

SAMSON

Issue 11

MAGAZINE

SAMSON MAGAZINE 2008



Impulse

Burning wood to protect the woods

Report

Innovation the Bavarian way

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Optimally tuned – TROVIS 6495 Industrial Controller

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Cover

Carnival of Venice with its famous masks and disguises. Italy masters the art of combining business and pleasure.

Acknowledgements

We would like to thank the following persons and organizations for providing photo material: Roche (p. 6), Uwe Niggemeier (p. 7), www.pixelio.de [Werner Wind (p. 8), Götz Friedrich (p. 9 top), Peter Kirchhoff (p. 9 bottom), Gandi (p. 12), Jürgen Heimerl (p. 13 right)], Barilla (p. 11), Krones AG (p. 13 bottom right), Heiner Heine/Industriepark Werk GENDORF (p. 14), NUVERA (p. 21), Woodside (p. 22, 23 top) Bluewater (p. 23 bottom) and Tourismusverband Hochpustertal [C. Tschurtschenthaler, M. Schönegger (p. 13)].



Sustainable innovation

Dear Readers,

Last year, the 101st year in the company's history, proved to be excellent for SAMSON. We do not need to keep our recipe for success a secret. Key factors include tradition, innovation and customer service. Our tradition primarily involves concentrating on our core business as well as the expertise we have gathered over many years. Our engineering excellence covers the entire scope of valve technology, including peripheral instruments. We are able to supply control products for all conceivable automation requirements. It goes without saying that top quality contributes to our success.

We have set ourselves high standards concerning the manufacture of consistently high quality products and we are able to achieve them thanks to our excellently qualified, committed employees. We have trained many of our own staff, who started in the company as apprentices. This reflects the long-term strategy also followed by the company's owners who have kept the business in family hands without the need for external funding. This stability and consistency allow us to manage the business strategically.

This solid basis has enabled us to concentrate on continuous and sustainable innovation. Of course, we continue to develop our products. We are at the

forefront in those fields of automation technology which have experienced radical advances such as fieldbus communication.

Delivering the best quality at all times for a wide variety of applications at a competitive price requires perseverance and continuous innovation to improve products and processes. As a result, we invest a great deal in new buildings and machinery.

We are currently in the process of increasing the density of our worldwide network of production and sales sites, which exists alongside our carefully selected sales partners. New production facilities are being built in India, and the Chinese subsidiary in Beijing is being expanded. We aim to advance further into the flourishing oil and gas production sector in Central Asia and the Persian Gulf. We will continue to rely on the strength of our tradition, search for the best-suited control solutions and provide local customer support to make full use of the opportunities that arise in the future.

Ludwig Wiesner, Chairman of the Executive Board

Optimally tuned – TROVIS 6495 Industrial Controller

Of course, these days almost all industrial applications can be conveniently controlled by process control systems from a computer. However, there are still some processes that require frequent manual intervention, or are better controlled on site, whose integration into a process control system would involve comparatively high costs.

The TROVIS 6495 Industrial Controller was developed for customized automation of such processes. It masters the chief control modes ranging from fixed set point to cascade and ratio control. Thanks to its neural network structure, the controller can be easily adapted to new requirements. In practice, this means various variables can be included to achieve the best control results without having to perform any complicated programming. Auto tuning helps find the optimal control parameters quickly. Users can operate and monitor two integrated control loops at the same time. The display enables users to view all key parameters and certain graphs. Each control loop has its own separate operating keys, making operation fast and safe. The controller can be integrated into a higher-level control system over Profibus DP or Modbus RTU.

The TROVIS 6495 Controller provides the perfect solution for various small and medium-sized plants. The three following examples demonstrate its versatility.

Example 1: Heat exchanger

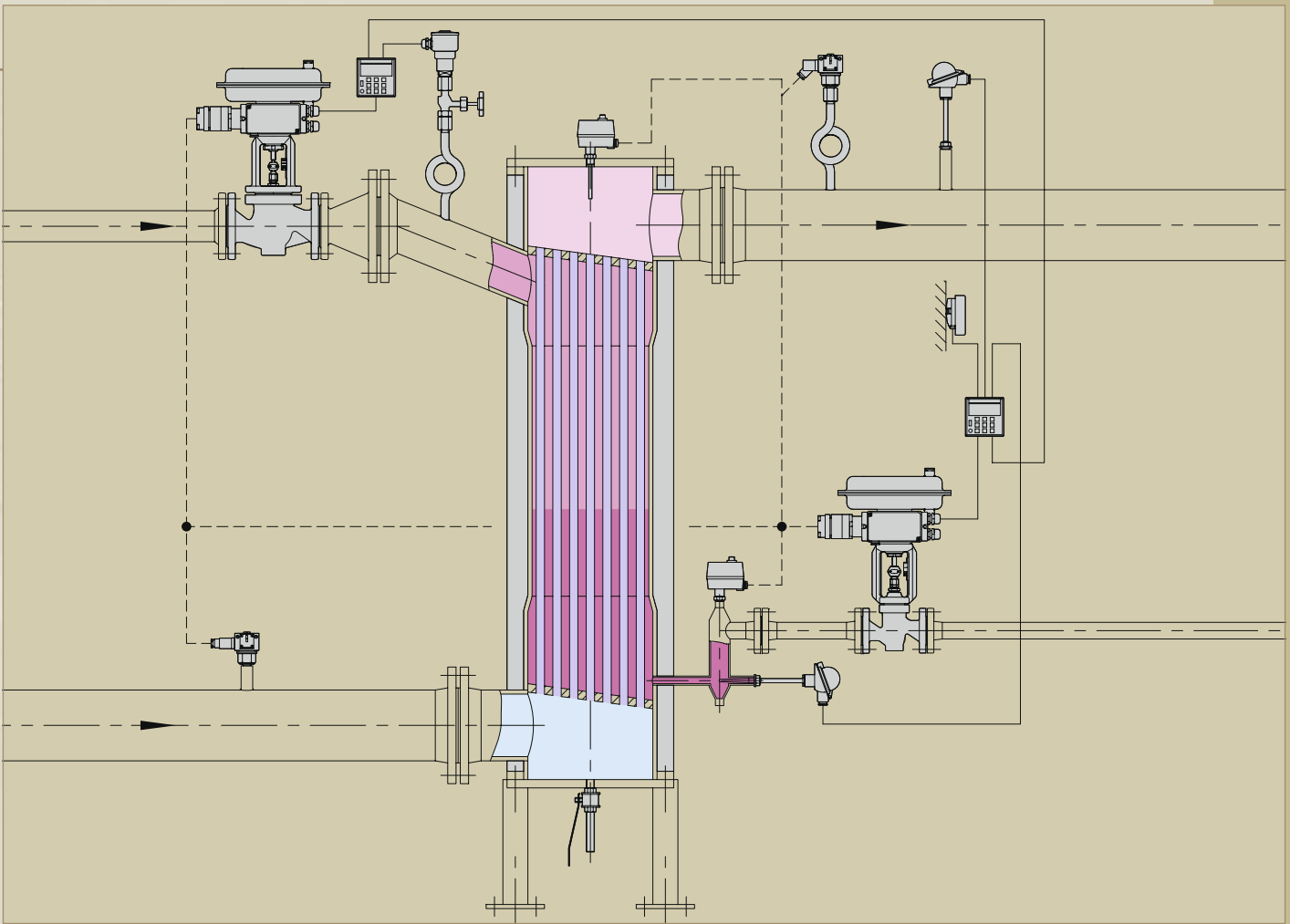
Heating at full steam – A typical application for up-right heat exchangers is the substation in a district heating network. The primary circuit of the district heating network operates with superheated steam at a pressure of 10 bar and at temperatures between 180 and 210 °C. This steam is used to heat up water in the heat exchanger at the consumers' to supply sufficient heat energy for heating and hot water.

