



Mill Containment System - Jet Mills



OVERVIEW

The process for this application consists of the controlled feeding of a mill through a feeder. The powder is introduced into the feeder using a Drum Transfer System. After the particle reduction is complete, the powder is passed through a Cyclone housing and collected in a continuous liner system.

The Jet Mill, or Micronizer as this style of mill is also called, used in this application is a Jet Pulverizer 8" Micron Master. In this process, air drives the particles which are reduced in size when they impact upon each other. Smaller particles flow up the transfer tube to the Cyclone housing while the larger particles continue to be impacted on each other until they are reduced to the desired size (see Figure 1 at right).

The Feeder in this application is the K-TRON Model number K-PH-MV-KT20 feeder. This is a 20L, twin screw, volumetric feeder with a separate control system.

This equipment was on site prior to this effort. Some modifications were required by the customer which included, but were not limited to, modification of the piping going to the Cyclone and mounting the equipment on the ILC supplied cart.

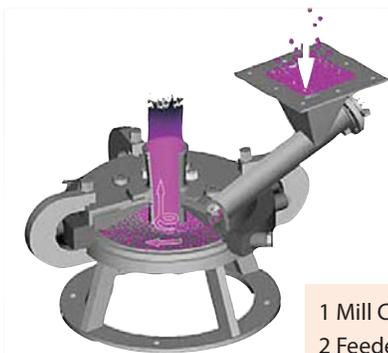


Figure 1

- 1 Mill Containment Cart
- 2 Feeder Inlet Canister
- 3 Drum Lifter
- 4 Drum Transfer System Frame and Platform
- 5 Drum Transfer System Enclosure
- 6 23" Diameter Continuous liner (not shown)

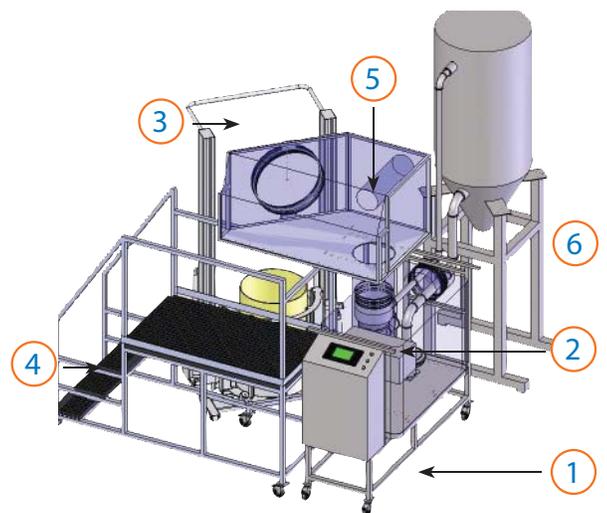


Figure 2

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HOW DOES IT WORK?

This system (Figure 2 at right) provides a contained method of transferring the complete or partial contents of drums to a variety of processes including milling. The design will accommodate the charging of several different types of mills with various sizes and shapes though the Jet Pulverizer 8" Micron Master was used in this application.

In the case of partial transfers, the system provides a contained method of resealing the drum for return to stock. The system consists of a flexible enclosure mounted on a mobile stainless steel frame (see Figures 3 and 4 on next page).

Product drums are over-sleeved with disposable drum attachment sleeves. The sleeves are stretched over the drum and taped to the drum. The opposite end of the sleeve is attached to the 23" diameter stainless steel bag-in ring using a band clamp and integrated O-rings. This provides a connection interface to attach the sleeve and introduces the drum into the enclosure. The enclosure containing the Mill and Feeder is mounted on a tray integral to the cart provided by ILC Dover. All air and electrical lines are passed through the tray. The milled product feed pipe to the Cyclone passes through a single interface ring which includes a groove for enclosure attachment. This ring is mounted to the cart. The feed hopper is fitted with a grooved canister to also allow enclosure attachment for the Drum Transfer Station and the Mill.

The mill enclosure includes three butyl gloves. A right and left pair are on the front of the enclosure. The third is a bidirectional glove on the opposite side on the enclosure. HEPA filters and bungee cords allow for the enclosure to move with the operator which is an ergonomic benefit that is not achieved with a rigid system.



Figure 3



Figure 4

The milled powder is collected from the bottom of the cyclone via a 23" diameter, 50 foot continuous liner in this application. This interface is fitted with a valve to prevent inflation of the liner. DoverPacs[®] could be used instead if contained powder transfer to the next step in the process were required.

What Are The Applications?

In addition to the Jet Pulverizer system, containment has been proven on other Micronizers. Fielded applications include, but are not limited to, the Microtech Midas Mikronizer—200.

Enclosures that separate the process and technical areas as well as systems that encapsulate the entire Jet Mill have been supplied.

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FEATURES

- Process and technical areas separated
- Clear film
- Flexible materials
- Retrofit to existing equipment
- Validated containment technology

BENEFITS

- Process is contained without contamination of motors and controls
- Visibility optimized and use of room lighting achieved
- Ergonomics maximized
- Capital equipment costs minimized
- Reduced cleaning and cleaning validation

What Containment Level Provided?

The Occupational Exposure Level for this application was set to be less than 1 µg/m³. The flexible containment technology utilized in this application has been proven to be capable of being below this level in third party and customer testing. Test results on a variety of powders have shown that containment in the 250 to 500 nanogram range is achievable.

Why Use This Over Other Technologies?

The cost of ownership, ergonomic advantages, and speed of delivery benefits of this flexible solution far outweigh those of rigid isolation systems.

Since 1947, ILC Dover has built a global reputation for out-of-the-box thinking that makes the seemingly impossible possible. Our engineered solutions solve our customers' most complex challenges through the creative and efficient application of flexible materials often integrated with advanced equipment and hardware.

We look beyond the boundaries of convention to help customers see what could be. Every day, everything we do brings new solutions to light. Are you ready to take your vision beyond boundaries? *Let's talk.*



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