

# Hosokawa Micron Ltd's Multi-functional Dispensary Booth Design Raised to a Higher Level

When a leading manufacturer of innovative pharmaceutical products was looking to increase capacity at their tablet manufacturing and packaging Centre of Excellence in the North of England they approached Hosokawa Micron Ltd to develop a bespoke, GMP design, multi-functional, dispensary weigh booth.



The requirement was for a dispensary downflow booth designed to support dispensing, weighing, delumping and material handling of Level III active pharmaceutical compounds with containment systems to provide consistent operator protection from hazardous airborne particles.

Hosokawa Micron Ltd engineers worked closely with the customer to establish the optimum system design to ensure the most ergonomic solution capable of delivering operator protection at OELs <math>10\mu\text{m}/\text{m}^3</math> Time Weighted Average over an 8 hour period, across a range of integrated semi-automated and manual powder handling activities. In order to ensure the most effective and ergonomic design of downflow booth, a wooden mock-up of the booth and integrated equipment was produced prior to customer sign off. The final design offers optimum flexibility of use; for example, the capability to handle a variety of drum sizes, manual and semi-automated handling operations and addition of an operator protection screen.

Located on a mezzanine floor the Downflow Booth incorporates two drum tipping stations, drum lifting equipment, gravity feed chutes to lower level IBC stations as well as equipment for product de-lumping and drum charging. With space at a premium, the Downflow Booth has been designed to fit into an existing building footprint, meeting unique design and integration challenges and throughput demand.

'Our engineers have worked closely with the customer, listening and responding to the customers' wishes to create an integrated, ergonomic design solution that improves the working environment for personnel and meets the demand for streamlined product throughput and increased capacity. Together we have

brought together equipment from several leading OEMs to fulfil the demand for a user friendly, integrated facility for the handling of active pharmaceutical ingredients,' comments Carl Emsley, Hosokawa Micron Ltd.

Material filled drums enter the open front design Downflow Booth, where a vertical downflow of air alleviates the rise of dust in the operators breathing zone which may be created during drum opening or drum tip and sampling activities.

The Downflow Booth is equipped with two separate drum tipping stations. Drums are loaded into the drum tippers using a pneumatic hoist. Once delidded the drum tippers elevate the drums to 180 degrees and can either dispense product into a receiving drum or operators can manually dispense from the drum in the 90 degree rotated position. When dispensing from the Downflow Booth to an IBC on the ground floor of the facility, the drum is inverted and docked prior to gravity discharge down a vertical transfer chute which passes through the floor and is fitted with a Stott hygienic, inflatable, downward sealing head that seals against the top opening of the IBC thus minimising dust exposure to the operator during the filling process. The downward sealing head is fitted with integrated LEV extraction collar for removal of dust when the seal is deflated.

'A secondary level of barrier containment is also available for operatives with the inclusion of a 5D containment screen. Located on an articulated arm the screen provides a physical barrier between airborne dusts and the operator's breathing zone to deliver lower operator exposure levels and potential risks from contact with APIs. The range of movement of the containment screen and positioning in the booth allows operators to use this additional method of protection at either tipping station and for access to all areas of the Downflow Booth,' explains Carl Emsley.

A milling station is incorporated within the Downflow Booth to achieve product delumping prior to further sampling, subdivision or IBC loading. The drum tippers totally invert the drums to dock onto the mill to create a dust free seal that minimises airborne dust.

Full operation of all automated equipment and operations is achieved from a single console. The Downflow Booth is equipped with a cooling package which maintains the temperature in the booth at 21°C +/- 2°C to create a user friendly working environment.

Hosokawa Micron Ltd completed full onsite OEL testing during commissioning to ensure the completed installation met customer requirements and to allow confirmation of all operational protocols and standard operating procedures.



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