The automation system must be able to cope with extreme fluctuations in heat consumption caused by the high heat demand in winter and low heat demand in summer without the safety equipment raising the alarm. A high control ratio, which is the technical term for the difference between minimum and maximum load, can be achieved by regulating the steam.

From zero to one hundred – The energy contained in steam is not just based on the temperature. Pressure also plays a decisive role: the higher the pressure, the more energy there is. Since the steam pressure in boilers or downstream of a turbine is usually constant, the steam pressure in the heat exchanger is reduced to a certain level by a steam regulating valve. The second variable, the level of condensate that collects in the heat exchanger, is controlled by a valve.



The TROVIS 6495 Industrial Controller fulfills a wide variety of control tasks thanks to its display and various functions.



The steam that has condensed back into water has already released its energy and reduces the surface area for heat transfer, impairing the heat exchanger performance. The combination of condensate level regulation and upstream steam control allows the energy demand to be reliably controlled between zero and 100 %.

However, a large consumer, such as a swimming pool operator who switches to full power at five o'clock in the morning and utilizes large quantities of hot water, can overtax the capacity of a single heat exchanger. Since transfer stations are always equipped with several heat exchangers to guarantee the energy supply, a second heat exchanger is activated at the right moment by a temperature regulating valve connected in the same supply line, which regulates the flow rate of water.

Available in the right sequence – This is achieved by two TROVIS 6495 Industrial Controllers assigned to every heat exchanger and the sequence control of the heat exchangers in automatic operation is implemented by a small programmable logic controller (PLC). The self-supporting solution for each heat exchanger provides all the necessary functions for optimal control of the key parameters while being easy to operate. This solution is much more cost effective than an automation system consisting of a PLC and control station, and also provides a better availability.

Example 2: Steam conditioning

Keeping the right temperature – Reaction vessels are key plant components in the chemical and pharmaceutical industries. Substances

Upright heat exchangers require the precise control of the steam pressure and condensate level. Additionally, an accurate sequence control is essential.

react together in them as part of controlled chemical reactions to produce products such as paints or medicinal products. As most of these reactions need to be performed within a certain temperature range, the vessels are heated with conditioned steam. This often entails the steam temperature following an intricately plotted set point curve. For instance, the control task at hand may involve heating a product within 30 minutes from 60 °C to 80 °C, then keeping this temperature constant for 60 minutes, followed by 20 minutes of heating up to 90 °C. In many cases, the maximum permissible difference between the steam and product temperatures is also specified to prevent the product from being spoilt. To achieve relatively low temperatures, the steam conditioning plants, e.g. water bath desuperheaters, must be able to operate in the negative pressure range.

Protecting valuable products – As in our first example, the steam pressure is regarded as the crucial controlled variable. It is responsible for regulating the maximum temperature of the steam used to heat the reaction vessel. The steam valve allows the right amount of steam to pass through the pipeline to keep the right pressure and, as a result, the right temperature, too. The steam is cooled down using the condensate in the water bath desuperheater. The condensate level is kept constant. When a certain level is exceeded, the controller output for the steam valve is set to 0%. This ensures that the steam cannot damage the product in the reaction vessel.



To ensure that chemical reactions run as required, complicate temperature profiles are often specified. The TROVIS 6495 is the right choice for the precise temperature control of reaction vessels.

Only one TROVIS 6495 Industrial Controller is required to handle all the aforementioned control tasks in place of the two controllers previously needed. The controller is connected to the automation system of the reaction vessel using analog and digital signals or over a fieldbus network. A wide variety of applications are covered by the industrial controller, ensuring that narrow control tolerances can be kept.

Example 3: Wire rolling mill

Large temperature fluctuations – The art of wire drawing developed over many centuries. In the meantime, the highly specialized craft has become an automated industrial process. Yet, even the most modern technology has to cope with the peculiarities and laws that are characteristic of wire manufacturing. As in all other types of steel processing, the temperature plays a decisive role.

Right at the start of the process, the billets (the metalworking term for the metal bar before it is processed) are heated up to 1500 °C. The temperature during this process can fluctuate

by as much as 100 °C. The steel runs through several different rolls until it has reached the required thickness. The properties of the wire are not only based on the composition of the metal, but on the temperature cooling process that follows where the wire is cooled down quickly passing through a series of cooling zones. During this process, only very slight deviations in temperature are permitted.

Impossible to measure – A problem is posed by the fact that the temperature of the wire cannot be measured as it enters the cooling zone. Similarly, the temperature cannot be measured after the wire has completed the cooling process. The mean wire temperature cannot be measured before the subsequent coiling station. As a result, the measurement is afflicted with a dead time and fluctuating data as the wire does not always coil evenly. An additional disrupting factor is the irregular cooling water pressure.

What is more, the entire process involves a very fast batch process: Turning the initial billet into a ready-coiled roll of wire takes only 90 seconds. After that, a maximum of

20 seconds is available for the controllers responsible for the flow rate in the cooling zones to adjust a temperature of around 10 °C. To meet this control demand, the scan times of the controller must be below 100 milliseconds. Different wire qualities and diameters involve a variety of flow rate ranges.

TROVIS 6495 Industrial Controllers with various configurations are used in the wire rolling mill to precisely keep track of various process variables, such as outlet temperature and flow rate. The batch-related control is steered by digital inputs sent of the PLC installed in the rolling line. The set points and output variables for starting a new batch are

sent by the PLC to the controller over a bus network. The updated measured data are transmitted in return. Thanks to the short controller scan time, the required control accuracy can be achieved. The local operator interface, on which all key process variables are displayed, and the possibility of intervening manually make the TROVIS 6495 Industrial Controller the ideal solution for the difficult control tasks set by the wire rolling process.

