Shaping the Future
in China

Sapa Profiles China
A Global Market Leader

Sapa develops, manufactures and markets value-added profiles, profile-based building systems and heat exchanger solutions based on strip, all in the lightweight material aluminum. It is the world’s leading value-added aluminum solutions provider and has customers in a variety of industries: building and construction, distribution, automotive, transport, industrial and others.

Sapa has three core operations:

**Sapa Profiles** – the world’s leading producer of extruded aluminum profiles, including extensive value-added operations.

**Sapa Building System** – one of the three largest suppliers of profile-based building systems in Europe and growing in Asia.

**Sapa Heat Transfer** – the world’s leading producer of strip for heat exchanger to the automotive industry.

In 2010 the Sapa Group had combined net sales of almost CNY 32 billion and 14,800 employees in 30 countries.

Sapa is owned by the Orkla Group, a Norwegian company that comprises a total of around 100 companies operating in a variety of product areas. The Orkla Group has 30,000 employees in more than 40 countries and had a turnover of around CNY 64 billion in 2010.

Vision, Mission and Core Values

**Vision**

Sapa shall be perceived as the most attractive partner through a combination of innovation, business know-how and cost effectiveness.

**Mission**

Sapa should offer the market innovative, value-enhancing solutions based on profiles and strip in lightweight material aluminum.

**Core Values**

**Entrepreneurial Spirit:** To recognise the opportunities in a business venture and have the ability to make it profitable, while recognising the risks. Sapa thrives on the entrepreneurial spirit of its employees.

**Commitment:** To provide all Sapa employees with support and tools to fulfil our constant commitment to serving our customers and constantly improving our business.

**Honesty:** To ensure that all Sapa employees are honest and responsible in dealing with customers, suppliers, co-workers, shareholders and the communities in which Sapa has an impact.

**Responsibility:** To ensure that Sapa works safely in a manner that promotes the health and well-being of individuals and the environment. To ensure a high and consistent quality in all that we do.

**Innovative Focus and Customer Orientation:** To come up with intelligent solutions in a creative work environment, solving customer and market needs. Only by focusing on our customers will we obtain true commercial value in our operations.
Sapa Profiles in Asia

Sapa Profiles is the world’s largest supplier of aluminium extrusions with 16 per cent market share in Europe, 26 per cent in North America, and eight years of experience in Asia. Over the past two years, Sapa has focused on growing its presence in Asia in general and China in particular, through mergers and acquisitions and joint ventures:

• 2003: Sapa Profiles Shanghai is established as a fabrication unit in Jiading in north-western Shanghai.
• 2010: Sapa acquires a 65 per cent share of former Vijalco, now Sapa BTG, a plant with extrusion and an anodising line located outside Ho Chi Minh City, Vietnam.
• 2011: Sapa Asia and Sapa Profiles China open headquarters in Hongqiao, Shanghai.
• 2011: Sapa acquires 100 per cent of Alufit, an aluminium extrusion plant with anodising and coating lines in Kuppam, Andhra Pradesh. Sapa becomes the first global aluminium extrusion company with local production facilities in India.
• 2011: Sapa Profiles sets up a fabrication plant in India for manufacturing of aluminium coolers for the telecom industry. The plant is located in Bangalore.
• 2011: A joint venture (JV) is established between the Aluminium Corporation of China Limited (Chalco), the largest aluminium company in China, and the Sapa Group with the intention to serve the rapidly growing Chinese rolling stock market.
• 2011: Sapa acquires Jiangyin Hailong Non-Ferrous Material Co. Ltd, now Sapa Profiles (Jiangyin), located 150 km from Shanghai and one of the largest extruders in the Yangtze River Delta.
• 2011: Sapa Technology Shanghai is established in Jiading, Shanghai area, as Sapa’s 3rd R&D centre globally (in addition to North America and Europe).

Sapa Profiles has also established sales offices in Japan and South Korea as well as a sourcing office in South China.

With these investments, Sapa Profiles has established a foothold in Asia from which the company can expand.

Sapa is not only the world’s largest aluminium extrusion company with a presence in 30 countries and extensive processing capabilities, it is also a company with a long experience of understanding its customers’ business and needs. Sapa has the ability to produce highly advanced and complex profiles, which is a prerequisite for serving demanding industrial customers.

In China, it is Sapa Profile’s ambition to consolidate as a technology leader within certain niche segments such as automotive applications, large profile solutions for the train and marine industries, and applications within thermal management for the telecom, power and consumer electronics industries.

In India and Vietnam, Sapa’s long term strategy is similar to the one for China, but it is currently mainly delivering to building and construction, solar and furniture markets.

