

Bespoke System for Aluminium Recycling - Can Lids



CJ Waterhouse company were initially approached to develop a bespoke dosing system for an aluminium recycling plant in Damam, Saudi Arabia. The end customer, Alcoa provided us with a brief to design a system to accurately dose aluminium can lids from a bulk bag source into the downstream process line at varying rates from 20 – 80Kg/hour. The can lids have a higher level of non-aluminium material and must therefore be dosed into the recycling line at a specific rate in relation to the downstream process. In addition to this the line can only operate for a specific time period before a pre-determined shut-down period is initiated to reduce the potential levels of fumes given off by the non-aluminium recycling process.

The system comprised of a number of constituent component machines to provide a bespoke solution to discharge the bulk bag, separate out the can lids and dose them to the downstream process by weight.

Bulk Bag Discharging

The bulk bag opening system is designed to accept 1M3 FIBC bags, loaded via the electric hoist system. Internally the system houses a bespoke multi-blade cutting assembly with a central piercing cone which penetrates the base of the bag and produces 4 diagonal cuts from the centre to the corners. This cutting operation is performed under the bag weight alone and allows complete discharge of the bag contents to the hopper below. All blades and piercing cone are removable for sharpening and replacement.



Vibratory Dosing Unit

The vibratory dosing unit resides beneath the bag opening section and is designed to provide a controlled feed of bulk materials to the downstream elevating conveyor. The unit is supplied complete with variable speed control which varies the vibration amplitude and hence the speed of material transfer. It is the speed control at this point which ultimately dictates the overall throughput of the system at its output. The feeding device is also fitted with a stream depth regulator plate to adjust the depth of material travelling over the feed trough.



Elevation/ Separation Conveyor



The elevating conveyor collects the can lids from the discharge point of the vibratory hopper feeder and is designed to deliver them to the downstream batch weigher at a controlled rate.

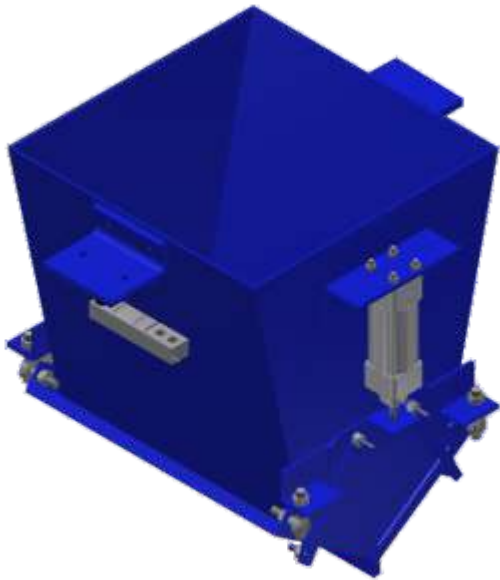
The conveyor unit incorporates a plastic belt with regular pitched flights to provide small pockets to enhance the separation of the can lids.

The unit is powered by a variable speed drive motor directly attached to the tail drum to permit base speed variation.

Start / stop operation of the elevating conveyor is automatically provided via the status of the downstream batch weigher.



Batch Weighing & Dosing



Can lids are dispensed from the elevating conveyor into a dual loadcell weigh hopper providing high accuracy automated batch weighing. The weigher fitted with a pair of pneumatically operated bomb doors to provide quick discharging to the downstream process. The batch weight is determined by the required system throughput

and typically equates to between 10 and 12 can lids. Once the target weight is achieved the upstream feed system is stopped and the weigher discharge doors are opened. Once discharged the doors are closed and the feed system starts up to commence the next weighment. Small batch weighments and high speed discharge provide a near continuous stream of weighed components onto the dosing conveyor. This dosing conveyor runs at a higher speed to further separate out the stream of can lids and discharges directly into the clients recycling process line.



Control



The machine mounted control panel houses a block PLC which provides sequence control of the can lid dosing system. The panel also incorporates a door mounted HMI unit providing a graphical representation of the system together with numerous data presentation, set up and configuration pages.

The system provides automated throughput and speed control in relation to the required rate set by the operator on the system set-up page. As the system runs it constantly monitors the totalised throughput of the weigher against time and cross references it against the required throughput. Speed alterations are performed by the PLC as a direct result of the feed back data from the weigher.