The steel heated up to 1500 °C is rolled, drawn and cooled in various stages. Fast-reacting temperature control is vital in this process.





Culture of refinement

It was in 1421 that the Italian builder and architect Filippo Brunelleschi received the first recorded patent for an industrial invention: a barge with hoisting gear designed to transport Carrara marble down the river Arno. The patent gave Brunelleschi a three-year monopoly on the manufacture of the ship, which considerably sped up the building of his major work, the dome of the Cathedral of Santa Maria del Fiore (the Duomo) in Florence. Historic documents indicate that such privileged grants to inventors spread from Italy to other European countries during the following centuries. So, this patent is only one example of the cultural enterprise and innovative strength that has been characteristic of Italy since the early Renaissance period.

Today, Italy is the seventh largest economy in the world and home to numerous leading companies in different sectors, whose success on the world market is still based on continuous innovation and refinement. At the same time, Italy is a country with a rich history and fabulous landscapes where *la dolce vita* is still celebrated. In 2006, SAMSON Italia, SAMSON's subsidiary in Italy, had another reason to celebrate: its 25th anniversary.

Venice is famous for its annual carnival and the colorful masks traditionally worn for the celebrations.

Then and now – The boot-shaped Italian peninsula has influenced Mediterranean and European culture since the times of the Etruscan civilization, the Greek settlements in Sicily and the Roman Empire. Notable achievements, for example of the 12th century, included the development of the modern banking system and the establishing of an elaborate trade network that spanned the then-known world, allowing Italy to distribute its many handcrafted goods across the world. For over 2,000 years, Italy has been a place where the old was continuously refined to create something new, where tradition and invention continue to coexist. As in Brunelleschi's times, the country still produces goods that are much sought after the world over.

Quality and design – Italian food and wine figure among the top exports. This is no wonder since a wide variety of culinary specialties originates in the regions located between the high peaks of the Alps in the north and the island of Sicily in the south. However, it is not only pizza and pasta that have gained global popularity. Further world-famous products of highest quality come from Italy: Thinking of luxury cars? Think Ferrari, Lamborghini and Maserati. Thinking of fashion? Think Dolce & Gabbana, Prada and Versace. And these are only two examples of the many fields where Italian design sets the standards for elegance and style from New York to Tokyo. Evidently, the Italians know how to combine business and pleasure, how to work hard and enjoy life, how to produce high quality and make it look exquisite.



Niches and innovation – Over centuries, Italy has maintained a culture of refinement and constant improvement that is deeply rooted in the Italian mind; it marks the daily business for many small and medium-sized enterprises that possess enormous dynamics and innovative strength. These companies create trends and open up yet undiscovered niche markets.

True, customers the world over may be more familiar with the flashy Italian fashion and cars. Yet, this does not mean that other Italian industries work less efficiently or successfully. The mechanical engineering, vehicle construction, textile, chemical and petrochemical sectors

Food and wine are among Italy's top exports. They stand for Italian know-how and la dolce vita.

Portrait

SAMSON Italia's headquarters in Milan.

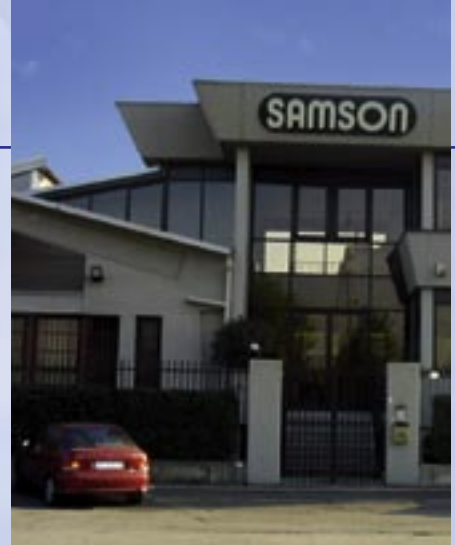
produce equally good quality, but their products are less frequently found in the international limelight.

SAMSON and Italy – SAMSON has been active on the Italian market for over 85 years. In a first step, a representative started selling SAMSON regulators between the First and the Second World Wars. The next step was to establish a proper subsidiary in 1981. SAMSON Italia is headquartered in Milan, the industrial metropolis in the north of the peninsula, where most of the subsidiary's 23 employees work. The majority of customers do business directly with the headquarters' service representatives. The Milan facilities provide storage space so that the essential components are always at hand. A workshop exists, allowing devices to be repaired, upgraded or

modified. In addition, two mechanics assemble control valves for express orders.

Training courses are regularly held at SAMSON Milan to bring customers and staff up to date on the latest developments in instrumentation and controls. The programs cover a wide range of topics, from valve sizing and configuration to the communication schemes used by the different fieldbus systems. In addition, customers and staff receive hands-on training in repairing and servicing SAMSON equipment.

Apart from the Milan headquarters, SAMSON Italia has a branch office in the country's capital, Rome, which serves the southern part of the peninsula and Sicily.



A number of independent representatives assists the SAMSON staff in their daily business, i.e. taking care of the many domestic customers who operate plants all across Italy. They ensure that all customers have a local SAMSON contact close by when they need one. In addition, the representatives handle orders and provide after-sales service directly on site.

Plant engineering and project business – Another major field of activity for SAMSON in Rome and Milan is supporting the highly specialized plant engineering companies that



Staff and sales representatives of SAMSON Italia enjoyed a day out at Lake Como to celebrate the company's 25th anniversary with guests.

operate out of Italy. This involves intensive consulting with planners at the initial stages, sizing and configuring the required equipment, scheduling on-time production and logistics, assisting customers in installation and start-up, and finally, providing excellent customer service.

SAMSON equipment is installed in many applications in the Italian food, pharmaceutical and district heating sectors, where mainly self-operated regulators are in demand. For example, SAMSON control valves regulate the flow of dough that is turned into the delicious Italian pasta that is so popular all across the globe. As the Italian plant engineers usually work on international projects the world over, it may well happen that a chocolate factory in Canada or a refinery in the Gulf region is equipped by SAMSON Italia.

To properly handle such complex international ventures, SAMSON Italia set up a dedicated department specializing in the management of large-scale projects four years ago. Relying on the necessary resources, the department plans and organizes the entire control valve equipment to match the specific requirements of even the largest plant.

And this dedication to quality and refinement is what makes the SAMSON staff true representatives of their country: They breath life into the Italian ambition of producing good quality and furthering constant innovation. Their dedication to refinement helps ensure the global success of their customers. As a result, it is no wonder that many machines and plants operated, designed or constructed in Italy rely on control equipment by SAMSON, which has demonstrated the same commitment to quality and innovation throughout its entire history.