Jarle Dragvik
Managing Director China
Sapa Profiles Shanghai

Sapa Profiles Shanghai (SPS) started as a small fabrication plant in 2003. In 2010, the company had grown to 330 employees and with a turnover of CNY 135 million.

SPS has previously mainly supplied coolers to the telecom and power industries both in China and for export. However, recent years due to a broader market approach, the company has also taken market share in for automotive and renewable energy applications.

Production consists mainly of computer numerical control (CNC) and friction stir welding (FSW) machining. The fabrication of profiles also includes sawing, bending, punching, deburring, ultrasonic washing, CMM, assembly and packing, etc.

The great majority of SPS’ existing customers are leaders in their industries.

The total Chinese aluminium extrusion market is the largest market in the world and has grown from approximately 3.2 million tonnes in 2005 to 8.4 million tonnes in 2010. It is forecasted to reach about 13.4 million tonnes in 2015. Currently, the building and construction segment strongly dominates the market, but is forecasted to give share to industrial applications as the market is evolving.

In China, most domestic players are currently not capable of meeting complex technical demands, presenting opportunities for Sapa Profiles to take significant positions in the market place.

In 2011, Sapa Profiles had a fabrication plant in Jading, north-west of Shanghai, an extrusion plant in Jiangyin, Jiangsu Province, a sourcing centre in Foshan, Guangdong Province, and a joint venture with Chalco, China’s largest aluminium company, in Chongqing.

Arnold Yuen
Managing Director,
Sapa Profiles Shanghai.

Sapa Profiles Shanghai

Facts about Sapa Profiles Shanghai (SPS)
- Location: Jiading, Shanghai, PR China
- Year of establishment: 2003
- Number of employees: Around 330
- Total area: 25,817 sq m
- Plant area: 21,233 sq m
- Machinery and equipment: CNC and FSW machinery

Sourcing Centre in Guangdong
Sapa Profiles China & Asia Sourcing Centre is located in Foshan, close to Guangzhou, the capital of Guangdong Province. The function of the centre is two pronged: to (1) source aluminium profiles equipment, tools, consumables, etc., and to (2) provide services to Sapa companies worldwide.
In 2011, Sapa took a significant step forward in realising the ambitions of its Asian growth strategy in the world's largest extrusion market by acquiring Jiangyin Hahong Non-Ferrous Material Co. Ltd, now Sapa Profiles (Jiangyin) Co, Ltd.

It is a fairly new plant, established in 2009, with a total current capacity of 60,000 tonnes. It is operating 15 presses, including a 3,600-tonne UBE press and a 2,500-tonne local press. In addition, a 6,800-tonne UBE press will be relocated from the former Sapa plant in Illinois, USA. Planned start of production is 2nd half 2012.

The 6,800-tonne press has both direct and indirect capabilities, which enables Sapa Profiles (Jiangyin) to extend the product range to encompass a broader alloy range – for example, both soft and hard alloys.

With this new press and other improvements by Sapa, the annual capacity at the Jiangyin plant will increase to 95,000 tonnes. The three large presses are able to produce half of the total volume.

Sapa Profiles (Jiangyin) is an integrated plant equipped with a remelt facility, two anodising lines, a powder coating line, two thermal break lines and some light fabrication machinery.

### Facts about Sapa Profiles Jiangyin

- **Location:** Jiangyin, Jiangsu Province, PR China
- **Year of establishment:** 2009
- **Number of employees:** Around 400
- **Total area:** 330,000 sq m
- **Plant area:** 190,000 sq m
- **Annual capacity:** 60,000 tonnes (will be increased to 95,000 tonnes in 2016)
- **Presses:** 15 presses installed ranging from small 600-tonne to the largest one, a 3,600-tonne UBE Press. A 6,800-tonne UBE press will be relocated from the USA, with start of production 2nd half 2012
- **Remelt:** Two 15-tonne furnaces
- **Painting:** A horizontal powder coating line and a fluorocarbon line.
- **Anodising:** Two U-shaped anodising lines.
- **Other machinery and equipment:** More than 4,000 dies, two thermal break lines, one fabrication line.
A joint venture between the Aluminium Corporation of China Limited (Chalco), the largest aluminium company in China, and the Sapa Group was established in 2011 to serve the rapidly growing rolling-stock market in China.

The joint venture, Sapa Chalco Aluminium Products (Chongqing) Co, Ltd (SCAP), will build a state-of-the-art aluminium extrusion and fabrication facility, ready for production in 2013. The new greenfield plant will be located at the Xipeng Industrial Park in Chongqing.

Chalco has solid cooperation with the two state-owned train manufacturers in China. Chalco also has a large extrusion press at the Southwest Aluminium (SWA) plant in Chongqing, enabling fast market entrance.

