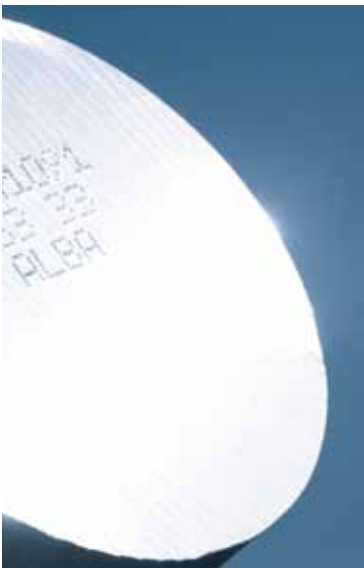


# Aluminium Bahrain creating a lasting legacy



[albasmelter.com](http://albasmelter.com)





# Casting the Future in Aluminium



1971 was a remarkable year for the industrial sector in Bahrain. Adding momentum to the nation's economic progress, His Highness the Late Amir, Shaikh Isa bin Salman Al Khalifa officially launched Aluminium Bahrain B.S.C (Alba) and laid a strong foundation for industrial diversification.

The visionary leadership foresaw the need to set up an industry that could earn valuable export revenue, contribute to the economic and social development of the country, initiate non-oil industries and create career opportunities for future generations. Crystallising this vision, Alba was incorporated by a charter in 1968 and commenced operations in 1971 with an initial production capacity of 120,000 metric tonnes per annum, which has seen an increase in subsequent years. It was the preamble of an inspiring success story to follow.



Over the years, Alba boosted its production capacity with the state-of-the-art technology, maintained international standards of excellence, introduced new products range and expanded its customer base. Alba has emerged as one of the largest single site aluminium smelters in the world with a capacity of more than 981,000 metric tonnes per annum of high-grade aluminium.

Alba has been a key player in Bahrain's overall progress since 1971. Throughout the years, achievements on the operational front have been backed by significant contributions to Bahrain's social, industrial and economic progress.

Alba has been in the forefront of ensuring a safe and healthy environment around the plant. The awards received in recognition of environmental conservation efforts demonstrated the company's commitment to be a responsible corporate citizen.

Alba shareholders include Mumtalakat Holding Company (69.38%), SABIC Investment Company (20.62%) and the General Public (10%).

If Bahrain entered the annals of history in 1931 with the first oil well in the Arabian Peninsula, then the first aluminium smelter in the region has accelerated the nation's progress with the metal of the future.



## Did You Know ? \_\_\_\_\_

Bahrain pioneered the start of aluminium era in the MENA region and Alba is one of the top aluminium smelters in the world.

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## Safety First and Last



Safety is an all-encompassing concept at Alba covering both people and systems. As an integral part of Alba's charter, safety is a priority. Performing with zero harm is a way of life.

Alba has invested time and resources to ensure safety awareness translated into defined action plans. Everyone at Alba is trained in health and safety practices by OHSAS 18001 certified safety personnel.

Alba is the recipient of the International Safety Award from the British Safety Council and the Occupational Health & Safety Gold Award from the Royal Society for the Prevention of Accidents (RoSPA) for several consecutive years.

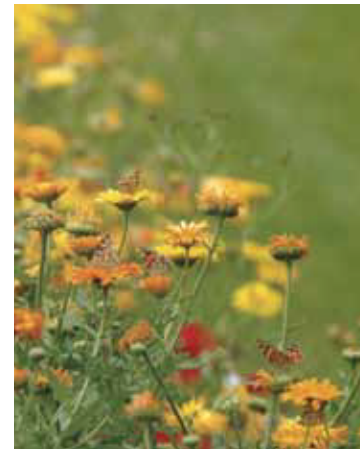
The various Plant-wide and Departmental SHE campaigns and initiatives being conducted on continuous basis are a live testimony of Alba's commitment towards Safety, Health and Environment.

### Did You Know ? \_\_\_\_\_

Alba is the first aluminium smelter in the world ever to record more than 9,200,000 work-hours without a single Lost Time Injury (LTI).



## An Environmental Model



Protecting the environment with the best eco-friendly systems and procedures is important to Alba. The entire Alba plant adheres to the ISO 14001:2015 standards for Environmental Management Systems.

Alba's efforts to ensure a healthy environment go beyond compliance with international regulations. Since 1990, Alba has invested more than US\$ 589 million to implement world-class systems for efficient waste management to reduce the emission of harmful gases. It also included the building of seven fume treatment plants between 1992 and 2002 at US\$ 130 million. Operating at 99.5% efficiency, the fume treatment plants prevent harmful fluoride emissions into the atmosphere.

The energy used in the aluminium production is simultaneously utilised to produce desalinated water for the cooling process. The steam resulting from this process generates additional power for the plant.