Quality and family tradition

If you want to sell pasta in an Italian neighborhood it better be of really good quality. Pietro Barilla was fully aware of this when he opened his small shop in the northern Italian town of Parma in 1877. Right from the beginning, he selected only the best ingredients to turn them into handcrafted bread and pasta that he and his son Riccardo sold fresh from a horse-drawn cart. Placing paramount importance on quality and family tradition proved to be the right way: Today, the Barilla Group is the world's leading pasta producer and still run by Pietro's family in the fourth generation. Apart from pasta in over 180 shapes and sizes, Barilla makes crispbread, pasta sauces and various kinds of baked products.

Each year, about 1.25 million tons of durum wheat, 350,000 tons of rye and 500 million eggs are processed in 26 production facilities worldwide, with the new mill in Parma alone grinding 900 tons of wheat daily. With an annual output of over one million tons of pasta, the Italian family business doubtlessly contributed to the global popularity of pasta, e.g. as a *primo piatto* (starter).

Following Pietro's principle of quality, Barilla places high demands on raw materials. From cultivation to the final selection of wheat types, Barilla watches closely over every stage in the supply chain. Suppliers are regularly audited and incoming goods are examined thoroughly so that, statistically, Barilla conducts one test every 30 seconds.

Equally high demands are placed on the production processes. The Group invests five percent of its annual sales in upgrading its plants. Naturally, great care is taken over plant maintenance, process monitoring and quality control. Nevertheless, these efforts at meeting highest quality demands require the use of suitable control equipment. And this is where SAMSON comes into play: Its control valves, which meet the exceptionally strict hygienic standards of the food industry, help Barilla hold up a tradition of quality and excellence.

Innovation the Bavarian way

Lederhosen, Weisswurst and Oktoberfest, the annual Munich beer festival where *weissbier* is served by the liter, are the mainstays of a widespread cliché image of Bavarian peculiarities that, abroad, are also mistaken to be typical of Germany. True, Bavaria is different: different from the rest of Germany, but also different from the well-known stereotypes.

Apart from its undeniable unique naturalness, Bavaria is characterized by ultramodern, dynamic industries, e.g. in the automotive, electronics, chemicals and plant engineering sectors. Many industrial world leaders have settled in the state bounded by the river Main to the north and the Alps to the south. They are supplied with SAMSON products by the Munich engineering and sales office located in the Bavarian capital. Together with its Burgkirchen branch, Munich is the German SAMSON office generating the highest sales — and a typical example of SAMSON's service culture.



Brewing at its best – One of the main peculiarities of Bavaria is that tradition and innovation seem to blend there better than anywhere else. For example, the world-famous Bavarian beer is still brewed according to the traditional recipes dating back to the 15th century. At the same time, Bavaria is a leading producer of state-of-the-



The successful team of the Munich engineering and sales office.



Munich's major sites: the onion-domed Frauenkirche and the New Town Hall on Marienplatz.

art brewing equipment. Krones, for instance, a world market leader in beverage filling and packaging lines based in Neutraubling, is a major supplier of brewing and mashhouse automation solutions. In the plants Krones designs and builds, control valves and electropneumatic converters by SAMSON ensure that high-quality beer and other beverages find their way into bottles and kegs.

Munich itself is rather a location for service-oriented enterprises than production industries. As a result, heating, ventilation and air-conditioning account for a considerable share of the business done at SAMSON's Munich office. Further major customers include the numerous plant engineering businesses and other companies that, like Krones, integrate SAMSON technology into their own products. Tailored

to the needs of these customers, SAMSON Munich provides comprehensive engineering services and helps with planning. In addition, the office has an extensive warehouse for after-sales service and facilities for assembling control valves to immediately handle urgent orders.

The Munich office was established in 1970, starting out with eight members of staff. At the time, the relatively vast sales area – Bavaria is as large as Belgium and the Netherlands taken together – covered approx. 3,200 potential customers in different industries. Since then, the number of customers has increased considerably, as has the number of staff: Today, the office employs 17 people, four of whom work in the Burgkirchen branch office, right at the heart of the Bavarian Chemical Triangle.

The beer for Munich's most famous beer cellar, Hofbräuhaus, is still brewed according to the traditional recipe.



Right where the customers are:
the staff of the Burgkirchen
branch office.

Chemical cluster in the countryside –

The Chemical Triangle is located approx. 100 km east of Munich, near the Austrian border, and forms a unique synthesis of old and new. In an idyllic, rural landscape usually predominated by cows and cornfields, a large number of chemical plants has settled over the past decades, concentrating specialized production sites and expert knowledge in a rather small region around Burgkirchen. First signs of the Chemical Triangle emerged around 1910 when the conversion of carbide into calcium cyanamide fertilizer began. The conversion process required considerable amounts of energy, which could be supplied by hydroelectric power sta-

tions situated along the nearby rivers Inn and Alz. Since then, the rural region has developed into a significant center of the German chemical industry.

In the middle of the 1960s, a refinery now part of the OMV Group was commissioned in Burghausen, which introduced the petrochemical industry into the conglomerate and paved the way for the industry's ongoing growth in the area.

Forward-thinking infrastructure – In the beginning, mainly chemical mass products were manufactured in the Chemical Triangle. Today, over 25,000 people work in the produc-



tion of highly specialized chemicals. Production relies on an ultramodern infrastructure: The energy demand of the region – at around five billion kilowatt hours per year it equals that of the city of Munich – is largely covered by company-owned hydroelectric power stations that help cut costs and have less environmental impact. In addition, thermal and combined cycle power plants, i.e. cogeneration plants that produce both electricity and heat, are at work.

Crude oil gets to the region through a connection to the transalpine pipeline running from Triest in Northern Italy to the Bavarian town of Ingolstadt. Finished petrochemical products are pumped through a dedicated pipeline to Munich's airport. A 350-km-long ethylene pipeline, which will link the Chemical Triangle with an existing network in northwest Germany and expand the trans-European pipeline system, is currently under construction.

Apart from the chemical industry, other sectors, including technical gases and metal processing, have put down roots in the Triangle. Spin-offs and newly founded companies that provide all kinds of services, ranging from logistics and IT to complete infrastructural development, have long since expanded their customer base beyond the Chemical Triangle.



An industrial landscape: the Bavarian Chemical Triangle.

Service around the clock – In the middle of the 1990s, an outsourcing wave swept the Triangle and finally led to the opening of SAMSON's branch office in Burgkirchen. At that time, one of SAMSON's major customers in Bavaria, Wacker, thought about spinning off the spare parts supply for the control valves used in its chemical plants. In September 1998, SAMSON's new office moved into a vast complex that could house the entire valve components stock required by Wacker as well. Soon, the SAMSON specialists also took over the component stock of another major chemicals producer, which at that time still traded under the name "Hoechst". Gradually, the Burgkirchen office evolved around these initial customer-specific services. Now, the branch office provides the chemical and petrochemical industry in the Triangle with the well-known 24/7 SAMSON service.

