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Powder handling without interruption

Bulk handling equipment supplied by **Flexicon** is being used by a US desalination plant to help provide Florida's Tampa Bay region with around 10% of its drinking water

Producing up to 95 million litres of drinking water daily, The Tampa Bay Seawater Desalination plant consumes 1800-2725kg/day of DE (diatomaceous earth) silica powder which arrives in 400kg bulk bags that are stored in a temperature- and humidity-controlled area to prevent compaction of the material. Desalination plants rely on Reverse Osmosis (RO), and to ensure efficient RO, seawater must be pre-treated to remove particulates. At Tampa Bay, this method of pre-treatment included installing a DE filtration system.

When the RO process calls for DE, a crane moves a bag from storage to either of two bulk bag weigh batching systems that feed the DE to a 1140l tank, where it is put into suspension with water to a 5% concentration. The suspension is then metered into the saltwater upstream of the filter by peristaltic pumps.

The DE bulk handling equipment, produced by Flexicon, consists of two identical systems, allowing cleaning and maintenance of either one with no interruption in the movement of DE. Each system consists of a bulk bag unloader with loss-in-weight batching and an integral flexible screw conveyor.

The bulk bag unloaders measure 1.5m². Four vertical extension posts are adjustable in overall height from 4.3 to 5.8m to accommodate bulk bags from 600 to 2000mm tall. The unloaders are equipped with Flow-Flexer bag activators that raise and lower opposite bottom edges of the bulk bag at

timed intervals, improving material flow into the bag's discharge spout. As the bag lightens, the stroke of the pneumatic activators lengthens, producing a steep 'V' bag shape to promote evacuation of material.

A Spout-Lock clamp ring also promotes flow by creating a high-integrity sealed connection with the bag spout, and a Tele-Tube telescoping tube that applies continual downward tension on the bag as it empties and elongates. Above the clamp ring is a Power-Cincher flow-control valve whose curved, articulated rods cinch the bag spout concentrically, allowing the operator to control the flow of material through the spout after releasing the drawstring, and to close and re-tie the spout of partially empty bags with no leakage or dusting.



A Bag-Vac dust collector vacuums displaced air and dust, and collapses empty bags prior to tie-off and removal

DE flows from the bulk bag through the bag spout into a 1.8m³ capacity surge bin able to hold the contents of one bag, effectively doubling the unattended run time of dischargers having small surge hoppers.

The sealed system is vented through a port in the hopper lid to a dust collector that vacuums displaced air and dust and collapses empty bags dust-free prior to tie-off and removal, eliminating manual flattening and associated dusting. Reverse-jet filter cleaning allows the vacuum system to operate efficiently, while extending filter life.

DE transferred by the flexible screw conveyor is discharged into a tank, where it is put in suspension with water

The hopper discharges into an intake adapter that charges a Model 1250 flexible screw conveyor with DE. A cantilevered arm on the bulk bag unloading frame supports the discharge end of the conveyor tube which is inclined at 30°.

When the DE dilution tank has discharged its contents, a level indicator signals the PLC that controls the weigh batching system to initiate a weigh batching cycle by running one of the flexible screw conveyors. Load cells supporting the bulk bag unloader frame with integral conveyor, transmit weight loss information to the PLC which reduces the conveyor speed immediately before stopping it, achieving an accurate batch weight. Based on the amount of weight lost, the PLC also indicates when the operator needs to load a full bag of DE into the unloader.

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Screen system improves plant efficiency

Micromac Filtration has installed a run down screen and spray bar system at St Regis Paper's Higher Kings Mill in Devon. "Our challenge was to remove paper and plastic waste from our effluent treatment plant at the earliest possible point in the process," explained Higher Kings Mill engineering manager Jason Emery. "The Micromac system will improve the efficiency of our effluent treatment plant and enable us to meet our environmental targets."

The run down screen has no moving parts, which minimises maintenance and makes it easy to install - in this case by the mill's own maintenance team who decided that the spray bars would work even better if they rotated over the screen, so made the necessary adaptation.

Because Micromac Filtration designs and manufactures in the UK, the company can incorporate bespoke design modifications to meet the specific needs of each application.

"Early trials were encouraging and the screen does remove more than the expected amount of fibre and plastic," confirmed Emery. "When we reported some screen blinding Micromac was swift to remedy the problem through the addition of a second spray bar. Our in-house maintenance team was able to adapt the spray bars to meet the specific requirements that we have."

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