salt slag produced in the course of the plant's production processes.

- To cut the amount of filter dust produced by 2 %.

# 10. Applicable environmental legislation

Befesa Aluminio, S.L. is part of sectoral associations that, on a monthly basis, identify, supply and update legal texts. With this information, the new requirements or their modifications are extracted and the own legislative database is updated, with the particular requirements applicable to the company. Also, Befesa Aluminio, S.L. performs a continuous verification of compliance with its legal requirements, confirming the non-existence of any breach of environmental and / or industrial safety.

A list of some of the main environmental legislation applicable to the company follows:

- Integrated environmental authorization BA2030044 awarded on 1st December 2004 by the Catalan Government Environment Office for the activity of non-ferric metals recovery with capacity > 20 t/day of aluminium. The authorization BA2060085 awarded on 22th September 2008, including a non-substantial change and the punctual modification of the annex of integrated environment authorization BA2030044 awarded on 29th April 2008.

- Renewal of the environmental authorization, with number BA20120011 and date of December 11, 2012, as well as the non-substantial changes authorized with B1CNS130394 and B1CNS140191 files. After the favorable resolution of incorporation of the activated carbon dispenser in the focus number 2 (B1CNS140191 and date of July 21, 2014), and the satisfactory results of the PCCD / F emissions in it, the resolution has also been granted with number B1CNS130394 and date of March 10, 2015, of expansion of waste treatment capacity.

- Company is now in the in the process of changing substantially its integrated environmental authorization.

- Legislation of water discharge (Articles 24, 26, 29, 38 and 49) to award discharge authorization.

- RD 252/2066 of 3rd March in which objectives for the recycling and valorisation established in law 11/1997 of 24th April for containers and containers wastes are revised.

- Law 22/2011 of wastes and contaminated floors, in relation to producers and recovery factories of wastes.

- Industrial Safety Legislation (fighting systems, oil installations, high voltage, pressure vessels, etc.).

- Legionella control associated to cooling systems for the production of solid aluminium alloys.

- European Agreement for the international road transport of dangerous goods. The organization has a security adviser, who issues the annual report to the corresponding Department.

## 11. Cooperation with environmental organizations

Befesa Aluminio, S.L. is an active member of the following environment-related associations:

- ACLIMA (Basque Environment Industry Cluster Association). The company has signed up to the Commitment to Sustainable Development (1999) and the Declaration of Bizkaia on the Right to the Environment (1999).

- ASERAL (Spanish Aluminium Recovery Association).

- Confemetal (Spanish Confederation of Metal Industry Organisations). The company is an active member of the Environment Committee of this organisation.

- OEA (Organisation of the European Aluminium Recycling Industry).

- ASEGRE (Spanish Association of Special Waste Managers): This association brings together hazardous waste managers based in Spain.

- Technical Committee of AENOR.

Befesa Aluminio, S.L. regularly participates in R&D programmes with various research centres and other European firms, mainly for the improvement of recycling, valorisation and the best possible use of aluminium industry waste.

## 12. Participation

Befesa Aluminio, S.L. pushes the participation of all their employees in the definition of all the environmental processes. For that purpose, facilitates different ways for problems and improvements communications, using at the same time the company´s committee to guarantee the communication between all the integrated parts of the company.

## 13. Availability

This environmental declaration is accessible via the corporate website (www.befesa.es).

## 14. Next environmental declaration

This environmental declaration is intended to provide information on our management policies to associates, authorities, customers, suppliers, the media and local residents, and to establish a constructive dialogue.

It is a public document validated by Bureau Veritas Certification, S.A. (ENAC-accredited environmental certification body nº E-V-0003), with registered address at calle Valportillo primera 22-24, edificio caoba, 28108 Alcobendas, Madrid.

This environmental declaration is valid for 12 months. The next validated declaration is to be submitted in June 2018.

For more details about Befesa Aluminio, S.L. and its products visit our

website at www.befesa.es. If you wish to know more about us at any time, do not hesitate to contact Manel Arco Alcaraz on:

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**Glossary:**

**kg:** kilogram.

**Si:** silicon.

**Cu:** cooper.

**Mg:** magnesium.

mm: millimeters.

**t:** ton.

**t $CO_2$ eq:** $CO_2$ equivalent tons.

**MWh:** megawatt per hour.

**$m^3$:** cubic meter.

**HCl:** hydrochloric acid.

**HF:** hydrofluoric acid.

**$NO_x$:** nitrogen oxides.

**$SO_2$:** sulphur dioxide.

**SST:** solids in suspension.

**$NH_3$:** ammonia.

**Zn:** zinc.

**Fe:** iron.

**g:** gram.

**NaCl:** sodium chloride.

**KCl:** potassium chloride.

**$cm^2$:** square centimeter.

**h:** hour.

**kW:** kilowatt.

**V:** volt.

**R&D:** research and development.

**$m^2$:** square meter.

**GHG:** greenhouse gases.

**mg/ $Nm^3$:** milligram per normal cubic meter.

**Pb:** lead.

**Cr:** chromium.

**Mn:** manganese.

**Ni:** nickel.

**As:** arsenic.

**Cd:** cadmium.

**Hg:** mercury.