Being so close to the customers in terms of location and dealing with them on a daily basis has allowed SAMSON to gain a thorough understanding of their processes, which is a clear asset for the Burgkirchen office as well as for the customers themselves. As the Chemical Triangle has been booming for years, plants are planned, built, modified and expanded continually, time and again causing situations that require immediate help and control valve expertise. When specifications change at short notice or new plant sections must be tuned to mesh seamlessly with existing installations, the SAMSON experts are always at hand to help with their specialist knowledge, their tailor-made tools and their well-stocked warehouse, 24 hours a day, seven days a week.

Customers appreciate the commitment and immediate availability of the SAMSON service team, even though the need for maintenance is minimal anyway thanks to the excellent quality of SAMSON's products. The local SAMSON staff also assists customers in considerably minimizing downtimes for start-up, maintenance and repair, saving the Bavarian customers time and money.



Chemicals for computers

On 13 October 1914, the entrepreneur Dr. Alexander Wacker founded the company today known as Wacker Chemie in the small Bavarian town of Burghausen near the Austrian border. In those days, transporting generated power over larger distances involved heavy losses. Hence, Wacker used the water power of the nearby river Alz for the world's first large-scale production of acetaldehyde, acetic acid and acetone from carbide. This innovation turned the company into a pioneer in acetylenes. After World War II, Wacker's business flourished mainly thanks to PVC and new product groups like silicones and dispersions. In addition, Wacker was the first company worldwide to start producing highest-purity silicon in 1953, a material indispensable to today's computerized world.

Wacker's highly integrated production and supply chain are based mainly on silicon and ethylene as raw materials. Employing some 14,700 people at 22 production sites all across the world, Wacker produces a broad range of products that meet highest quality standards. These high-tech products are widely used for further processing or as tailor-made solutions, e.g. in solar engineering, electronics, pharmaceuticals and personal care. In 2006, Wacker recorded sales of approx. 3.34 billion euro.

In the summer of 2007, Wacker awarded SAMSON a prize as its best global supplier, emphasizing, in particular, SAMSON's high manufacturing quality, short delivery times, its extraordinary service and worldwide presence.

Burning wood to protect the woods

When hordes of skiers return to their hotel rooms in the afternoon to take a relaxing shower after spending a day on the slopes, the need for hot water is enormous. Boilers work flat out and chimneys puff away. In the narrow valleys of the Alps, e.g. in Val Pusteria in South Tirol, Northern Italy, this used to cause serious problems with exhausted smoke clouding the air: a thick, black haze of flue gas usually settled over the skiing resorts around five in the afternoon, which severely affected the mountain forests. Fortunately, such phenomena are a thing of the past since most of the hotels and private homes in the South Tirolean valley are now supplied by an environmentally friendly district heating network. And the wood waste from the local sawmills supplies the required renewable energy.

Like in other Alpine valleys, the control system, district heating controllers and control valves used to efficiently distribute the heat are made by **SAMSON**.



Waste as renewable resource – Traditionally, the timber industry is an integral part of all mountain economies. Thanks to state-of-the-art district heating technology, its waste can now be turned into energy. Any residue produced when processing the valuable logs, e.g. bark, wood chips and wood scrap, is turned into hog fuel. This shredded wood is burned in the combined heat and power station that serves both towns of Toblach and Innichen in Val Pusteria with



Winter wonderland with clear air: SAMSON equipment ensures an environmentally friendly heat supply in Toblach and Innichen.



their 6,500 inhabitants and over 920,000 nights spent by tourists each year. The power station is at the heart of a complex heating system that prides itself on high efficiency and environmental compatibility.

The power station's chimney is no simple flue but includes a modern ex-

haust gas cleaning system that filters out almost all harmful substances that might pollute the air or damage the forest. Of course, the cleaning system is much more efficient and thorough than filters in individual buildings could ever be. In addition, it is subject to the strict regulations governing industrial installations and scrupulously checked

at regular intervals. The amount of carbon dioxide inevitably released to the atmosphere when burning the wood roughly corresponds to the amount that the trees absorbed from the air during their growth: a natural circuit without putting additional pressure on the environment.

Controlled transfer – As a combined heat and power station, the burner uses a second circuit with heat transfer oil to drive a turbine and generator to produce electricity. Its main task, however, is to heat up the well-insulated primary circuit of the district heating network that transports water at around 90 °C to the over 600 con-

sumers in the hotels and private homes in Toblach and Innichen. Instead of having their own burners, the buildings have been equipped with district heating transfer stations. In Val Pusteria alone, SAMSON supplied over 1,000 smart heating controllers for these stations and delivered all required control valves for the district heating system.

Using a heat exchanger, the buildings' secondary circuits are connected to the primary circuit and, depending on the individual heat demand, their water is heated up to temperatures between 60 and 70 °C by the hot water from the power station. As a

result, the heating and domestic hot water needs of the connected buildings are covered.

Thanks to the meter bus integrated into the district heating controllers, data from the heat meters are transmitted to the control system in the power station. As a result, billing can be automated or, if preferred by the energy supplier, the usage data can be saved in a database for invoicing in a separate system on a fixed date. The speed of the pumps in the network that transport the hot water into the buildings can be controlled with the TROVIS MODULON automation system depending on the amount tapped. Calculated over the system's



Hog fuel for the district heating plant is made from the wood waste produced by the local sawmills.



Pumps transport hot water to the individual transfer stations.

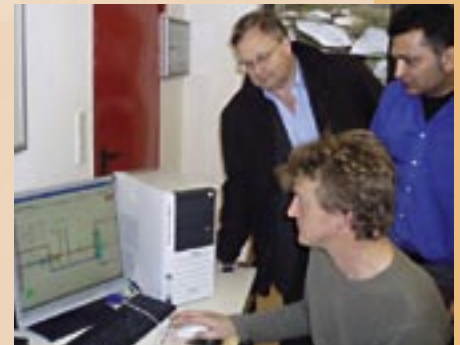
lifecycle, this demand-driven pump operation considerably reduces the cost for electrical power.

Remote access, remote service – The centralized control system used in Val Pusteria was set up by SAMSON to run on PCs. It collects all system-related data from the central power station as well as from the district heating network and the over 1,000 transfer stations. Operators can access data from any of these stations, e.g. the heat consumption, current temperatures, flow rates or the settings that each customer adjusted by hand. This allows operators to give valuable advice or change a station's settings over the centralized control system.

All relevant parameters are saved in a historical database; for example, past temperatures for individual customers or the entire district heating network

can be viewed. This helps optimize the system's parameter settings and serves as proof of the system's performance at any given time.

