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# Safety culture in the bag

With safe working conditions a vital ingredient in chemicals manufacture, one company has implemented a Total Safety Culture along with a **Flexicon** bagging system to protect employees

**A**rrMaz Custom Chemicals produces specialty chemicals for the mining, water treatment, fertiliser, asphalt and construction industries at its 18,580 sq m manufacturing facility in Mulberry, Florida.

In addition to extensive quality control and customer service programs, the company has implemented a Total Safety Culture to protect its employees and the sub-tropical ecosystem of central Florida. In a number of ways ArrMaz goes beyond OSHA and environmental regulations in operating the majority of its open air manufacturing facility beneath a roof to provide safe working conditions while minimising storm water run-off.

One product is a resin soap which is used as an emulsifier in slow-setting asphalt and as an air-entrainment agent in masonry cements. The process uses heat and agitation to dissolve a solid resin into sodium hydroxide or potassium hydroxide to produce an aqueous soap solution.

To transfer the solid resin from kg sacks, ArrMaz originally installed a Flexicon manual bag dump system comprising a hopper with a dust collector, and a 6.7 m flexible screw conveyor to discharge the resin into a 22,700 L tank. Each 9090kg batch of resin represented 400 sacks that required lifting, slitting and dumping by the operator.

## Minimal manual handling

In 2008 it was decided to retro-fit a low-cost bulk bag unloader to the bag station and so minimise the manual



The removable bulk bag lifting frame is lifted and positioned using a forklift truck.

handling requirement. This helped prevent potential injury and other health hazards associated with the handling and disposal of bags while minimising waste.

The Flexicon flexible screw conveyor was retained since it is not only well suited for use with a bulk bag discharging station but also has handled the resin effectively despite the material's tendency to interlock and degrade. The existing dust collection exhaust system was also retained but moved from above to beside the hopper to allow positioning of bulk bag spouts directly above it.

The new hardware consists of a four-post unloading frame, at the top of which is a cradle with wide receiving cups supporting a removable bulk bag lifting frame that is lifted and positioned using a forklift truck, allowing operators to connect full bags and disconnect empty bags at floor level.

## Controlled discharge

A conventional iris valve located above the existing manual dumping hood prevents material flow from the bulk bag until it has been untied. It then allows controlled discharge of the bulk resin into the hopper which feeds the flexible screw conveyor.

The frame is also equipped with spring-loaded Pop-Top bag extension devices that raise the bag-lifting frame and elongate the bag as it loses weight, promoting the flow of material from the corners of the bag through the bag spout.

Simultaneously, pneumatically actuated Flow Flexer plates raise and lower opposite bottom sides of the bag into a 'V' shape at timed intervals, loosening agglomerated material and directing it through the bag spout.

With the new system in place, ArrMaz began sourcing 99% plus of its resin in 1000 kg bulk bags which are discharged in their entirety and supplemented with manually dumped 22.7 kg sacks to achieve target batch weights of 9090 kg.

The bulk bag unloading capability has cut resin loading time from about 60 minutes down to 15 and by retaining the original bag dump station system, accurate batch weights are achieved without investing in an automated weigh batching system.

**Flexicon (Europe)**  
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Enter 214

## Reactor charging isolator ensures safe operations

One of Europe's largest chemical plants has installed a twin chamber, reactor charging isolator from Hosokawa Micron to meet the company's demands for shift sleeve operation with full personnel protection.

Although the target operator exposure level (OEL) for the isolator used to charge a catalyst powder into a reactor vessel was <math>< 1.0 \mu\text{g}/\text{m}^3</math>, the isolator is designed to the same specification as one required to operate at OELs of <math>< 1.0 \mu\text{g}/\text{m}^3</math>, with the actual OEL achieving results of <math>< 0.01 \mu\text{g}/\text{m}^3</math> when third party tested using micronised lactose.

In operation the drum is loaded onto the tipper, de-lidded and the safety gate closed. The pneumatic circuit is interlocked, preventing the tipper from operating unless the gate is closed. The drum is raised, tipped and docked with the isolator; the drum rim and outer liner are sealed to the isolator.

The bagged powder is removed from the drum into the transfer chamber and then into the charging chamber via the transfer door. The bag is opened using a Hosokawa safety knife and charged into the reactor below.

A grid fitted to the discharge hopper prevents bags and other objects falling into the vessel below. Waste materials are removed via the continuous liner bag out port system. Before dispatch the isolator was tested to strict protocols developed in conjunction with the client.

This system is certified for use in an ATEX II 3G (Zone 2) area; the main electrical cabinet is air purged which prevents exposure of live electrical equipment to flammable gases. All electrical field equipment including pressure transmitters and proximity switches are connected via galvanic barriers to give intrinsically safe operation.

The isolator operates with a nitrogen inerted, negative pressure internal atmosphere and the system incorporates interlocks to allow the safest possible operation. HEPA filtration is used to give a pressure cascade through the isolator to reduce the risk of contamination.

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