



Twin Chamber, Reactor Charging Isolator Offers Super Safe Operations

A new, twin chamber, reactor charging isolator from Hosokawa Micron Ltd has been installed at one of Europe's largest chemical plants to meet the company's demands for shirt sleeve operation with full personnel protection. The specially designed isolator is used to charge a catalyst powder into a reactor vessel and incorporates an integral pneumatic drum tipper.

With personnel protection of paramount importance, the design of the isolator incorporates a number of features to ensure the safest possible operation. Although the isolator target Operator Exposure Level (OEL) was $<10\mu\text{g}/\text{m}^3$, the isolator is designed to the same specification as a system required to operate at OELs of $<1\mu\text{g}/\text{m}^3$, with the actual OEL of the system achieving OEL results of $<0.01\mu\text{g}/\text{m}^3$ when third party tested using micronized lactose.

In operation the drum is loaded onto the tipper, de-lidded and the safety gate closed. The pneumatic circuit is interlocked and will not allow the tipper to operate unless the gate is closed. The drum is raised, tipped and docked with the isolator; the drum rim and outer liner are sealed to the isolator using the Hosokawa drum dock system which uses both compression seal and inflatable seal technology.



The bagged powder is then removed from the drum into the transfer chamber and then moved into the charging chamber via the transfer door. The bag is opened using a Hosokawa safety knife and charged into the reactor below.

The discharge hopper is fitted with a grid to prevent bags and other objects falling into the vessel below. Waste materials are removed via the continuous liner bag out port system. The isolator is ergonomically designed to ensure ambidextrous flexibility to facilitate all manual processes and offer overall user friendly functionality. Before dispatch the isolator was tested to strict protocols developed in conjunction with the client.

The system is certified for use in an ATEX II 3G (Zone 2) area. The main electrical cabinet is air purged which prevents exposure of live electrical equipment to flammable gases. All electrical field equipment including pressure transmitters and proximity switches are connected via galvanic barriers to give intrinsically safe operation.

The isolator operates with a nitrogen inerted, negative pressure internal atmosphere and the system controls a variable speed extract fan and incorporates interlocks to allow the safest possible operation.

HEPA filtration is used for the nitrogen inlet and the isolator extract and a HEPA Filter is also installed between the transfer chamber and charging chamber to give a pressure cascade through the isolator to reduce the risk of the transfer chamber becoming contaminated.

The system incorporates the Hosokawa safe change filter system as well as safe change gloves.

In today's industrial climate the demands for strict regulation and compliance to reduce operator exposure levels cannot be over emphasised. Hosokawa Micron's expertise in this area is renowned, being the preferred supplier to many major pharmaceutical and chemical companies worldwide.

Where ultra high containment levels are required for the handling of highly active or toxic chemicals the Hosokawa range of isolators offers complete operator safety and product integrity. Designed to meet individual requirements isolators enable both manual and automatic handling procedures to be carried out with minimal operator exposure.