

No cold Shower thrown on the Quality

Bette GmbH & Co. KG

The clear assignment of manufacturing steps and production data to the respective workpiece or final product is crucial in the industrial contract manufacturing. Modern RFID technology delivers the key to this, plus additional positive side effects, as demonstrated at a leading German manufacturer of shower trays and bathtubs.

Founded in 1952, the Bette GmbH & Co. KG headquartered in Delbrück (Westphalia) specializes in high-quality shower trays and bathtubs made from the base materials steel and enamel. Over 30,000 shower trays and bathtubs leave the family business per month, about 55% of them for the German market. The remainder is delivered to the other European countries, but also to Southeast Asia. A distinguishing attribute of the Bette products – besides their sophisticated design – is the especially smooth enamel surface.

In addition, the company is known for its great model variety and market-oriented product innovations. Thus, for example, the recently introduced flush-to-floor shower area Bette floor has been very well received by the customers. At present, approximately 280 employees manufacture over 500 models in about 1,000 colours, with optional, customized equipment on top of that.

Better in Shape, better informed

For Johannes Hils, manager of technology and data processing at Bette, it is therefore clear: "To control the manufacturing aspects of such a large number of variations requires a clear identification of the individual products, enabling their tracking through all manufacturing steps."

For this reason, Bette already decided in 1996 to use RFID technology (Radio Frequency Identification) and installed the MOBY L system by Siemens Automation and Drives (A&D). Ten years later, following extensive tests of several new systems on the market, its successor – the SIMATIC RF300, transmitting on the worldwide approved 13.56 MHz radio frequency – came out on top again.

Bette employs the system to organize the route of the workpieces through the production, and to ensure that precisely what has been ordered is also being produced – customer-specific and to the exact deadline.

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All processing steps are customer-specifically assigned and product-specifically acquired via the RFID system RF300.



A magnet provides for the safe hold of the credit-card-sized data media RF360T on the product.

Quick and versatile: Mobile Data Media

The most important tool for this are the mobile data media (tags) of the system. In all, the RF300 offers four tags that primarily differ in their shape, memory capacity, and the maximum read/write distance, as well as three read/write devices designed for the most common applications. A shared characteristic is the very fast transfer rate of 3 KByte/s, although for lower requirements, Siemens also has available a particularly low-priced solution that connects to the SIMATIC controller S7-300 via an IQ-Sense interface.

As electronic goods identification documents, tags can hold not only multiple times the information of traditional barcodes, but also can be continuously modified and updated during the manufacturing process. For Bette, the credit-card-sized RF360T with 8 KByte of FRAM suffices, since besides the order number and the item number, the tag only contains the product-related manufacturing route in binary code. The RF360T is IP67 protection-rated and designed for operating temperatures from 20 to +75 °C.

The respective production data is written when the tubs/trays and shower floors are transported from the interim storage to the steel blank degreasing. Johannes Hils on this: "We have subdivided the production line into segments, at the beginning of each, a decision for one or the other direction is made. On the tag we are storing an order-related bit string, which selects the appropriate branch at each decision point of the conveying system."

Non-contact Reading and Writing via Induction

The information is read without contact using the stationary read/write devices (readers) of the type SIMATIC RF340R with integrated antenna. As soon as a tag enters their read range, a voltage is induced in the tag and the transmission of the stored data is activated. In two production halls, Bette currently has a total of 45 readers in use to perfectly organize the data flow and the production. The installation of the devices is facilitated by the

data transmission and the supply of power being run over one and the same cable. Furthermore, the M12 plug connections are compatible with those of the ECOFAST system – for the decentralization without a control cabinet of other components from the SIMATIC world.

For the connection to the process controller, a SIMATIC S7-400, Bette utilizes the profibus interface modules ASM456, which each support two readers. The controller in turn is connected via a communication processor CP443-1 IT and the company intranet to a control room, where the data from the production is analyzed and written into a production database.

Assured Quality: Sought after Products

The tags themselves are affixed to the deep-drawn steel plates by means of magnetic holders so that they can be easily removed again. Because after the cleaning of the blanks, the wet-on-wet applied, wafer-thin enamel base and top coats – consisting of glass powder and water – are fired at roughly 850 °C, which none of the data media would tolerate. The coating process was jointly developed by Bette and enamel specialists, and results in a one-of-a-kind surface quality.

During the firing, the data is carried along by software. Afterwards, at a manually operated write station, the updated data record is written onto another data medium again, which accompanies the product through the next manufacturing steps. Where applicable custom colouring and/or optional finishing of the surface with an anti-slip coating follow – in both cases associated with a new cycle through the enamelling furnace and repeated tag change.

At the end of the production line, the tags are read and returned to the production start. Each RF360T can be rewritten up to 1010 times. In the packaging hall, prior to being readied for shipment, each finished product receives a specific label with a serial number, by which the entire production run can be retraced.

“For our quality policy, the RFID system is a true gain,” says Johannes Hils. “If at one point, despite all the constant controls, complaints are received, we know at a glance how the product was manufactured and who handled it. In doing so, possible error accumulations can be much easier uncovered and remedied.”

Close Cooperation and additional Benefit: Future-proofing

The entire facility was implemented in close cooperation with Siemens A&D, which not only supplied the IT hardware, but also was responsible for the connection to the S7 controller. Installation and visualization were carried out by Bette on their own. As main advantages of the new system, Hils primarily mentions its higher read/write speed and exceptional reliability: “Following the elimination of typical minor start up difficulties, we have so far not had a single malfunction.”

Still, with the switch to the new system, the Westphalian manufacturer sees itself only at the beginning of a comprehensive optimization of the production sequences and the product quality. Contributing to this in the future is the mobile reader of the type RF310M, which Bette is testing as a pilot user. With it, meaningful data on every product can also be obtained locally from anywhere in the production – quickly and at any time. Via an additional WLAN connection, the data can be immediately transmitted to other users on the company intranet. Vice versa, for example, the next manufacturing step can be visualized on the display of the handheld device.

Bette is also relying on the RF300 system by Siemens A&D for the upcoming expansion of the production capacities: “With the changeover to the controller generation S7 and the new RF300 system, we have started to again critically examine our entire manufacturing organization.



During the firing of the enameled coating, the data is carried along by software. Afterwards, each tub/tray or shower floor receives a new tag – pictured is the manual write station.

I expect, for example, an increased use of the system's new possibilities for the analysis of the production data via the OPC server, to even better inform our colleagues in the production as well as in the sales department, to avoid errors, and to further improve our quality,” outlines data processing manager Hils the future projects.

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