Sapa has extensive competencies in the market segment through its knowledge of the industry, research & development solutions, extrusion process and fabrication solutions such as friction stir welding (FSW). Sapa also has long-term customer relationships with global train manufacturers.

The joint venture will cover all three product segments that presently exist on the Chinese rolling-stock market: high-speed trains, metros and light rail vehicles, and freight cars. The company will offer significantly lighter weight extrusions than the competition that will lead to lighter trains.

**Joint Venture with Chalco**

**Location:** Xipeng Industrial Park, Chongqing, PR China

**Year of establishment:** 2011

**Number of employees:** 30 in the first phase, around 200 in 2013.

**Total area:** 70,000 sq m

**Plant area:** 35,000 sq m

**Annual capacity:** The factory will be ready for production in 2013.

**Proress:** SCAP will invest in a 12,000 tonnes press line which will be capable of extruding very large profiles. Before that it will source aluminium profiles from an 8,000 tonnes press at South West Aluminium (SWA) in Chongqing.

**Other machinery and equipment:** A fabrication workshop with FSW and CNC machinery.

**Facts about Sapa Chalco Aluminium Products (SCAP)**

Torbjörn Sternsjö, General Manager of Sapa Chalco Aluminium Products

Tolga Egrilmezer, Vice President Strategy, Sapa Group, and Luo Jianchuan, President of Chalco.
Our Technology & Processes

Sapa Profiles has extensive operations for the processing of profiles, such as cutting, bending, CNC processing, hydroforming, fusion welding, friction stir welding, anodising, painting, and other value adding processes.

The overall strategy is to establish close cooperation with customers to provide them with value-enhancing aluminium solutions.

The principle of aluminium extrusion is based on carefully controlled and managed process of temperature, speed, tooling design and timing, where an aluminium billet is heat to exact temperature for its alloy properties ideal temperature and pressed through a custom made die with great force.

The profile emerges at a speed of 5–50 metres per minute and reaches a length of 25–45 metres depending on the specification of each individual profile. Cooling takes place immediately, by air or water. To ensure that the profiles are straight and to release internal stresses, the profiles are stretched after cooling. At the same time, they are checked to ensure that all key functional dimensions are correct and that the surface quality is correct. The profiles are then cut to the appropriate length. The material is then subjected to natural aging or artificial aging to bring it to its permanent level of tensile strength.

Large or medium-sized profiles are pressed through the die with only one cavity. For smaller profiles, multi-hole dies may be more appropriate. Multi-hole dies can have up to 16 cavities.

Sapa provides its customers with expertise, high quality and resources, freeing up capacity to allow them to concentrate on their core operations.

In addition to aluminium extrusion, process control and die design, here are some of the areas in which Sapa has unique leading edge technological expertise:

Surface treatment
The appearance and surface quality of the aluminium profile is quite satisfactory for many areas of application, even before any surface treatment. Due to its
excellent resistance to corrosion, it is rarely necessary to apply surface treatment merely to create protection from corrosion.

On the other hand, surface treatment of profiles is carried out for many other reasons. Surface structure, colour, corrosion resistance, hardness, wear resistance, reflectivity and electrical insulation properties are some of the properties that can be modified.

Anodising is one of the most common surface treatment methods. Anodising produces a decorative, soil-repellent, corrosion-resistant surface. The surface of the metal is transformed into oxide through electrolysis. The process continues until the desired thickness of the oxide layer is reached.

Powder coating is by far the most common method of applying colour to aluminium profiles. Powder coating withstands high impact and abrasion considerably better than wet coating. It has good formability and is suitable for use in open air due to high UV radiation resistance and corrosion resistance.

Decoral is a variation of powder coating that produces patterned surfaces.

Fabrication
From the outset, when a profile is being designed, it is possible to create a shape that will minimise necessary post-extrusion processing. However, some type of further processing is often necessary. It is relatively inexpensive to carry out further processing of aluminium profiles. The excellent formability of the material generally creates competitive tooling costs.

Considerably higher cutting speeds can be achieved in cutting aluminium than cutting steel. Tumbling is used mainly for burring and creates different surfaces depending on time and tumbling material.

With several CNC-controlled multi-task machines, Sapa is well equipped in the area of high-speed machining. The machines have considerably better dynamics and more efficient control systems than conventional machines.

Hydroforming
Using hydroforming, cross-sections can be modified on a section of the profile or on the entire profile. In a single step, complicated details can be created, with very high precision. The hydroforming operation also permits local changes such as domes or holes. This saves several processing steps, which can produce shorter lead times.

The profile is placed in a die whose inner geometry is the same as the finished component. The die is locked under intense pressure, after which hydrostatic pressure is created inside the tube (the profile). When the profile is pressed onto the die, it takes on the shape of the die.