A tangible evidence to the success of our sustained environmental programme is HRH Princess Sabeeka Oasis. Thousands of trees, flowers, vegetables and shrubs greet visitors across a 153,000 square metres landscaped sanctuary. This green oasis is adjacent to the plant and thrives along an artificial lagoon that is a home to migratory birds and marine life. Treated wastewater from the plant is used to replenish this lagoon and to irrigate the garden.

The success Alba had in meeting its environmental goals has resulted in a variety of prestigious awards. In 1997, Alba was awarded the United Nations Environment Protection (UNEP) Award, and in 2000, the Millennium Business Award for Environmental Achievement. Moreover, in 2005, Alba was the only plant in the region to earn the GCC Prize for the Best Industrial Establishment that complies with Environmental Standards and Specifications. Most recently, in 2017, Alba was the proud winner of the 2017 Occupational Excellence Achievement Award and the 2017 Significant Improvement Award from the National Safety Council (NSC) - USA.

### Did You Know ? \_\_\_\_\_

Alba is the first plant in the region to win the GCC Prize for the Best Industrial Establishment to comply with Environmental Standards and Specifications.



## World-class Infrastructure



Alba commenced its commercial operations with two reduction lines in 1971 and progressively increased the number to five reduction lines through periodic expansions. Currently, Alba is working on establishing its reduction line 6, which will make it the largest single-site aluminium smelter in the world upon completion.

To date, Alba produces more than 981,000 metric tonnes per annum (mtpa).

A host of infrastructural facilities supports the production system comprising five reduction lines, two cast houses, three dedicated carbon plants, a 550,000 mt capacity coke calcining plant, a water desalination plant, eleven fume treatment plants, a marine terminal, and a 2,249 MW ISO power plant with four power stations.

Alba's production and support facilities are bolstered with its own modern marine terminal, which facilitates the import of raw materials.

### Did You Know ?

Alba's 5th reduction line, with a length of 1.5 kms, is one of the longest aluminium reduction line in the world.

## Calciner Plant and Marine Terminal



Calcined petroleum coke is the major raw material for the production of anodes used in the smelting process. In order to gain control over the quality and supply of its calcined petroleum coke, Alba sets up its own calciner plant in 2001.

Alba's calciner plant has a production capacity of 550,000 metric tonnes. The plant, which was upgraded in 2004, uses unique technologies like an indirect cooling mechanism to produce superior moisture free calcined coke. It boasts the only completely covered green coke storage facility in the world to prevent gas emissions. The calcined coke produced is transported to Alba's in-house carbon plant where it is mixed with coal tar pitch and baked in kilns to produce anodes. Alba's calcined plant is built on 140,000 sq.m. of reclaimed land at the modern marine terminal.

The marine terminal provides Alba with an edge in logistics. Comprising two jetties, it is equipped to receive ships with a capacity up to 60,000 tonnes and is able to handle 3.5 million metric tonnes of materials per year. Raw materials such as alumina and pitch are unloaded at this marine terminal.

Alba's integrated calciner and marine terminal facility operates to international standards and has received the latest ISO 9001, ISO 140001 and OHSAS 18001 certifications for its operations.

Moreover, Integral to the Calciner plant is a seawater desalination plant that utilises waste heat from the Calcining process for generation of steam. The plant produces and supplies upto 41,000 cubic meters per day of portable water -- conformed to WHO and Gulf standards -- to Alba and public water distribution networks.

### Did You Know ?

Alba is one of two smelters in the world that has a dedicated coke plant.



## Human Assets



On top of the first-class technologies used in our systems, Alba functions with the strong support of its employees who put their hard work and expertise to help the company perform on all fronts.

Today, more than 2,700 employees spearhead Alba's operations. As a proud Bahraini company, we believe it is our duty to foster the development of skilled local talent and offer avenues to the young generation to achieve their career ambitions. With an award-winning Bahrainisation level, Alba enables aspiring Bahrainis to build a career with great prospects and gives impetus to the Kingdom's Economic Vision 2030.

Providing our employees with opportunities to perform to their full potential is a priority. We help sharpen their competency with world-class training, both in-house and outside. In partnership with InJAz Bahrain and Tamkeen, we regularly conduct specialised training programmes for Bahraini employees to upgrade their skills and boost their productivity levels to international standards.

### Did You Know ? \_\_\_\_\_

Alba has won many awards from the GCC and Bahraini authorities for excellence in Nationalisation and Bahrainisation.



## Marketing Prowess



Thanks to its consistent high quality, Alba's aluminium products have appealed to clients in more than 25 countries around the world. In addition, our customer-focused strategy to supply products to clients' specific needs with a prompt support service has enabled us to expand our global footprint.

We supply almost 50% of Alba's production to the downstream industries in Bahrain, supporting the Kingdom's industrial progress. The remaining is exported to the Middle East and North Africa, Americas, emerging markets of Asia and to the key markets in Europe.

