Fives Solios, 10 years at the heart of the aluminium process

In January 2003, Procedair SA in France, Procedair Industries in Canada, FCB Aluminium in France and Stein Atkinson Stordy in the UK, all members of the Fives Group, joined their expertise in the aluminium sector to provide a better service to their customers. Solios was born with the objective of becoming a major player in the global performance of the plants. In 2008, Solios became Fives Solios and adopted the new visual identity of the Fives Group.

Over the last ten years, the ability to provide state-of-the-art technological solutions combined with its strong expertise in managing large international turnkey contracts, led Fives Solios to be selected by key customers to be involved in prestigious projects, such as Alba line 5 in Bahrain (2003), Alcoa Fjärdal in Iceland (2005), Sohar Aluminium in Oman (2006), Qatalum in Qatar (2008), Rusiash Tashket and Bogchany in Russia (2008), Hindalco Mahan & Aditya (2009) and Vedanta Balco in India (2009), Emaiden Aluminium in Saudi Arabia (2010), Rio Tinto Alcan Jonquière and Kitimat in Canada (2011). Thanks to these numerous references, Fives Solios has continued to develop skills that are essential for managing large-scale projects, especially in the fields of contract administration, site supervision and management of a large panel of local subcontractors, while always keeping a specific focus on safety.

These ten years of continuous successes are also the results of Fives Solios’ capacity to propose innovative processes and to develop proprietary equipment and know-how that combine sustainable development with industrial profit. Through its innovation program, Fives Solios is committed to meet customers’ requirements: high performance, Capex and Opex reduction, energy efficiency and sustainability.

Major innovations offered by Fives Solios have become technological references and many trademarks are now widespread on the aluminium market, among which:
- Xalios, the high performance vibrocompacting unit serving the electrolysis.
- Rhodax®, the natural dry mix solution for anode preparation.
- IMCy™, Intensive Mixing Cascade to improve anode quality.
- Amelios, an advanced control solution for your anode quality management.
- Yprios, a boosted suction system for lower fluoride emissions.
- Eolisos the clean solution for a Green Anode Plant.

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- High performance.
- Capex and Opex reduction.
- Energy efficiency and sustainability.

In 2012, the Fives Group also celebrated its anniversary: 200 years of industrial progress. Since 1812, and all along its history, Fives has been involved in the major industrial and economic world events. Indeed, Fives is responsible for some of the most impressive achievements of the industrial age, from the first steam and electrical locomotives to many prestigious structures such as the Alexandre III Bridge in Paris, the metal framework of the Eiffel Tower in the mid 20th century, Fives has participated in the reconstruction of France, taking part in the construction of the Tancauville Bridge and supplying numerous plants throughout the world. In the 21st century, the group is involved in significant and prestigious projects such as aluminium plants in the Middle East and the most efficient steel production lines in China.

Having become the Compagnie de Fives-Lille when Call and Fives-Lille merged in 1958, the company later changed its name to Fives Lille Cail and then operated the first cast. In the case of aluminium into one of the ingot furnaces, Fives Solios has supplied five 100-ton furnaces for the ingot casting facility, five 135-ton furnaces for the slab casting facility, three 85-ton furnaces for the billet casting facility and one 90-ton and one 36-ton furnaces for the remelt facility.

In November, the Ma’den Alcoa joint venture’s operation team loaded the first charge of aluminium into one of the ingot furnaces, and then operated the first cast. In the case of Fives Solios, Fives Solios has supplied five 100-ton furnaces for the ingot casting facility, five 135-ton furnaces for the slab casting facility, three 85-ton furnaces for the billet casting facility and one 90-ton and one 36-ton furnaces for the remelt facility.
A new company joined Fives Solios

On March 1st, 2012, the Fives Group acquired the Carbochemical and Crystallization activities (Proabd® processes) of Litwin’s Mulhouse-based (France) entity. As a consequence, a new company, Solios Chemical, has been created within the Fives Solios brand and has adopted the Fives Group visual identity.

Solios Chemical designs and supplies process equipment and complete plants worldwide and more than 60 industrial plants based on the modern version of the Proabd® processes are in operation in various industries. Coal tar pitch processing, one of the major Proabd® technologies, strengthens Fives Solios’ expertise on the prebaked anode manufacturing process by further integrating the know-how upstream from pitch unloading and storage facilities, anode forming and anode baking. Likewise, the customers of the Proabd® pitch processes can benefit from Fives Solios’ expertise in anode manufacturing, which constitutes the main application for this specialty product. Fives Solios also continues to support and develop the whole Proabd® portfolio including the processing of coke oven by-products and Melt Static Crystallization (MSC) purification for the chemical, pharmaceutical and food processing industries. To constantly further improve this process, an in-house laboratory and pilot hall dedicated to Research & Development programs is shared between Solios Carbone and Solios Chemical, in Mulhouse.