Friction-stir welding (FSW)
A rotating tool is pressed into the metal and moved along the line of the joint. No filler metals or shielding gases are used. FSW takes advantage of the metal’s characteristic of withstanding major plastic deformation at high temperatures, though not above the melting point. Clean metal surfaces on the profiles that are to be joined are pressed together under high pressure. At the same time, mechanical action using a rotating tool creates friction heat. The pressure and the heat combined result in a new, homogenous structure.

FSW gives higher strength than fusion-welded joints, reduces thermal deformation and forms flat surfaces.
Sapa Technology is the Sapa Group’s joint research and development (R&D) function carrying out development projects in cooperation with Sapa’s customers, regional technical and application centres and entities worldwide.

Sapa Technology Shanghai is one of the Sapa Group’s three R&D centres globally. The others are located in Finspång, Sweden, and Portland, Oregon, USA. The three centres contribute to strengthening the group’s leading position in the aluminium extrusion and heat exchanger industries by leveraging on global R&D capabilities, engineering competence and technology transfer.

The aim of Sapa Technology Shanghai is to serve the customers mainly in the Asia-Pacific region by making use of the local team and specialised experiment equipment combined with industrial trials.

Sapa Technology is continuously working with the development of the extrusion process to improve both production and the final product – for example, the development of new alloys, billet quality, surface treatment methods and extrusion dies.

The R&D centre provides expertise in many areas, including melting and remelt treatment, casting, homogenisation, alloys, billet quality and its relation to extrudability, etc.

In fabrication, Sapa Technology offers, for example, analysis and testing of forming and joining, as well as development of the friction stir welding (FSW) tools and process.

Sapa Technology’s laboratories provide qualified support for customers through advanced equipment for engineering, simulation, measurement and materials technology.

Before the acquisition by Sapa, Haihong was mainly a general extruder serving the solar industry and the building & construction sector with profiles. Sapa Profiles Jiangyin will continue producing profiles for these industries but gradually move towards becoming a niche player for mid- and high-end industrial markets, such as marine, thermal management and automotive in addition to high-end building & construction.

These niche markets require more sophisticated technical expertise and production control and the ability to deliver constant high quality, some of Sapa’s core competences.

The additional investment of the 6,800-tonne press from Sapa’s former plant in Morris, USA, will give Sapa Profiles Jiangyin a possibility to supply large profiles to several market segments, such as the marine industry and large sizes of curtain walls that previously have not been accessible.

Even though there are more than 600 extruders in China and competition is fierce in many segments, not many extruders have moved successfully in to the more advanced automotive component segment. One of the reasons behind this is difficulties involved in meeting the quality levels typically required by the automotive industry. Sapa has the right experience, quality approach and management systems in place to overcome this difficulty.

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The Sapa Group constantly seeks to limit the environmental impact of its operations by improving resource utilisation and to create a healthy and safe working environment.

**Environment**

Sapa uses its innovation and technical resources to find mutually beneficial solutions with customers that meet environmental targets.

Aluminium is known as the green metal. The main starting material in the production of aluminium is bauxite. The known extractable deposits are estimated to last for 200–400 years at the current rate of use. The area affected by bauxite extraction is relatively limited and where extraction has been completed the original environment can be recreated.

Sustainability is high. Through remelting, aluminium can be recycled and reused for the same purposes over and over again. Recycling requires only 5 per cent of the original energy input. Around 75 per cent of all aluminium produced globally since 1888 is still in use.

Around 50 per cent of Sapa’s total production is based on recycled aluminium.

Aluminium is also a green metal thanks to its properties: low weight, high strength, superior malleability, ease of machining, excellent corrosion resistance, etc.

**Health & Safety**

It is Sapa’s aim to provide safe and healthy workplaces for all employees, with the long-term goal of avoiding all injuries, incidents and occupational ill-health.

All employees and managers adhere to safety laws and regulations issued by the company and the local government. Everyone has the responsibility to improve health and safety performance on a day-to-day basis.

Sapa Profile China employs altogether around 750 staff (2011) at its facilities in Shanghai, Jiading and Jiangyin. Furthermore, there are 20 employees at the joint venture in Chongqing, which will grow to 200 when the plant is inaugurated in 2013.

The average age of the employees is around 30 years and some 70 per cent are men. Blue-collar workers generally have technical high school education and most white-collar staff has university degrees.

The company arranges technical training and management skills training on a continuing basis to improve the competence base. There are also frequent exchanges of employees between China and Europe/North America.

Sapa provides equal opportunities in recruiting, promotion, education, and compensation, without discrimination of gender, age, religion, or nationality. Sapa promotes a comfortable and dynamic working place for all employees.

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