Combining our strengths in production, customer support and logistics, and with a strong marketing strategy in place, Alba is building sustainable partnerships across new territories and markets. We constantly explore new opportunities to gain more market share by identifying potential markets and clients, as well as assigning dedicated marketing personnel to serve best our clientele.

In this regard, we have set up sales offices in Switzerland, Atlanta and Hong Kong to cater to the growing product demand in European, American and Asian markets.

By enriching customers' experience, both locally and globally, Alba is progressing with a long-term strategy to become the largest single site aluminium smelter in the world.

### Did You Know ? \_\_\_\_\_

Our Marketing Department has been operating to ISO 9002 Quality Management System standards since 2002.



## Aluminium Story



Production of aluminium is a time and energy consuming process. It all starts with aluminium's ore known as bauxite...

Calcined petroleum coke is another key raw material in the aluminium production. The quality of this raw material is important in ensuring high-quality anodes and thereby superior quality of primary aluminium.

The smelting process or electrolysis to separate pure aluminium metal from its oxide form takes place in large carbon-lined furnaces called reduction cells, which are maintained at a temperature of 970°C. Alumina fed into these cells is liquidised by molten cryolite, which can dissolve alumina and conduct electricity at high temperatures. Partially immersed anodes, which are produced at the calciner plant, are in turn suspended above each cell and the carbon lining of the cell acts as the cathode. An electrical current of 100,000 to 320,000 amp flows from the carbon anode through the alumina and cryolite mixture to the carbon lining of the cell. During the electrolysis process, the alumina mixture is separated into positively charged pure aluminium ions and negatively charged oxygen ions.

The molten aluminium settles at the bottom of the cell where it is extracted at regular intervals by using vacuum crucibles, while the oxygen rises to the top and consumes the anodes to form the carbon dioxide. Molten aluminium is siphoned off from the cells to the casthouse where it is mixed with other raw materials to produce customized alloys. Alba makes four different aluminium products; Standard or T-Ingots, Extrusion Ingots, Rolling Slabs and Properzi Ingots. In addition, we supply Liquid Metal to the downstream industries located in the immediate vicinity of the plant.

In order to streamline the operations, the electrolytic process is seamlessly sustained throughout the year by feeding alumina into cells to ensure sufficient quantity of dissolved alumina in the electrolyte using high of energy. Alba use sustainable initiatives to save considerable amounts of energy; the waste heat generated in the smelting process is used to produce steam for additional electricity. It is also used to desalinate seawater into potable water for plant usage.

### Did You Know ? \_\_\_\_\_

Two tonnes of alumina is required to produce one tonne of aluminium.



## Carbon Plant



Alba has three Carbon Plants to ensure constant supply of high-quality anode blocks in the electrolytic process.

Anodes are produced from calcined petroleum coke and coal tar pitch. Self-sufficiency in the production of calcined petroleum coke gives us control in ensuring high quality of anodes.

The first stage of anode production is to crush the calcined petroleum coke chunks into bits. They are then segregated as per their sizes and mixed depending on the required anode quality. This dry mix is preheated and mixed with coal tar pitch to bind the coke particles into anode blocks.

In the second stage, anode blocks are heated at 1,100°C for 17 days in the baking kiln to improve their strength and electrical conductivity. Then, they are transferred to the Rodding Room to be fitted with an electricity conducting rod. In the electrolytic process these anodes interact with oxygen in the cells and gradually get consumed in the process. Anodes are replaced every 28 days and what is left of the used anodes butts is recycled in the Rodding Room.

### Did You Know ? \_\_\_\_\_

Alba's carbon plants have an annual production capacity of 540,000 metric tonnes of carbon anodes.



## Autonomy in Power



A glimpse at the electrolysis process is enough to get an idea about the energy-intensive properties of the smelting process. However, Alba achieves self sufficiency in power production with its own dedicated power plant.

Alba's power generation system is complete with on-site distribution, maintenance, operations and project management facilities. The power stations are equipped with the most advanced control systems and utilise eco-friendly technologies. The power plant employs natural gas combustion to turn turbines and generate electricity.

Alba uses the waste heat from the gas turbines to produce steam in boilers, which in turn generates additional electricity through the use of steam turbines.

This cycle technology is efficient in minimising pollution and in conserving the nation's valuable natural gas resources.

In addition to power, Alba also meets its potable and industrial water requirements with Reverse Osmosis water treatment plants.

### Did You Know ?

Alba's Power Plant generates a capacity of 2,249 MW ISO, equivalent to the average power consumption in Bahrain.

## Casthouse Operations



Casthouse is the place where molten aluminium is cast into a variety of shapes with added properties.

