application profile

Consistent automation concept for the production of washing agents

For the last few years, washing agents have been produced in a completely new manufacturing process at Henkel Waschmittel GmbH in Düsseldorf Holthausen. As part of the process, the active ingredients are condensed into beads under extremely high pressure, thereby taking up a minimum amount of space.

This new technology is fundamentally different from the manufacture of other compact washing agents. In contrast to the well-known spray technology, which gives the washing agent particles a porous hollow structure, the new production technology enables an extremely high degree of compaction of the ingredients by the formation of spheres which consist entirely of the washing agent active ingredients.

Safety and transparency of the production process were particularly required, as is the case for all chemical industry products intended for the final consumer. The keywords are: producer liability, traceability and identification, as well as control of faulty products.

To implement product monitoring and control for the whole plant, Henkel decided in favor of a ProLeiT process control system with TF 900 technological functions, as it had already done in other production sites in Genthin, Italy and France.

Plant design

The process control system controls and monitors various areas of the plant: raw materials supply, premix production, extrusion, drying, finished product preparation, dedusting, rinse water and operating materials systems.

Four steps characterize the production technology. In the first step, the recipe elements are combined into a kneadable mass and homogenized. This premix is then transported on conveyors to the heart of the plant, to the extrusion section. Here the premix is turned into small cylinders by being pushed at high pressure through a perforated plate and then being cut. A cascade of two rounders turns the small

cylinders into spheres, the MEGAPERLS. The megaperls are then dried in a dryer and passed on to the preparation plant. At the end of this product processing, the product goes to packaging.

The process control system was implemented in accordance with Henkel's process specifications. Particular emphasis was placed on the following aspects:

- Continuity of automation design
- Safeguarding production also during technologically necessary changes during commissioning
- Safe operation by means of simple menu-based operation
- Meticulous attention to recipes
- Reporting for the traceability of production and process procedures
- Standardized data interface for transfer to higher-level plant data recording

Continuous automation design

A continuous automation design was achieved by the use of various components from the ProLeiT system family: the technological functions TF 900 for control of the underlying SIMATIC level, the PC-based process control system OS 386 / 486 for operating and visualizing the plant, and the Windows-NT based OS-NT system for the control station report and recording of readings. The various plant areas are networked via SINEC H1 bus.

Flexibility

The modular construction of the standard software provides the highest degree of flexibility during commissioning, and the optimization which are often required here. Plant-specific adjustment is done by simple parameterization. Here the type, number and designation of the aggregates used, the permitted paths between machines and plants, the raw materials for processing, and the processes which are to be controlled are allocated. In the control recipes,

the set values, heating times, quantities etc. can be changed online during the running process. These changes are protected from unauthorized access by passwords, and are recorded on demand.

Operation

The plant is operated from seven operator workstations with full graphical interface. All masks are menu-controlled and are operated by keyboard and mouse. Operator guidance and function keys provide precise information without losing clarity. In order to ensure a smooth production process, the only operational possibilities which are offered at any given moment are those which can be carried out at that stage of the production process. This minimizes operating errors. The clear depiction of process graphics, supported by the report system (error and operating messages), informs the operator about the process stages at all times so that the latter can intervene to correct any irregularities that occur.

Recipe management and control

As production specification, the laboratory specifies the set values for the materials used in the recipe, which is passed on to the process control system. Here the set values specified in the recipe are constantly monitored for inaccuracies.

Reporting

All process data required by the shift leader is provided at the production or line control station. These are essentially:

- Control station report on production quantities and process-relevant data
- Consumption statistics for raw and operating materials
- Hourly automatic control of the recipe for the premix and finished product for quality control purposes.
- Errors and shutdowns are recorded per aggregate and evaluated for process optimization and maintenance purposes
- Recording of readings and presentation in graph form with set/real value comparison for plant and product optimization

This data, managed by a database, is used for various purposes, including raw materials management and planning, the drawing up of maintenance plans, spare parts stocks, and quality control of the finished product, as well as for identification and control of faulty products.

Link to SAP R/3® plant management system

A bi-directional link connects the process control system to the plant control system. This link enables direct access to the underlying SIMATIC controls (using head stations) on the one hand, and access to the data of the ProLeiT OS system on the other. The head stations provide batched real values, readings and counter readings, together with error and operational messages in a unified and standardized form, for the higher-level plant control system.

It is also used to collect order data from the higher-level production planning system SAP/R3, and finished orders are reported back.