

SOLIDS & BULK HANDLING



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Safer surfactant handling

Flexicon's rotating drum and bulk bag filler system improves surfactant packaging line at BASF

The Washington based chemicals producer BASF Corp. recently upgraded the packaging of surfactants line with two key additions to its manufacturing plant. The first was a purpose-built room designed for greater cleanliness and control in loading surfactants into drums and bulk bags prior to shipping. The second was the installation of a rotating drum and bulk bag filler system from bulk solids handling specialists Flexicon Corp. This plant automates the process and yields greater product output and quality control than the previous method of manual loading.

Surfactants are additives that reduce surface tension in liquids, making them easier to formulate and use in a range of consumer, industrial and healthcare products. BASF surfactants are formulated as liquids and then converted into powders. The materials are usually packaged in 208L capacity fibre drums and sometimes in 907kg capacity bulk bags for shipment to product manufacturers.

Since many surfactants produced by BASF are for the personal care market used in products such as toothpaste, mouthwash, soap, shampoo and laundry detergent, their manufacture must meet rigorous quality standards. The plant is certified as ISO 9001:2000, is FDA regulated and conforms to Good Manufacturing Practices. Processes comply with U.S.



PLC communicates with weigh-filler scale to regulate product flow into each drum and shut down on reaching a pre-set weight. Four drums await filling as four are about to exit the room. System improves product output, worker safety, and quality control

Pharmacopeia (USP) and National Formulary (NF) guidelines; hence the need for a packaging operation that is accurate, efficient and capable of maintaining high levels of quality control.

The loading room was designed to meet these needs as it is part of BASF's commitment to continuous improvement in operations and product quality. Its efficiency will help BASF expand production of USP and NF surfactants and increase its share of the market.

Automation of the loading process also has safety and regulatory benefits. Prior to construction of the room and installation of the bulk bag and drum filler system, containers were manually loaded. This required an operator to move a drum to a weigh-filling station, operate a slide gate to fill it, check the weight and, if it exceeded the limit, adjust as needed. After filling, a drum was physically moved onto a pallet for transport to the shipping area. The process was labour intensive and exposed workers to possible injury during the handling procedure.

To automate the process, BASF engineers worked with Flexicon engineers and the PME Equipment Co., of New Jersey to develop a Rear-Post Bulk Bag Filler that also has the capability to fill four fibre drums sequentially. An automated conveyor system now moves drums and bulk bags in and out of the filling station and a rotary valve meters the required weight of material with a high degree of accuracy.

The bulk bag and drum filler installed in the loading room incorporates design features developed by both companies. BASF added a dust-collection system on the machine attached



Automated drum filler utilises an indexing diverter head to fill four 208L drums sequentially with surfactant powder gravity feeding from rotary valve at top. System can also be configured for loading 2000 lb (907 kg) bulk bags

via flex-hose to contain particles that rise up during loading. The company also specified an Allen-Bradley PLC (programmable logic controller) to automate operations. The PLC communicates with a Mettler Toledo weigh-filler scale to regulate product flow and shut down the operation when a pre-set weight is reached.

An operator selects the appropriate product-loading program on the PLC and pushes a button to start the filling process. Surfactants are transported from the main plant to a vessel above the rotary valve, then gravity-fed into either a drum or a bulk bag.

When filling drums, the operator attaches the automatically rotating drum fill adaptor to the Flexicon bulk filling station. Once the four drums have been positioned on the deck of the filling station, the operator presses a start-up button on the PLC and surfactant begins flowing. Each drum has a plastic lining into which the surfactant flows. When one drum fills, flow is interrupted while the diverter head indexes to fill the next drum in sequence. Once all drums are filled, the operator seals the liners, and puts lids on the drums which are then transported via conveyor from the purpose-built loading room into the shipping area.

When filling a bulk bag, an operator attaches the four bag straps to each corner of the loading frame, engages the bulk



Pallet of four drums is conveyed into purpose-built loading room where they are filled by rotating drum/bulk bag filler



Filled drums are conveyed from loading room to shipping area

bag fill spout to the fill head utilising an inflatable collar to provide a dust tight connection and puts the bag into a rubber bladder, which seals the surfactant in the bag after product is loaded, and acts as an extra layer of protection during transport. The frame rises to accommodate the height of the bag as it rests on a pallet atop the weigh-filler scale, which has a 2.3 sq. m foot print. The scale transmits weight data to the PLC, which automatically stops the flow of material when the correct weight of surfactant has been loaded. The bag is then closed and moved on the roller conveyor to the shipping area.

Sherri Molomo, BASF's Senior Process Engineer acknowledges that the automated loading process significantly enhances the surfactants packaging operation and increases operator productivity. Most importantly, though, is the improvement in operator ergonomics and safety, as well as elimination of operator involvement in the filling process. This has resulted in a more effective use of personnel and reduced the risk of contamination of surfactants during packaging.

In assessing the impact of the loading room and the Flexicon bulk bag and drum filler system on operations, Sherri Molomo believes that their products have become better by using better tools.

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