

The Alba Story

The story of Alba marks the inception of industrial diversification in the Gulf.

The company's ongoing success as a primary producer of high-grade aluminium has brought significant economic benefits to the region and has taken the country technologically into the 21st Century.

In the mid 1960s, the Bahrain Government was seeking to diversify its economic base from a heavy dependence on oil. The aim was to establish a suitable industry which would provide valuable export earnings, develop the country's resources and create training and employment opportunities for a large number of Bahrainis.

Bahrain was well situated geographically between the source of raw materials, particularly alumina from Australia, and the markets for primary aluminium in Asia, Europe and the Americas. Bahrain's prime advantage was its plentiful supply of gas from the Khuff field to meet the high energy requirements of aluminium production.



Aluminium Bahrain was therefore incorporated by Amiri Charter in 1968 and officially commissioned on 11th May 1971 as a 120,000 tonnes per annum smelter.

Today, the company produces more than 500,000 tonnes per annum, having expanded in 1981, 1990, 1992 and 1997 - making the smelter one of the largest single-site producers of aluminium in the world.

The aluminium process

Aluminium is the most abundant metallic element in the earth's crust with most rocks and clays containing aluminium oxide (alumina).

However, it was not until 1886 that the production process known as electrolytic reduction was discovered, enabling aluminium to become one of the world's most widely-used metals.

The electrolysis takes place in a steel vessel called a cell. The cell, maintained at a temperature of about 965°C, is lined with carbon and contains a melt or electrolyte of molten cryolite. Carbon blocks are suspended above the cell and partially immersed in the electrolyte to act as anodes while the carbon lining of the cell acts as a cathode.

Alumina is fed into the electrolyte and separates into positively charged ions of aluminium and negatively charged ions of oxygen. Direct current applied across each cell moves the ions in opposite directions.

The oxygen rises to the anode where it burns the carbon to form carbon dioxide. The molten aluminium settles at the bottom of the cell where, at regular intervals, it is extracted - or tapped - using a vacuum crucible.

To sustain the electrolytic process, alumina is fed into the cells continuously - 365 days a year - to maintain a sufficient quantity of dissolved alumina in the electrolyte.

The raw materials required to produce one tonne of aluminium are:

1.9 tonnes of alumina

418 kg of carbon (a blend of petroleum coke and pitch)

17.5 kg of aluminium fluoride.

Power

To supply the energy needed for aluminium production, Alba has its own power complex with a total generating capacity of 1,504MW. Use is made of combined cycle technology which allows the company to achieve optimum power generation efficiency. In simple terms, waste heat generated by the gas turbines is passed through heat recovery boilers to produce steam to power the steam turbines.

The power plant consisting of four power stations also provides up to 275MW of electricity to the national grid during the summer.

Anode manufacture



Petroleum coke is crushed and blended with pitch and pressed into green anodes. These are baked in kilns for 17 days at a temperature of 1,250°C.

Once in the cell, the carbon anodes are gradually consumed during the electrolytic process and are therefore replaced approximately every 28 days. The remains of these spent anodes - the butts - are returned from the reduction areas and recycled.

Alba's carbon department provides a continuous supply of replacement anodes, producing some 457,000 anodes each year.

Metal production

Alba has four reduction lines with a total of 1,048 cells. It is here that the electrolytic process takes place.

Following the modernisation of all the original cells, all four reduction lines now share the same high degree of operational efficiency and environmental control. Using the latest technology, traditionally manual tasks have been automated resulting in significantly improved working conditions.

Quality products

From the reduction lines, liquid metal is transported to the casthouse where it is poured into mixing furnaces where elements such as silicon, magnesium, copper, iron, titanium or boron will be added to meet the customers' required alloy specifications.

The prepared aluminium is then cast either in solid mould ingots or direct chill (DC) casting machines.

The four types of products cast at Alba are:

- Standard ingot - used for remelting
- T-ingot - a larger version of the standard ingot
- Billet - for extrusion of aluminium profiles or sections
- Rolling slab - used in rolling mills for plate sheet and foil.

In addition, liquid metal is transported from the casthouse to downstream industries located adjacent to the plant.

The Metallurgy department uses a wide range of sophisticated analytical instruments to ensure that only top quality products leave the plant. Metal purity levels of up to 99.90% are consistently achieved. Indeed, Alba's commitment to quality was underlined by the casthouse being awarded ISO 9002 certification in 1994.

Metallurgy is part of the Technical Services Centre, a purpose-built facility which also houses the company's R & D, Environment and Laboratory sections.





Marine terminal

The three main raw materials used by Alba - alumina, petroleum coke and pitch - are unloaded 10km from the main plant at the company's marine terminal.

Pitch: As part of the company's environmental commitment, Alba utilises the environment-friendly liquid form of pitch. It is unloaded into the liquid pitch facility before transportation by special purpose truck to the smelter.