Faults and errors that occur in the system are meticulously logged. In automatic mode when no operators are present, alarms are sent as text messages to a mobile phone. So, the service technician on duty can decide whether immediate action is to be taken or whether the problem can wait until the next morning; that is, of course, only if the problem cannot be solved on the spot with remote diagnostics and maintenance. In any case, SAMSON is the only partner that the technicians have to deal with since all important components in the system come from just one reliable source: a source the operators have hardly had to resort to since the system was put into operation.



SAMSON automation systems present the entire system at a single glance.



Instead of boilers, homes and hotels have their own transfer stations.

Producing just electricity and water

Fuel cell technology used in the chloro-alkali process brings to mind a perpetual-motion machine. The hydrogen, a by-product of the production process of chlorine, is converted into electricity and this electricity recycled in the electrolysis process of the chloro-alkali plant. This is not only efficient, but environmentally friendly in several ways: During combustion the hydrogen fuel used produces water as a by-product. Electricity is saved, which would otherwise have to be supplied by a power plant. The US/Italian-based company NUVERA FUEL CELLS recognized the opportunities presented by this chlorine manufacturing process and has developed specialized fuel cell modules. The implementation of this technology in processes of the chemical industry was performed by NUVERA's technology partners. The field instrumentation of the plant, which was planned by SAMSOMATIC, was supplied by SAMSON.

A base chemical – The chemical element chlorine (Cl) belongs to the group of reactive halogens. It is a major building block for the chemical and pharmaceutical industry. There are several methods to produce chlorine for industrial purposes. One of the most commonly used methods is chloro-alkali electrolysis. It involves applying an electric current to a simple salt solution ($\text{NaCl-H}_2\text{O}$), and produces sodium hydroxide (NaOH), chlorine (Cl_2) and hydrogen (H_2). An estimated 189 tonnes of hydrogen are released each hour during this process worldwide. This amount of hydrogen could be used by fuel cells to generate 3.151 GW of energy – until now an almost unexploited source.

NUVERA FUEL CELLS EUROPE was formed in 2000 through the merger of a US and an Italian company. Besides fuel cells, NUVERA develops plants for the environmentally friendly generation of hydrogen. As described before, hydrogen is produced as a by-product in abundance in the chloro-alkali industry and is vented unused into the atmosphere. The project undertaken by NUVERA involved optimizing the



Large amounts of hydrogen are released in the cell hall of a chlorate factory during chloro-alkali electrolysis.

In 2005, the NUVERA test laboratory supplied practical proof for the efficiency of using recovered hydrogen to generate electricity.

fuel cells to use this wasted hydrogen for on-site electricity generation which NUVERA has accomplished with the Forza™ product family of fuel cells (*forza* stands for strength in Italian).

Stability and efficiency – In 2005 the development started when NUVERA built laboratories in Osio Sopra in northern Italy on the site of the Italian company SIAD. A year later, the first pilot plant was installed in a chlorate factory at the chemical company Caffaro in Brescia, Italy. This allowed the operation of the fuel cells to be verified under real conditions. This plant generated more than 185 MWh of electricity during 2,000 hours in service. A plant availability of 98.1 % was achieved already in the test phase, providing confirmation of the system's excellent stability. After the test was completed, the Forza™ concept was refined and enhanced for continuous service in electrochemical plants.

Currently, standardized modular units exist, which can contain between 40 and 192 fuel cells. They run automatically 24 hours a day with the high level of 56 % net efficiency and can produce from 250 kW to several megawatts of electricity. The reliability and efficiency of electricity generation rely on future-oriented technology developed by NUVERA as well as the valves and field instruments supplied by SAMSON. They control the flow of gases and cooling water. The intrinsically safe instruments had to be supplied due to the risk of explosion presented by hydrogen. The bodies of the control valves are made



of forged steel to handle this gas safely. Bellows of cold-drawn steel ensure the best possible seal to the atmosphere. Intrinsic safety played a key role in the development phase as it allowed engineers to retune individual parameters even while the process is running.

Belonging to the best on the market

Giampaolo Sibilia, Director of EU Operations of NUVERA and global platform leader for Forza™ products, said that NUVERA decided in favor of SAMSON valves because they belonged to the absolute best on the market. In addition, the expertise in automation engineering provided by SAMSON during the development and installation played a decisive role for NUVERA according to Mr. Sibilia.

Thanks to the Forza™ fuel cells, 20 % of the electricity required for chloro-alkali electrolysis can be saved. In addition to electricity, ion-free water between 65 °C and 75 °C, which can also be used for a wide variety of other applications in chemical processing, is generated as a waste product during the process. The system does not emit any harmful emissions, making a considerable contribution to protecting the environment and fighting climate change.

SAMSON control valves ensure that the right conditions prevail at the inlet and outlet of the fuel cells.



FPSO improves offshore oil recovery

Several decades ago, oil companies extended their exploration of crude oil at sea. Since then, many of the oilfields in shallow coastal regions have nearly been depleted. Numerous untapped sources of oil, however, still slumber in deep waters. Conventional oil platforms, either floating or fixed to the seabed, cannot be used at these depths to produce oil economically. Furthermore, the initial processing to separate oil, gas, water and rock cannot take place onshore in convenient reach of the pipeline. In response, an increasing number of specially equipped tankers, better known as FPSO (Floating Production, Storage and Offloading vessels) are being used. These ships are able to produce and process the crude oil as well as provide field storage until the oil is offloaded onto shuttle tankers. The floating production sites are filled to the brim with high-tech processing equipment and frequently include control valves supplied by the SAMSON Group.



The drilling rig *Ocean Warwick* was destroyed by Hurricane Katrina and washed ashore on the coast of Alabama.



Cossack Pioneer is moored to a turret, which is connected to subsea pipelines. The vessel is situated 112 km north-west of Karratha off the coast of Western Australia. It produces oil, gas and condensate and has a production capacity of 150,000 barrels of crude oil per day.