The pure liquid metal is transferred to the casthouse for the production of various aluminium alloys. It is poured into large mixing furnaces where elements such as silicon, magnesium, copper, iron, titanium or boron are added as per customers' specifications to produce alloys with properties such as high strength or extra corrosion resistance. The resultant aluminium alloy solution is then poured into either solid ingot moulds or direct chill (DC) casting machines. The casting process takes place at temperatures of over 700°C.

Alba mainly casts primary aluminium into three different value-added products.

1. Extrusion Ingots (Billets/Logs) used for architecture, transport and general engineering products
2. Sheet Ingots (Rolling Slabs) which are used in the packaging, food cookware, cans as well as engineering applications
3. Foundry Alloys Properzi ingots that are widely used in transport and automotive applications

These products use about 61% of the liquid metal. The remainder is supplied to the local downstream industries.

Whether supplied as value-added alloys or liquid metal, the production and metallurgy team ensure top quality products to our customers worldwide. Alba casthouses operate to the ISO 9001 Quality Management System.

### Did You Know ?

Receiving the latest 2008 version of ISO 9001 certification for its casthouses, Alba has become the first manufacturer in Bahrain to receive this major quality management system upgrade.





# Aluminium Production Process



Starting from refining bauxite ore to the making of various products, the aluminium smelting process involves many stages.

Alba has been continuing this process for over four decades by ensuring the highest quality products to the utmost satisfaction of its customers worldwide.

# A Catalyst for Progress

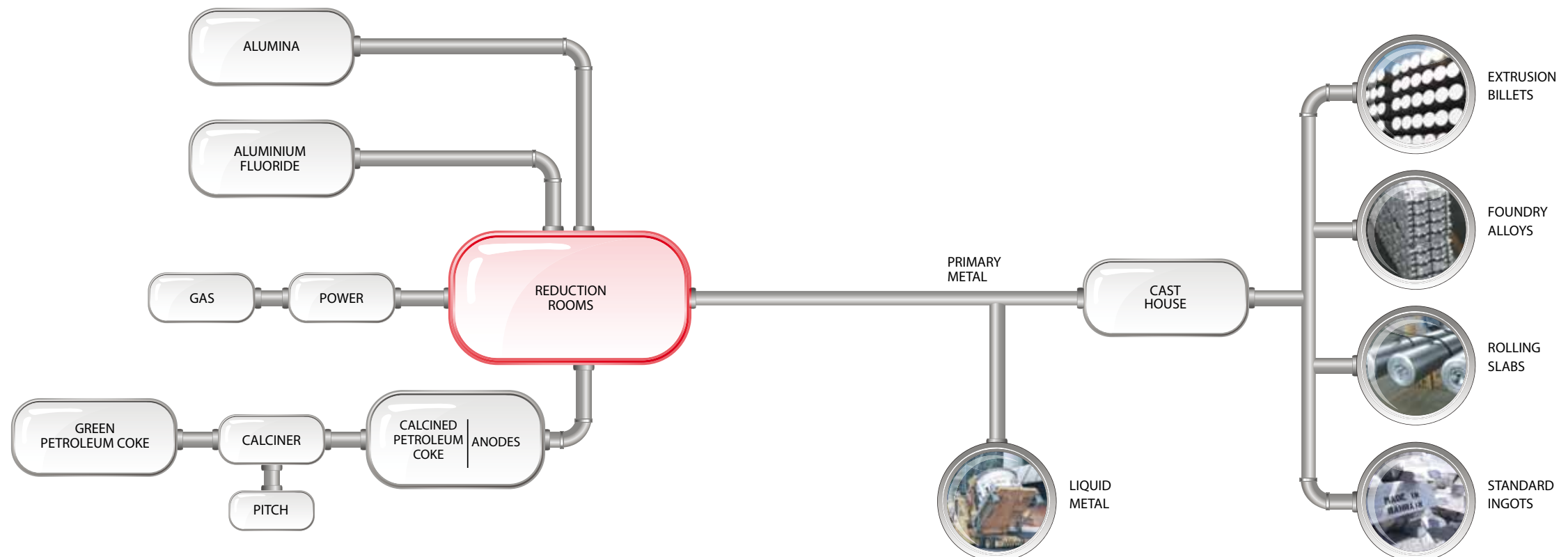


Alba is more than an industrial powerhouse that generates millions of export revenue for the Kingdom.

As a lifeline for a multitude of downstream industries, we play a key role in the industrial growth and economic progress of Bahrain. Beyond its contributions to the nation's exchequer, Alba is a staunch supporter to the Kingdom's Vision 2030. It aims to build a better life for every Bahraini citizen through growth and prosperity.

With a record in Bahrainisation level, we develop the Kingdom's human resources and provide enhanced prospects to succeed for the present and future generations.

Delivering on our promises to provide better products and ensure a better life for all, the Aluminium saga of Bahrain is continuing.





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