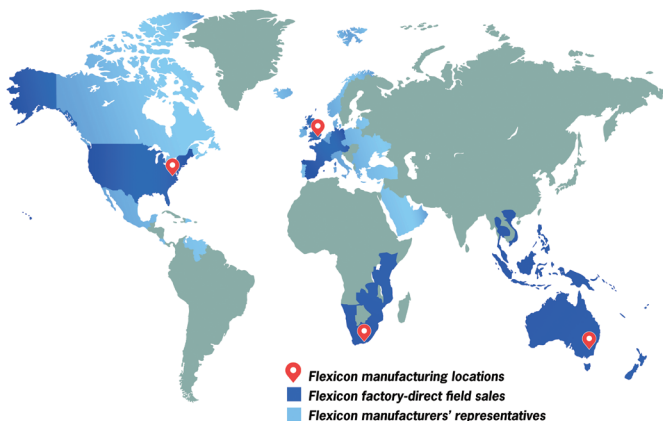




Leading Bottle Producer Moves Bulk Materials With No Cross-Contamination



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DONCASTER, UK — Rockware Glass Ltd. is the UK's market leader in the production of glass containers. From four modern factories it has been manufacturing glass in a variety of colors, in a host of shapes and sizes since 1919. The Wheatley, Doncaster facility in particular, has been producing mainly "flint" or clear glass containers since 1969, primarily to the specification of the food, dairy and soft drinks industries.

The company overcame a problem it encountered when relocating one of its production lines from its Knottingley plant to Wheatley, in an effort to accommodate a customer's need for green glass containers.

Producing glass of different colors at the same batch plant can compromise the quality of each production run due to the risk of raw materials cross-contaminating the furnaces. The objective, therefore, was to design a system able to function with precision, in a hostile environment, that would add premixed colorant to the main batch but remote from the batch plant itself. The system would feed a controlled flow of premixed colorant into the main batch just prior to entry into the furnace. On melt down, the combined colorant and main batch would yield the required molten liquid for molding into green bottles.

The main batch material is cullet (glass recycled via the bottle bank system), sand, soda ash, limestone and calumite. The premixed colorant used to achieve "green" glass is a 50-50 mixture of soda ash and iron chromite, also known as PORTACHROME®.

The company enlisted Flexicon Europe Limited, Herne Bay, Kent, UK, to design and manufacture its bulk handling system. It is comprised of a Flexicon model BFF fork-lift-loaded, bulk bag frame with receiving hopper secured by an interlocked guard door which isolates the system, and a series of strategically configured flexible screw conveyors to transport material to and from two smaller holding hoppers. Central to the fully automatic system is the Flexicon control panel that is slaved to the customer's own PLC that also controls the balance of the process.

By forklift, a 1-ton bulk bag containing the premix is positioned in the bulk bag frame above the receiving hopper. When secured in position, the bulk bag spout is tugged through a spout-cinching device, which is then closed, enabling the ties to be released without product loss or spillage. The cinching device is then opened and product is allowed to flow freely into the hopper. At the point of discharge from bulk bag to hopper, FLOW-FLEXER® plates raise and lower opposite bottom edges of the bulk bag at timed intervals, promoting the flow of products that are prone to compact during transport or storage, into the central flow column.

A "POP-TOP™" mechanism applies constant upward tension to the bag as it empties. This progressively elongates the bag while the stroke of the FLOW-FLEXER® plates increases, effectively raising the bottom of the bag into a steep "V" shape, promoting complete evacuation through the spout with no manual intervention.



Projecting through the sidewall of the receiving hopper are “Flexi-Finger” flow promotion devices that continually agitate the material to achieve uninterrupted flow into the intake adapter of the flexible screw conveyor. Each of the smaller holding hoppers is also equipped with the flow promotion devices.

When product within the receiving hopper falls below a low-level warning sensor, an operator is alerted to replace the bulk bag — a procedure that is generally required once daily, and is accomplished with no interruption of production.

The flexible screw conveyor transports the premix from the receiving hopper at a 45° incline to a height of roughly 20 feet (6 meters), feeding a controlled volume of material via a cross-feed conveyor, into two smaller holding hoppers. To ensure a continuous charge of material, both holding hoppers and gravity-fed main batch hoppers are equipped with high- and low-level warning sensors that signal the PLC to automatically start and stop the feed of material as required.

The east and west holding hoppers, in tandem with the east and west gravity fed, main batch hoppers, discharge premix and batch onto two (east and west) vibratory trays that feed material to the furnace via a screw conveyor that is independent of the Flexicon system.

Two slide valves, one actuated manually and the other electronically, allow either hopper to be cleaned with no interruption of production.

The mix is melted in the furnace at of approximately 900° F (1550° C). Molten glass then flows through a forehearth where it is cut into “gobs” that are loaded into the bottle forming machines and blown out as the finished containers. Any bottles that fall are recycled in the main batch as cullet.



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