

GSK BIOLOGICALS IN DRESDEN

RELIABLE AND ENERGY-EFFICIENT PUMP TECHNOLOGY

The pharmaceutical company GlaxoSmithKline (GSK) built a new building for the development, production and sales of flu vaccines at the production site in Dresden, Germany. The target of the site extension was to double production capacity. Due to the location in the centre of Dresden, the architecture as well as the system technology had to be as space-saving as possible. The pump manufacturer Wilo did not only convince with a spacesaving concept for pump technology, but also with competent consultation and service.

The pharmaceutical group GlaxoSmithKline sells more than 30 different types of vaccines against diverse diseases all around the world. Employing more than 9000 people, the company is one of the world's largest drug manufacturers. Dresden has been an established site for pharmaceutical research and development for almost hundred years. Since 1975, flu vaccines have been produced here. Founded in 1911 as the "Sächsisches Serumwerk und Institut für Bakteriotherapie" (Saxon Serum Plant and Institute for Bacteriotherapy), the company soon became one of the leading German drug manufacturers. Due to the nationalisation strategy of the GDR government, the export business in the postwar period initially remained limited. However, right after the German reunification, sales were extended to the old German Länder. In 1992, the British pharmaceutical group SmithKline Beecham acquired the company which merged with Glaxo Wellcome to GlaxoSmithKline in 2000.

Doubling production capacity

GSK Biologicals in Dresden produces the flu vaccine "Influsplit SSW" which is sold abroad as "Fluarix". In autumn 2004 the company decided to extend the site in Dresden, in order to double production capacity for the world market from 35 m. doses per year to about 70 m. New production, laboratory and administration buildings as

well as warehouses with a floor space of a total of 16.400 m² were built in the immediate vicinity of the historical city centre. The construction work, which amounted to about 125 m. Euros started in August 2005 and was terminated in autumn 2007. In February 2008, the new production plant was commissioned. After the extension, GlaxoSmithKline employs around 750 people at the site in Dresden.

Challenge for planners and craftsmen

GlaxoSmithKline developed the ambitious project in co-operation with the planning company M+W Process Industries GmbH (former LSMW) which is specialised in pharmaceutical and chemical industrial plants. The sensitive production and storage conditions place highest demands on building services which just like the architecture had to be as space-saving as possible due to the difficult urban planning right in the city centre. Thus the applied pump technology was a decisive factor. The pump expert WILO SE finally won the bid. It was the only manufacturer who was able to realise a particularly spacesaving concept using in-line pumps, which are much more compact compared to norm pumps. The company was able to combine a space-saving solution with the high technical demands placed on building services,



The pressure boosting system of the type "Wilo-Comfort-Vario COR-4 MHIE" perfectly supplies all connected taps with potable water. The automatic control of the pressure boosting system is realised by means of the "Wilo-Comfort-Vario controller VR". One or several pumps are switched on or off, whereas the speed is finely adjusted with the frequency converter.



With the utilisation of spacesaving in-line pumps in cold distribution Wilo could offer an alternative to norm pumps. The units, which are mostly electronically controlled, are also characterised by a very energy-efficient operation, a long service life and a high supply safety.

just as it was required. Moreover, the decisionmakers were convinced by the quick availability of the pumps as well as the technical expertise of the service employees during planning and commissioning. This even led them to the decision to equip all building services areas with Wilo pumps. With technology and service from one source, a fast and efficient project co-ordination and handling was possible.

The Dresden and Stuttgart subsidiaries of Cofely (former Axima Deutschland GmbH), who is one of the leading experts for industrial systems and process technology, were responsible for realising the building services and system technology with an investment volume of approximately 31 m. Euros. Pump planning was carried out in close co-operation with Wilo. The customer service of the pump manufacturer supported the installation onsite during the construction phase and commissioned the pump technology after an installation period of approximately nine months.

High demand for cold in pharmaceutical production

Several breakdown-safe cold circuits

with different temperature profiles are required for the sensitive production processes and the required storage conditions at GSK Biologicals in Dresden. A total of six partially speed-controlled refrigerating machines with a total output of about 6.5 MW generate the necessary cooling capacity. The building is cooled with a cold water temperature of 6°/12° C (feed/return). Production plants and cold storages are supplied with 2°/8° C or 0°/4° C via a water-glycol mixture. Each cold circuit is divided into a generator and a consumer circuit. Four cooling towers with approx. 2 MW cooling capacity each are also operated with a water-glycol mixture and supply the systems with the required cooling water.

A total of 45 in-line pumps transfer the cooling and cold water between the cooling towers, cold generators and consumers. For this purpose, both uncontrolled and electronically controlled glanded pumps of the “Wilo-CronoLine IP(-E)” and “Wilo-VeroLine IL(-E)” series are applied. The use of in-line pumps resulted in a clearly lower construction volume than a system configuration with norm pumps would have required. Offering an extensive range of in-line pumps for almost all performance ranges, the

pump expert could meet the factory’s entire cold supply requirement of three circuits of 600 m³/h each, and this in a space-saving and demand-oriented way.

Highest supply safety is essential

The glanded pumps used do not only require little space, they are also characterised by high quality and reliability. Due to their monobloc construction with a lantern and a rigidly coupled standard flange motor the pumps of the “Wilo-CronoLine” series are particularly vibration-free and silent. Flow energy losses are minimised thanks to very smooth surfaces inside the pump housing and the impeller so that an optimum efficiency is achieved. Furthermore, the geometry of the pump housing noticeably reduces axial and radial forces, thus providing smoothest running and more operational reliability.