Projects under execution

KAS Acceptance Certificate

In May 2012, Fives Solios received the Provisional Acceptance for the Fume Treatment Center at the Kazakhstan Aluminum smelter located in Pavlodar (Kazakhstan). This contract was awarded by Riedhammer GmbH, a specialist in the construction of anode baking furnaces. Fives Engineering Shanghai, a member of the Fives Group, was in charge of the filters manufacturing in China.

Baosteel completion

In September 2012, Fives Solios successfully completed the performance tests for the 60,000 tpy pitch granulation unit supplied to Baosteel, one of the major steel producers in China.

The customer selected the Proabd® technology for this project due to the reduced environmental footprint, the low water content as well as the quality of pitch granules produced.

Good teamwork between Baosteel and Fives Solios’ teams resulted in the plant exceeding the nominal capacity in a few days after start-up by 30%, thereby demonstrating the potential of the Proabd® process.

The acceptance certificate was signed on 21st September 2012.

First anodes production at Huolinhe and Liancheng

In May 2012, Fives Solios produced the first anodes at the Huolinhe greenfield aluminium smelter located in Inner Mongolia. The Green Anode Plant is equipped with a Fives Solios’ twin-table vibrocompacting machine fitted with vacuum and top back pressure. The first anode was also produced at the Chalo Liancheng brownfield aluminium smelter located next to the existing plant. The Fives Solios’ contract consisted of the supply of one twin-table Xelios machine for the production of large-sized anodes in order to meet customer’s requirements. Both equipment received the Provisional Acceptance in 2012.

Ozeos, a high performance solution for emission abatement

Fives Solios has developed Ozeos, the state-of-the-art scrubbing technology for modern smelters in order to meet customers’ objectives in terms of operation easiness and flexibility.

Ozeos is the most recent version of the Fives Solios alumina dry scrubber modules with integrated reactor.

It features a more compact design that better suits the large gas volume treated by centralized GTCs for modern high amperage pots. It also includes a lower velocity reactor that reduces the risks of scaling, abrasion and alumina attrition. It can be equipped with conventional or extended surface type filter bags, both of them using micro-denier polyester for best particulate filtration, with length up to 8m.

Ozeos implements some features to optimize control and maintenance operations, which improve fluoride scrubbing:

- Bag leak detection at each module with automatic tracking of the leaking row.
- Continuous monitoring of gaseous fluoride (HF) at each module outlet, which enhances tracking of the GTC performance and helps trouble shooting.
- Control of the gas volume treated by each module through continuous gas flow measurement combined with a modulating filter outlet damper. This is particularly useful when the bags are changed for one module at a time, as new bags offer less resistance to flow.
- Best in class fresh alumina distribution system with a unique offering of three modes of operation that aims at providing the lowest GTC fluoride emission:
  - the classic mode uses a distribution box with calibration system and individual air conveyors that ensure an equal distribution of fresh alumina to each reactor.
  - the Cascade feed mode (patented technology) enables fresh alumina to cascade from one module to the next, enriching itself in fluoride progressively, thus providing improved HF scrubbing.
  - the distribution box equipped with dual outlets allows for the temporary increase of fresh alumina injection at one reactor. It is based on the feedback from the HF monitoring at each module outlet.

Ozeos technology has been installed on Phase 1 of the new Rio Tinto Alcan AP 60 potline at its Jonquière site in Quebec, Canada. This new potline will operate in the first quarter of 2013.

Kitimat smelter expansion

As part of its project of modernization at the Kitimat aluminium smelter located in British Columbia, Canada, in May 2012, Rio Tinto Alcan awarded Fives Solios with two contracts. The project consists of upgrading the existing plant from Söderberg technology to probes AP40 technology, in order to increase the aluminium production capacity and to reduce the smelter’s emission level.

In the Carbon sector, the contract includes the supply of a complete mixing line including the preheating screw, the MCR® (Intensive Mixing Cascade), two Xelios, the anodes cooling tunnel as well as the integration of a pitch fume treatment system.

A new 42 tph Green Anode Plant will be built, adjacent to the existing one, and connected by a belt conveyor in order to transport dry materials to the new mixing line. This plant will be delivered with pre-assembled modules in order to reduce the construction time on site. Five main modules will be shipped in mid 2013.

In the Casthouse sector, the contract consists of the design and supply of three 100-ton capacity tilting Melting and Holding Furnaces with the associated launder systems. The furnaces are equipped with siphon metal transfer systems, and supplied with dual fuel combustion systems.

The furnaces’ casings were fabricated in the U.A.E. They were pre-assembled before being shipped to Canada in September, 2012.

Fives Solios will provide technical support for erection, pre-commissioning and commissioning for both contracts.

EMAL phase II

Fives Solios was awarded a contract for the supply of five Melting and Holding Furnaces for the EMAL phase II casthouse in Abu Dhabi, U.A.E., as part of the expansion project.

METAL-HOLDING-FURNACE-CASING-ABU-DHABI