

Integrated Process Containment Solutions

Case Example: Micronizing Isolator MC200®

This recent project consists of a special half suit operated isolation system featuring a through-the-wall design allowing the isolator services, motors, filters etc. to be executed within the technical area. The isolator ensures containment to a working OEL (Occupational Exposure Limit) of $< 50 \text{ ng/m}^3$ time weight averaged over an 8 h period (TWA) and operates within an ATEX Zone 2/3 G/D IIB T3 classified process room.



Given the product toxicity, it has been designed to operate under negative pressure to the outside environment with special HEPA filtration on both the exhaust paths and inlet to the system.

The isolator integrates two milling processes, an MC200® fluid energy mill and a cryogenic version universal mill processing at temperatures down to $-20 \text{ }^\circ\text{C}$ both of which operate on an interchangeable basis. The micronising takes place as a linear process with an area being provided in the work surface of the chamber. Micronised product is conveyed to an integrated cyclone filter allowing contained access to the cyclone

Dietrich Engineering Consultants sa

Z. I. Larges Pièces A · Chemin du Dévent · P. O. Box 9 · 1024 Ecublens · Switzerland
Tel +41 21/694 20 40 · Fax +41 21/694 20 59 · info@dec-group.ch



filter sleeves. Product discharge from the cyclone is discharged into a buffer vessel whereby it is then conveyed via Dec own powder transfer system PTS to a contained pack off station.

The grinding chamber is fed by a through-the-wall volumetric feeder. To enable the jet mill to operate as a closed system the mill venturi feed line is equipped with a closed system with integrated gas purge to the feeder and mill, removing the need for a balance line to the cyclone filter, thus removing additional set up and cleaning.

The micronizing process operate with nitrogen only and is equipped with an automated inertization system with an integrated oxygen analyzer. Process interlocks prevent the micronizing system from operating unless the predefined oxygen concentration level has been met.

API's are automatically fed into the feeder hopper by a Powder Transfer System (PTS) drawn from the previous process station. This operation is connected to the PLC which controls the level inside the feeder by use of level sensors. From there the product is conveyed into the venturi of the micronizing jet mill and further into the grinding chamber. Grind gas is fed into the outer chamber of the jet mill where it is then forced through the jet nozzles spaced around the periphery of the chamber at tangential angles.

The nitrogen is discharged into the fluid outlet at the center of the jet mill, which carries the smaller sized particles out of the of the milling chamber into the cyclone filter for separation, whilst the coarse particles are thrown back into the fluid jets for further reduction. Once the gas/product separation has taken place the exiting process gas from the micronizing system will pass through double efficiency HEPA filtration before exiting the isolator. The filters are of the safe change push type and contaminated filters are pushed into the isolator and removed via an RTP endless liner system.

The micronizing isolator has been CIP designed using a series of spray nozzles and spray guns strategically positioned throughout the complete plant.