All glanded pumps applied here are perfectly adjusted to the operating conditions in air-conditioning and cooling. They are, for example, double-protected against corrosion by a standard cathaphoretic coating and additional paintwork. Moreover, the motor housings are factory-equipped with drain labyrinths through which occurring condensate can be discharged. The result is an effective motor protection. So the pump’s service life is prolonged and, at the same time, maintenance costs are reduced. Due to high requirements for the reliability of the cooling in the Dresden flu vaccine factory, some of the in-line pumps are additionally available as double pump systems. Thus a minimum supply is also maintained in the event of a breakdown of a pump. For this reason, the double pump is installed redundantly. One of the two pumps runs in main operation, whereas the second pump is available as the standby pump. If the main pump does not operate anymore, the standby pump is immediately switched on. In order to reach an equal load of both pumps, there is an alternation between the main and the standby pump in certain temporal intervals.

Energy-efficient and reliable heat supply

Heat supply is realised by means of the Dresden district heating. The

district heat gets into the building complex through a central transmission station, which has a secondary connection dimensioned for a total power of 3.6 MW, and then via three plate heat exchangers. From there it is spread into the different buildings. The heat at GSK Biologicals in Dresden is mainly delivered by the installed air-conditioning plants. To ensure supply safety, two electronically controlled glanded pumps of the “Wilo-Vero-Line IP-E” series switched in parallel are responsible for the feeding into the main distribution.

A speed control in the pumps guarantees a set supply pressure in a demand-oriented way. An automatic adjustment of the volume flow to different load states is realised by means of a built-in frequency converter which allows for energy savings of up to 50 % compared to uncontrolled pumps. The two glanded pumps run in the reserve mode so that in the event of a malfunction, the redundant pump can be switched on without any problems and a complete heat supply can be guaranteed.

High-efficiency technology for lower power consumption

A total of seven power-saving high-

efficiency pumps of the “Wilo-Stratos” series installed in the heating circuits in the administration buildings. These gland-less pumps are designed for larger heating circuits, e.g. in commercial properties. Pumps of the energy efficiency class A were prescribed in the planning. These are electronically controlled glandless pumps with maintenance-free frequency converters and permanent magnet rotors.

They are based on so-called electronically commutated motors (ECM) and double the efficiency compared to electronically controlled pumps with conventional drives. ECM technology is the latest variant of the DC motor which is characterised by particularly high energy efficiency. Due to the automatic adjustment of the pump output to the alternating operating states of the heating system, electricity costs are considerably reduced compared to uncontrolled standard pumps. Especially in the partial load operation, which makes up close to 98 % of the operating time of a heating pump, a clear reduction of power consumption of more than 80 % can be achieved compared to an uncontrolled pump.



The high-efficiency pumps applied in heat supply consume more than 80 % less power compared to uncontrolled pumps. The redundantly installed main pumps of the “Wilo-VeroLine IP-E” type are automatically adjusted to different load states with a built-in frequency converter which allows for energy savings of up to 50 %.

Automatically controlled water supply

The potable water supply in the Dresden factory is supported by pump and system technology from Wilo. In order to guarantee a reliable supply in all parts of the widely ramified, multi-storey building, a powerful pressure boosting system of the type “Wilo-Comfort-Vario COR-4 MHIE” was installed. With an operating pressure of 3 bar it optimally supplies all connected taps with up to 20 m³ secondary hot water per hour. The system consists of four “Wilo-Economy MHIE” high-pressure multistage centrifugal pumps which are mounted on a common base frame. Each one of the pumps has a built-in frequency converter which allows for the pumps’ speed control according to the current demand.

The automatic control of the pressure boosting system is realised by means of the “Wilo-Comfort-Vario controller VR”. One or several pumps are switched on or off, whereas the speed is finely adjusted with the frequency converter. Thus the pumps’ output is exactly adjusted to the current load situation so that a higher utilisation comfort and, at the same time, also an energy-efficient operating mode is achieved. Furthermore, the intelligent VR control unit provides information like the collective fault signal and the current pressure state.

Hygienic sewage disposal also in the event of high water

A compact lifting unit “Wilo-Drain-Lift L2” was installed for draining the sanitary facilities in the first basement. The accumulating sewage is collected in its reservoir and discharged into the sewer system through a pipe loop located above the backflow level. Approximately 10 m³ of sewage per hour is discharged here. The double-pump system version with a baseload and a peakload pump made of sturdy stainless steel allows for an alternating and demand-oriented operation with the built-in switchgear, thus an equal load of both pumps is possible.

The lifting unit is anchored buoyancy-safe and twist-safe in the ground with fastening clips. In addition, it is equipped with a non-return valve. A



Spacesaving solutions also in building services were required in the extended building of GlaxoSmithKline Biologicals in the city centre of Dresden.

hygienic sewage disposal is guaranteed also in the event of a flood.

In the event of high water there are also two submersible pumps from the “Wilo-Drain-TP 65” type installed in the second basement for a fast and efficient drainage of the basements. They are perfectly suitable for building and site drainage. Since they have a large free ball passage, they are quite unsusceptible to clogging or muddying. In the emergency case, both pumps pump together approximately 60 m³ sewage per hour.

Pumps and lifting units are also applied for the disposal of process water. A double pump station with two submersible sewage pumps of the “Wilo-Drain TS” type collects the accumulating wastewater from the laboratory in a collection reservoir

made of PE. From there it is pumped into a central treatment plant on the factory premises with a maximum volume flow of 5 m³/h. Moreover, a total of 15 additional small lifting units are applied which conduct the process wastewater through longer sections without sufficient natural fall to the next drainage point.

Thanks to a doubling of the production capacities, large quantities of flu vaccines like, for example, for the dangerous H1N1 virus, can be produced at GSK Biologicals in Dresden within a short time. The installed pump technology contributes decisively to a fault-free operation of the system. << (photos: Wilo)

