

## Process Train Containment in CMO Operations

*Flexible Containment Technologies are critical to Pharmatek's CMO Operations*

### OVERVIEW

Pharmatek Laboratories, Inc. is a premier pharmaceutical chemistry development organization supporting the pharmaceutical and biotechnology industries.

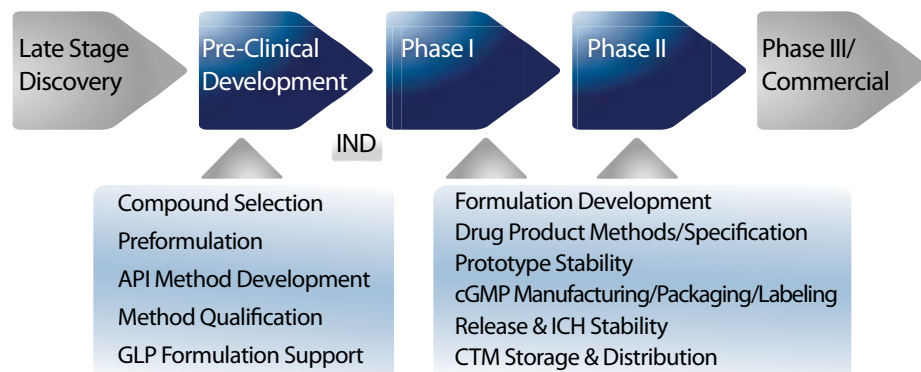
*Pharmatek offers development and manufacturing services for highly-potent and cytotoxic (HP/C) compounds including:*

- Analytical methods development
- Preformulation testing
- Formulation development
- GMP manufacturing of phase I/II clinical supplies
- Stability storage and testing services (all ICH storage conditions)
- Technical transfer for commercialization
- Clinical distribution and fulfillment

Handling HP/C compounds requires highly specialized facilities and controls. As part of Pharmatek's overall corporate safety program, they have chosen after careful consideration to integrate ILC Dover Flexible Containment Solutions into their HP/C facilities. Wet Granulation, Dry Granulation, Oven Drying, Fluid Bed Drying, Milling, Blending, Encapsulation, Tableting and De-dusting are all examples of manufacturing processes in which Pharmatek has integrated the ILC Dover containment technology.

Pharmatek's focus on pharmaceutical chemistry development, combined with their state-of-the-art HP/C facilities, ensures their customer's molecules move efficiently from discovery to clinical trials.

### Pharmatek focuses on preclinical and early-phase development & manufacturing of small molecules and peptides



### HOW DO FLEXIBLE ENCLOSURES WORK?

Flexible Containment Enclosures are designed using two basic methods – flange mount and total encapsulation.

The flange mount approach is used for the tray dryer where the flange is added to the face of the dryer outside of the door. An enclosure made from the rugged ArmorFlex® family of films is then attached to the flange and a supporting frame assembly. The door is within an enclosed environment when loading and unloading the trays with the drug product.



Flange Mount Flexible Containment Selected for Tray Dryer

The trays, drug product and associated process tools can either be preloaded into the enclosure or bagged into the isolated area via bag in/bag out (BIBO) canisters or larger drum ring attachment canisters.

For the wet granulation process, Pharmatek selected the total encapsulation method by working with ILC Dover engineers.

Solid pan mounted enclosures allow the entire piece of process equipment to be contained. The enclosure is supported by an elastic suspension system, attached to the pan, and includes glove sleeves for access to the equipment and integrated HEPA filters. Based on the suspension system, the operator is able to get in close proximity to the process, as if containment wasn't even present.



Solid Pan Mount Total Encapsulation Selected for Granulator

WHAT ARE THE APPLICATIONS?

Flexible Containment enclosures have applicability across Pharmatek's entire high potency process train.

WHAT ARE THE KEY BENEFITS OF THIS TECHNOLOGY?

- **Prevents cross contamination** – the enclosures are single-use and are dedicated to a specific compound to prevent cross contamination, which is of extreme importance to their customers.
- **Supports lean manufacturing** – with over 100 product runs per year, Flexible Containment supports easy product changeover and helps Pharmatek meet stringent EH&S requirements and project timelines.
- **Superior operator protection** – proven nanogram level containment (reference table below)

*Additional advantages*

- **Durability** – manufactured using puncture resistant ArmorFlex® films, the enclosures hold up during the most demanding operations.
- **Improved ergonomics** – the flexibility of the enclosures in terms of configuration (glove sleeves, ports, and passthrus configured for the equipment), the film clarity, and the elastic suspension attachments simplify the process for their operators.
- **Custom designed** – with ILC Dover's engineering expertise, Pharmatek custom designs enclosures for each process train unit.

WHAT CONTAINMENT LEVEL IS PROVIDED?

ILC Dover Enclosure System	Test Material	OBZ-TWA* (µg/m3)	Comment (No. of operators)
Granulator	Lactose	0.0026-0.0027	Operation (2)
Granulator	Lactose	0.0027-0.0331	Cleaning (2)
Drying Oven	Lactose	0.0026-0.0028	Operation (2)
Drying Oven	Lactose	0.0026-0.0037	Cleaning (3)

\*Operator Breathing Zone - 8 Hour Time Weighted Average

Based on surrogate monitoring testing conducted by Kasai Consulting, Pharmatek's facilities in San Diego achieved the nanogram containment values shown at left.

WHY FLEXIBLE?

Flexible Enclosures prevent cross contamination and help assure operator safety in Pharmatek's development and manufacturing operations.