Petroleum coke: In 2001, Alba commissioned its coke calcining plant, seawater desalination plant and new jetty facility. As a result, Alba began importing green coke, the raw material form of calcined petroleum coke which Alba previously imported. The calcining process now takes place at Alba's marine terminal, enabling the company to



better control the quality of its product and also export around 200,000 tonnes per annum of calcined coke for consumption around the world.

Alumina: Alba receives ships carrying up to 60,000 tonnes of alumina at its jetty facility. The company imports approximately one million tonnes of alumina each year.



Environment

A comprehensive environmental protection programme is an integral part of Alba and today the company is one of the Gulf's greatest environmental success stories.

This commitment to environmental protection has involved a concerted initiative to take advantage of the latest environmental control technology and monitoring techniques. For example, all the reduction lines are connected to state-of-the-art fume treatment plants, thus virtually eliminating fluoride and dust emissions.

Alba's ongoing investment has seen the company invest around US\$350m in environmental protection projects alone since 1987.

Environmental awards include the Millennium Business Award for Environmental Achievement. Alba was one of only 12 companies in the world to win this prestigious award in 2000 which was presented by the United Nations Environment Programme in conjunction with the International Chamber of Commerce.



Human Resources

Alba is an investment in metal production. More importantly, it is an investment in people – the people of Bahrain.

As the pioneer of industrial diversification in the country, Alba has always assumed the role of a trail-blazer – initiating strategies for Bahraini-sation and human resources development, safe working practices, quality control and automation programmes to enhance the working environment of its employees.

The company has a dedicated Training Centre and provides a range of managerial, technical and general development courses throughout the year – facilitating training each year for around 70% of its workforce. Competency-based assessment and training forms the backbone for the development and subsequent promotion of operational employees and a long-standing commitment to the training of nationals means the company has a Bahrainisation level of close to 90%.

Alba was the first in Bahrain to implement a plantwide Information Technology system which integrates all aspects of its operations.



Marketing

Alba is responsible for the worldwide sales and marketing of its metal for its shareholders the Bahrain Government and the Saudi Public Investment Fund.

Approximately half of Alba's metal (in the form of rolling slab, billets, ingots, T-ingots and hot metal) supplies the growing downstream aluminium industry in Bahrain. These companies include Garmco, Balexco, Midal Cables, Aluwheel and Bahrain Atomisers. Alba also exports to more than 25 countries throughout the world

To be an Alba employee is to have a secure place in the community. It is to be well trained and respected, part of something uniquely Bahraini: part of the production of aluminium shipped throughout the world proudly bearing the stamp 'Made in Bahrain '.



In 2000, Alba was accredited with the Environmental Management System standard ISO 14001, an excellent plantwide achievement given the size and diversity of its operations.

Recent Awards and Achievements

Alba's prominent role in the community and economy has long been recognised - a fact reflected in a number of recent awards. These include:

2001: GCC award for the best environmental activities by an industrial establishment.

2000: GCC-wide award for Bahrainisation, reflecting Alba's commitment to Human Resources Development.

The company also won a top supporting organisation award for HRD in this year.

2000: Environmental Management System standard ISO 14001.

2000: Millennium Business Award for Environmental Achievement. Alba was one of only 12 companies in the world to win this prestigious award presented by the United Nations Environment Programme in conjunction with the International Chamber of Commerce.

1999: Inaugural Shaikh Khalifa bin Salman Al Khalifa Award for Excellence in Industry, presented by His Highness the Prime Minister to Alba for its outstanding contribution to the industrial development of the country and in recognition of its international success.

1998: Safety Award from the Ministry of Labour and Social Affairs.

1998: Two Human Resources Development and Bahrainisation awards, presented by the Ministry of Labour and Social Affairs and the Bahrain Training Institute.

1997: United Nations Environment Programme (UNEP) Environment Award presented in conjunction with the Bahrain Ministry of Housing, Municipalities and Environment.

1994: Quality Management System ISO 9002 accreditation.

1993: Bahrainisation Award from the General Committee for Bahrain Workers.



جائزة الشيخ
خليفة بن سلمان آل خليفة
للتفوق الصناعي
Shakh Khalifa bin Salman
Al Khalifa Award for
Excellence in Industry



جائزة مجلس التعاون الخليجي
لأفضل الممارسات البيئية
GCC Award for Best
Environmental Activities



جائزة مجلس التعاون الخليجي
للمحورنة والتوطين
GCC Award for
Nationalisation



جائزة البيئة من
برنامج الأمم المتحدة (يونيب)
UNEP Environment
Award



شهادة الاعتراف العالمي
بالإدارة البيئية
ISO 14001
ISO 14001 Environmental
Management System



جائزة الألفية الصناعية
للمنجزات البيئية
Millennium Business
Award for Environmental
Achievement



شهادة الجودة الإنتاجية
ISO 9002
ISO 9002 Quality
Management System



جائزة البحرين
والتنمية البشرية
Bahrainisation and
Human Resources Award