APTECH PROVIDE RELIEF IN NEW THROAT LOZENGE FACILITY

Aptech (Powder Systems) Limited have recently completed two FIBC filling stations to Reckitt Benckiser Healthcare in Nottingham. The key benefits of these systems offer are:

- •Minimised product breakage through careful transferring and handling
- •Bag filling from bottom
- •GMP Construction
- •Settlement aid through vibration
- •Integral CIP for fixed parts
- •Ergonomic design for rapid and safe clean-down disassembly
- •IQ/OQ Qualification Documentation

The new stations are in addition to two existing filling stations supplied in 2003 and 2005.
The filling stations receive a continuous supply of throat lozenges which are stored in FIBC's under controlled conditions prior to packaging.
The new equipment has followed largely the original bespoke design which has been in successful operation for 5 years.
The new systems feature enhancements which are aimed at improving the preservation of product quality, cleanability and general functionality of the equipment. These enhancements were arrived at through close co-operation between RB engineers and Aptech.

Throughout the process the emphasis was on evolution rather than revolution so as to preserve the benefits of the core design.

PERFORMANCE

DESIGN

The equipment uses a duplex bag support framework to meet the continuous throughput of the forming plant.
The key to the successful design is minimising the distances that the product falls at every transfer point so as to minimise the incidence of breakage and chipping to the lozenge. In order to achieve this the product is introduced to the bottom of the empty bag by means of a spiral chute assembled inside a containing tube. The spiral is pitched specifically so that the lozenges slow down as they exit at the bottom thereby minimising the effect of an impact point.
As the product fills the bag the spiral, outer tube and infeed conveyor all articulate upwards (pivoting at the infeed end). A sensor at the bottom of the spiral detects the presence of the product and a rod-less cylinder powered by specially configured pneumatics raises the whole assembly in approximately 1" increments.

The FIBC neck is held in place with an inflating rubber neck ring. This neck ring is partnered with a stainless steel ring which gently pinches the neck of the bag. The main purpose of this is to permit slight variations in bag neck diameter without allowing the neck of the bag to pull off the inflated neck ring.

The bag and its support frame has been mounted on loadcells which are used to determine the switch over point. During filling, a pile of product builds naturally which can compromise the filling efficiency of the bag. To counter this effect the bag support frame and stand has been mounted on rubber ‘springs’ and an out of balance shaker motor attached. The software uses the weight of the bag to detect when to run the vibrator for a short period. This has the effect of reducing the angle of the pile and maximising the quantity filled to the bag.

INNOVATION

Due to the product being extremely hygroscopic the FIBC’s are inflated and continually purged with dry air during filling. The air is dried to levels of< 20%RH and is HEPA filtered. It has been possible to store product for months without degradation due to moisture where in a normal environment the moisture alters the product within minutes
The complete system is subject to significant sugary residue throughout the filling process. It is necessary to carryout out a complete hot water (80C) wash of the whole system between filling campaigns. The contact parts of the system are manufactured in such a way as to permit quick dismounting and disassembly. These parts are loaded to a trolley and taken to a washbay. In order to speed up the turnaround RB have chosen to duplicate these removeable items as change parts.

The remaining parts of the system are subject to an automatically sequenced hot water wash via spray nozzles directed at specific parts of the belts conveyors and elevator in particular. The hot water wash is followed by an air purge which accelerates the drying time of the static parts.

Emphasis was placed on GMP design and particular attention was paid to the minimisation of ledges and trap points. The box section stantion supports were used to house the majority of the cabling, pneumatics, CIP water and air and dry air. The result is a system with a minimum number of ledges and points where water can lie.

Being equipment which is required to handle a healthcare product, a validation protocol was observed throughout the design and build to ensure the quality of the equipment met the requirements of the FDA. All contact materials where from FDA approved sources and full traceability of these materials through BS EN 10204 3.1b certification (Certificates of Conformity for plastics and elastomers) has been provided.

The equipment was fully assembled and wired at Aptech's premises in Market Harborough. Product was run through it in a Factory Acceptance Test witnessed by the client. Full DQ, IQ, OQ documentation was completed and submitted for each system in a Machine Qualification Data Dossier.

DELIVERY