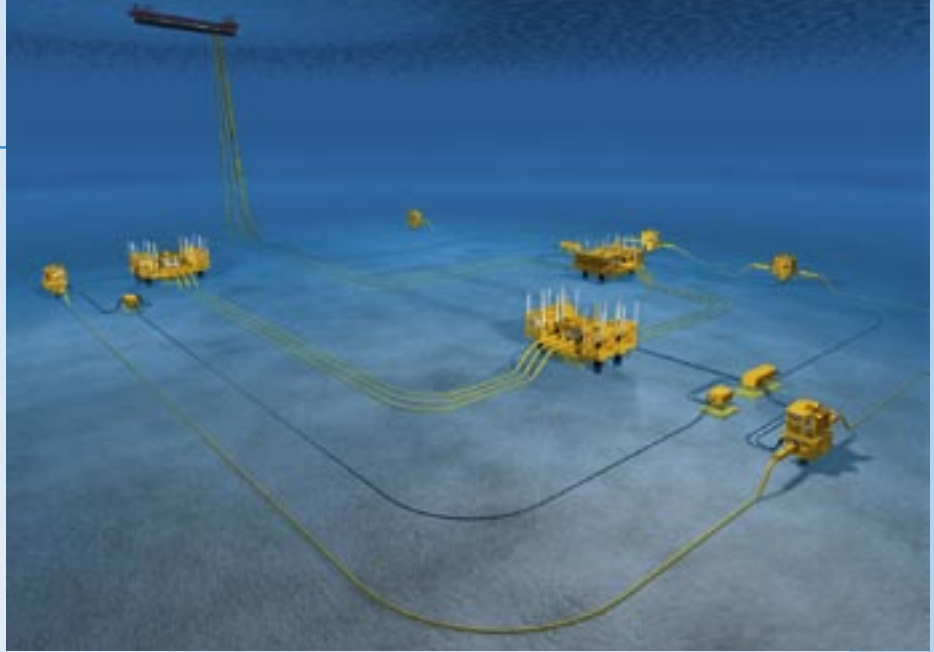
Flexible solution – The outlook for this type of oil production is promising as it is becoming the preferred choice for oil exploration in deeper water and more remote locations. Furthermore, FPSO units have other benefits. For example, they can be used in small-sized oilfields where the installation of a pipeline infrastructure is not viable. Thanks to their flexible mooring, setbacks associated with political instability onshore and extreme weather conditions can be avoided. They can be detached from their undersea wells and evacuated in advance of a predicted storm. Actual damage and production loss due to the destruction of fixed oil platforms during tropical storms amounts to over 12 billion US dollars.

Floating production also presents the opportunity of a second exploration of oilfields that have already been abandoned. Oil resources often still exist, even though oil exploration has been stopped. In the past, many oilfields were abandoned as soon as the natural pressure inside the reservoir became insufficient to convey the oil to the surface. Almost half of the oil remained unexploited. Nowadays, the remaining oil can be recovered by pumping air, water or carbon dioxide under high pressure into the reservoir.

Production continues up to wind force 8

– In any case, the crude oil reaches the onboard pipelines under immense pressure. Up to 200 bar can be encountered in newly explored oilfields. What is more, the crude oil is mixed with abrasive sand and gravel. The list of extreme conditions that the processing facilities onboard have to cope with does not stop there either: Saltwater and aerosols accelerate corrosion of the materials used. Even though the vessel is anchored to the seabed, it is still exposed to the adverse conditions encountered at sea. As a result, the installation parts must be able to handle the rolling motion at rough sea and harsh weather conditions. Operations onboard continue to run in storms up to force 8. As far as the valves are concerned, this means that the connections between the valves and their mounted accessories must be extremely rugged and that particularly resistant materials and coatings are essential. While the use of aluminum is sufficient onshore, duplex and high-alloy steels, often also titanium-based alloys are used for these offshore installations.

Maintenance not possible – Restricted space onboard is an additional factor to be considered. For instance, 13,000 meters of pipe had to fit into the vessel *Cossack Pioneer* operated by Woodside Petroleum 112 kilometers off the Australian coast. 23 different process installations are set up on this floating production site, including oil and gas pipes, processing and wastewater pipes as well as fire extinguishing systems for cases of emergency. Every square centimeter on the 279-



meter-long vessel has to be put to use. Maintenance routines are restricted to the minimum or not possible at all. Consequently, a maintenance turnaround is scheduled approximately every four years, when the vessel is practically taken apart in a dry dock and all worn parts are replaced.

Valve engineering from one source

During the general overhaul at the dockside, oil production naturally comes to a standstill. Therefore, time is a crucial factor. The critical parts, including numerous globe and butterfly valves, must be available at the right time in the right specifications. SAMSON is the ideal partner to provide this service. The range of products manufactured within the SAMSON Group includes just about every type of valve, even in exotic materials, manufactured to a consistently high quality standard and to match the process conditions at hand. Efficient logistics and a network of subsidiaries near major docks ensure delivery and service on time. The engineering competence at SAMSON does not only comprise standard products. Special valves are developed on demand to handle unique control tasks. For equipment contractors this means perfect valve engineering from one source to meet all control requirements.

Schematics of a subsea oilfield illustrating how the crude oil pipelines runs from the well centers over manifolds to the FPSO.

The FPSO *Glas Dowr* was fitted in Cape Town, South Africa and operates on the Sable field, 150 km south-west of Mossel Bay.



Strong growth from firm roots

After the 100th anniversary of SAMSON AG last year, there was another reason to celebrate this year: In February 2008, SAMSON Controls in London, the first ever SAMSON subsidiary abroad, celebrated its 50th anniversary.

SAMSON Spain also celebrated – its 25th anniversary in 2007. Both subsidiaries have taken root in their respective markets and continue to grow. The same is true for the entire SAMSON Group: The previous financial year was, yet again, extremely successful. SAMSON benefited from a strong global economy that brought about considerable growth in many industries and regions. The world-

wide demand for high-tech products and expertise by SAMSON is still unbroken; numerous large-scale projects are a clear indication of this. SAMSON signed framework agreements with many important customers to establish long-term technology partnerships. The on-going rise in sales went hand in hand with the infrastructural expansion of the Group. New sites, new production equipment and a further strengthening of the corporate competence base shall ensure good financial results in the future.



The staff of SAMSON Controls can look back on 50 years of success.

Headquarters of SAMSON Controls in Redhill near London.



50 years of SAMSON Controls in London

Struggling with standards – Great Britain, the birthplace of the Industrial Revolution, and its enormous market attracted SAMSON's attention quite early. In the 1950s, when traveling and communication still consumed much more time, it became increasingly difficult to handle the cross-Channel business from Germany. As a result, the first ever SAMSON subsidiary abroad was opened in London on 7 February 1958. In the first years, the struggle with the different standards accounted for a major part of the work.

At that time, the DIN and ANSI standards were not yet generally accepted in the UK so that valve bodies and flanges had to be tailored to the different requirements. Consequently, a workshop to manufacture expansion joints and machine bodies and flanges was established in Purley south of London in 1958 as well. Five years later, SAMSON Controls started to also use the workshop for manufacturing valve bodies as well as temperature regulators and pressure regulators.

In the 1960s, the London office and the Purley workshop moved into joint facilities in Redhill just outside London, where the headquarters of SAMSON Controls are still located today.

