Integrated automation of the ester wax production plants

The right chemistry

The current situation with regard to the national and international chemicals market is characterized by the long-term slowing of the economy. The chemicals industry is suffering from reduced consumer activity, in particular in its role as manufacturer of upmarket goods. However, diversified conglomerates such as Clariant AG who operate globally and take leading positions in numerous areas have good chances despite the current situation. The production plants, including the automation technology used, represent an important factor in terms of competitiveness. At Clariant in Gersthofen this was addressed in cooperation with the experienced system specialists at ProLeiT.

The history of the Clariant company began in summer 1995, when the parent company Swiss Clariant AG was created on the occasion of the spin-off of the chemicals division of Sandoz by means of an initial public offering. In the course of the takeover of the specialized chemicals business by Hoechst in 1997, the Gersthofen plant was among others integrated into the company. Clariant currently employs around 1200 individuals at the Gersthofen Industrial Park – a large proportion of the 6500 employees in Germany distributed across a total of 12 locations. On the premises located at Lech there are also research and development facilities in addition to the 13 production plants. These include a modern laboratory and a technical facility used to develop production processes from the laboratory stage to large-scale production.

In order to also keep production itself in line with the latest developments and with a view to optimizing efficiency and transparency, extensive efforts have been made for some years to eliminate island solutions with regard to automation in a step-by-step manner. However, procurement of a standardized structure is therefore difficult, as changes to hardware and software, which for example affect the control and monitoring of plant sections, must be undertaken during operations. Shutdown of the units was only possible under the most difficult conditions and at high cost. This meant that successes in modernization projects for plants for the manufacture of PE waxes and migration of a wax milling plant to a new system were even more enjoyable. On both occasions ProLeiT AG in Herzogenaurach, specialized in process control systems and automation solutions for the process industry, was chosen as partner.

Modular software

With ProLeiT, one is well prepared for challenges inherent in the chemicals industry as a result of almost two decades of experience. An important aid in this respect is the Plant iT modular system, which comprises software modules with a broad range of functions from the control, operations and production levels to ERP (Enterprise Resource Planning) – all areas are covered in a cohesive manner.

Good conditions for the new project at Clariant in Gersthofen: automation of the ester wax plant operating on cleaning and oxidation. After previously relying on manual operation, hopes were pinned on process optimization from the new process control with equipment parameters and diagnosis functions, encapsulated in the Plant Direct iT process control system. With the Plant Acquis iT module for production data acquisition in the latest version, an extensive tool is available.

More security

Storage of all data relevant for production in a high-performance real-time database based on Microsoft SQL server provides the basis for plant-wide information management. Where for example the possibility of searching for and diagnosing faults during operations used to be very limited prior to implementation of the new software, it is now possible to use convenient visualization tools on-site for rapid analysis or for long-term evaluation. For example, events can be displayed using reporting windows according to type and sequence of appearance but also according to machine, batch or shift.

The result is full control of running processes, monitoring and logging of external access and guaranteeing of plant security. The latter issue is of great significance in the chemicals industry, and finally, avoidance of accidents is given highest priority in order to exclude any risk to employees and residents from the outset.

In running operation

In order to implement required changes and upgrades during the project runtime without switching off the individual aggregate, corresponding hardware must be used in addition to flexible software. In Gersthofen, the ProLeiT engineers used the high-availability and fault-tolerant controller of the SIMATIC S7-400FH type, which is equipped with the "Configuration in RUN" (CIR) system property. This property enables in addition to startup the addition, removal and re-parameterization of decentralized slaves and modules from Profibus DP and Profibus PA without interruption of the running production process. In this way, the existing S5 and S7 controllers could be gradually linked. Further changes are planned on the field device level, where additional information was to be made available to the process control system in accordance with the HART protocol. The new

architecture is completed on the lower levels in terms of hardware with a redundant Ethernet and Profibus via optical fibers.

Everything monitored

The technical implementation of the new automation solution creates in addition to the above-mentioned points of higher plant safety and better process control, higher plant outage protection.

A dedicated server and operator stations with the system programs are set up for the Clariant employees. From there, all control processes and control loops can be viewed and modified. Upgrading of the batch controller in accordance with ISA S88 is additionally planned for the future. In addition to creation of recipes and partial recipes, tracking of individual batches is also integrated in this ProLeiT standard module.

Further options for the future

One of the reasons that those in charge in Gersthofen decided on installation of the new system was the increasing significance of linking automation solutions with commercial software, for example ERP systems such as SAP R\3. With Plant Connect iT there exists an add-on that considerably simplifies interface programming and is adapted to customer-specific requirements by means of appropriate parameterization. The module is thus a link between the process control system and tools for administrative processes, which serves both as an efficient support mechanism for decision makers and a platform for new business models.