Thermphos Deutschland GmbH, a subsidiary of Thermphos International B.V., employs around 50 members of staff. At its Frankfurt and Knapsack locations it manufactures inorganic phosphorus chemicals that, among other things, are used as excipients for flame retardants, pharmaceuticals or additives for plant protection products.

The Frankfurt site needed to optimise its filling station process for phosphorus trichloride and phosphorus oxychloride. Previously a lot of manual effort was required to roll the empty drums underneath the filling station on a roller conveyor. Following the completion of a new filling station, with the assistance of METTLER TOLEDO, the number of drums filled per week has increased from 100 to as many as 1000 - and the entire handling process has been simplified.

Aggressive substances – difficult environment – optimum solutions

The particular harshness of the substances manufactured and processed at Thermphos places extremely high demands on all production units. A dosage control system was required to optimise filling processes as an SWA (automatic balance for filling) in accordance with EO10 (certification ordinance).

The dosage control system hardware comprises SPC, weighing platform, terminal and dosage arm. When designing the station it was necessary to consider that the hardware would have to cope with higher demands than those in normal everyday industrial applications. As the substances are very aggressive - they even corrode conventional stainless steel - alternative solutions had to be investigated. The ID7 stainless steel weighing platform was sealed with a special coating and protected in a plastic housing. The weighing platform was also coated with plastic and protected against corrosion. During a test phase, it was established that METTLER TOLEDO's scales (coated with plastic) functioned extremely well, even after two months in the acid bath! The dosage arm is manufactured from corrosion-resistant Hastelloy (2.4602) which is recommended for contact with solutions containing free chlorine.

Modern dispensing in practice

Information regarding product to be dispensed is stored with target values, tolerances and cutoff points in the ID7SysFill (a weighing terminal with customer-specific dosage software) database. The dispensing process begins with the user selecting the required product and the number of drums to be filled. The dosage arm is positioned above the filling bung, the filling lance is lowered pneumatically into the bunghole by pressing the button and filling begins. The ID7 controls the coarse and fine flow as well as the tolerance evaluation. Once the target value has been reached, the ID7SysFill automatically stops the dispensing process and passes the corresponding signals to the master SPC via Profibus DP. This controls the filling column and metering valve, the safety-related control, emergency stop button and overfill protection device with the overfill sensor. It was possible to meet Thermphos's requirement for a two-stage safety system by integrating a Coriolis mass flow meter (installed as an addition on the scales) in order to avoid overfilling or overflowing. As requested, the ID7 dosage software is fully calibrated as an automatic balance for filling in accordance with the EO10 certification ordinance. The filling nozzle is connected by means of a direct SPC interface.

Not a standard solution: a challenge for the engineering team

The combination of the terminal with a master SPC and the considerable variance from the standard solutions normally found in the chemical industry required experienced project management. In close collaboration with Thomas Greulich, the Thermphos plant engineer, it was possible to develop a sustainable solution. A second filling station is now being planned.