Pneumatics for the North Sea – Right from the beginning, SAMSON Controls was particularly strong in the heating sector. The indestructible self-operated regulators, which also accounted for the major success of SAMSON in Germany, sold really well in the UK. Further sectors that the British subsidiary supplied control valves to included the pharmaceutical, chemical and food industries. In the 1970s, SAMSON Controls entered the oil and gas market, which opened up yet unprecedented opportunities in supplying control equipment for the exploration of oil fields in the North Sea. Such applications called for pneumatic valves that could be used in hazardous areas and additionally met the highest demands when it came to corrosion resistance and operational reliability.

To further expand its presence in Britain, SAMSON opened a valve center in Morley near Leeds in 2003. Morley is located in the north of England in the so-called "Valve Valley", where many domestic valve manufacturers are located. Apart from being situated on technologically fertile ground, Morley offers excellent transport links and is close to the large production sites of the petrochemical and chemical industries. Further engineering and sales offices are spread across Britain, ensuring that SAMSON is always there for its customers.

25 years of SAMSON S.A. in Barcelona

Democracy and continuing growth

Since the death of the dictator Francisco Franco in 1975, Spain has developed into an important European country that has a strong bond with Latin America. The transition to democracy and the opening up of the country paved the way for a thorough modernization of the Spanish economy and a considerable boom in the 1980s.

To supply this evolving market, SAMSON founded its Spanish subsidiary on 9 March 1982 in Sant Cugat del Vallés near Barcelona. Since then, the constant economic growth of the country has been mirrored in the financial results of SAMSON S.A. and finally forced the subsidiary to move house. As the previous premises had become too small, SAMSON Spain moved into brand new facilities in Rubí, also near Barcelona, in the year 2000.

Scheduled expansion – Meanwhile, the subsidiary has even outgrown the 1,400 m² of space available at Rubí. Therefore, construction work to expand the existing buildings will get under way at the end of 2008.

Apart from the headquarters near Barcelona, SAMSON S.A. has branch offices in the north, the center and the south of the country to provide the renowned SAMSON service directly on site. Two engineering and sales offices in Portugal are also part of the Spanish subsidiary.

On the Iberian Peninsula, SAMSON is active in all sectors that require the use of control equipment: from small cheese factories to huge refineries. SAMSON equipment is installed in different applications all across Spain and Portugal. Just recently, SAMSON S.A. signed a framework agreement covering the supply of control equipment with Spain's largest petrochemical company, Repsol.

Vendor lists

Major businesses dealing with industrial processes have to respond quickly to developments in the markets, sometimes even requiring them to establish production facilities in different countries at relatively short notice. As a result, such businesses tend to purchase the necessary production technology from long-standing partners who have displayed flexibility and reliability in supplying the required equipment.

Only partners who can guarantee excellent product quality, on-time delivery, flexible production to customer specifications and a quick, reliable customer service all across the world are put on vendor lists and only they are selected to sign framework agreements.

The name "SAMSON" can be found on the vendor lists of all major companies in process engineering. In addition, SAMSON signed numerous framework agreements with different companies (e.g. the oil and gas giant Shell) throughout the previous year, which grants SAMSON the status of a preferred valve supplier.

For customers, framework agreements ensure reliable delivery and service at defined conditions. For suppliers, such agreements make it much easier to plan ahead and schedule production and sales. Both parties benefit from the resulting long-term technology partnerships that further the development of products tailored to the specific demands of an application.



The headquarters of SAMSON S.A. in Rubí near Barcelona have grown too small after only eight years. Construction work for an expansion will start at the end of 2008.

Financial year 2006/2007

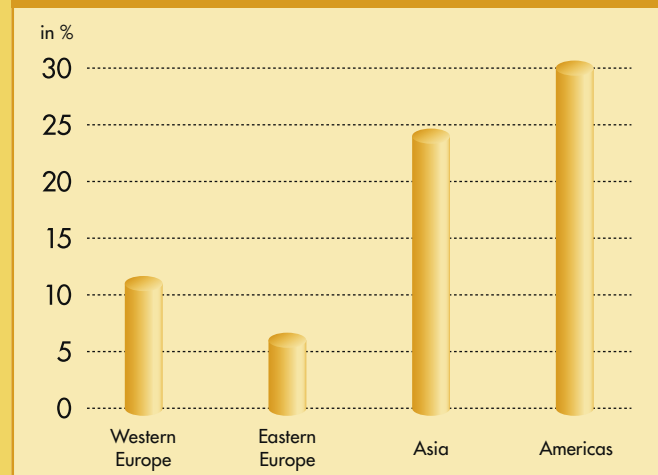


Final assembly of a stainless steel angle valve in DN 300 for the Puguang natural gas purification project in China.

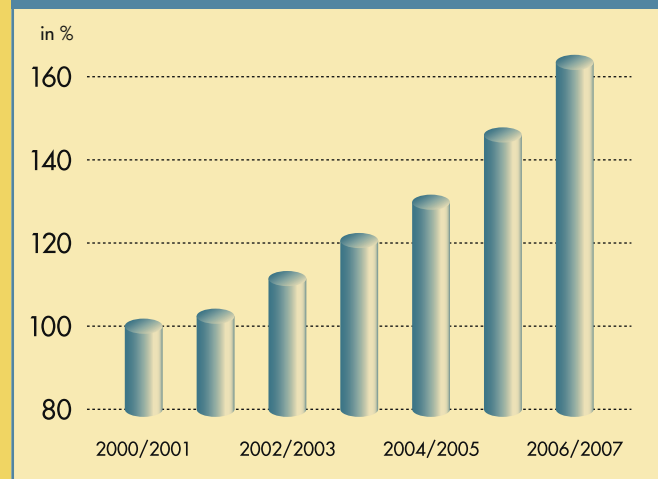
Project business

Nearly all branches of process engineering recorded significant investments in new plants last year. As part of this development, SAMSON managed to win various project-related contracts for supplying control equipment to major production sites, the most important ones being those of the oil and gas industry. One example of such a large-scale undertaking is the Puguang natural gas purification project, which forms part of the Sichuan-to-East China gas pipeline. This project aims to explore the rich gas reserves in China's Sichuan province and make the gas available in the industrial centers of East China. For the Puguang purification plant, SAMSON supplied a large number of control valves in different versions. Product quality was essential in winning this contract as the valves are operated under severe conditions. At the same time, this contract marked a breakthrough on the Chinese market as SAMSON was given the opportunity to co-operate with the Chinese market leaders in the engineering, oil and gas sectors for the first time.

Sales increase (by region)



Consolidated sales



The results of the 2006/2007 financial year gave SAMSON reason to celebrate beyond the 100th anniversary. Business continued to flourish: Despite the struggling US dollar, operations in North America registered a sales plus of 29%. The on-going boom in China and Russia, a strong world economy and the increasing demand for goods in process engineering provided a fertile ground for SAMSON's efforts. Worldwide, the SAMSON Group increased its sales by 12% – and the 2007/2008 financial year looks equally promising.

SAMSON worldwide



SAMSON

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