GLOVEBOX WORKSTATION

LFBC™ - LATERAL FLOW BIO CONTAINMENT FOR HPAPI PROCESSING

FLOW SCIENCES, INC.

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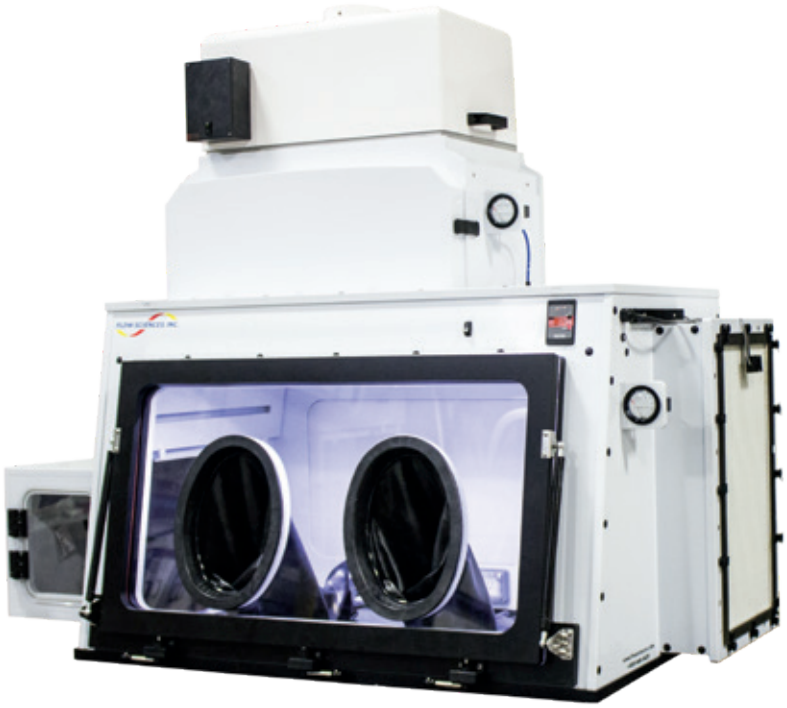
LFBC™

THE FLOW SCIENCES GLOVEBOX WORKSTATION SERIES



Transfer systems and RTP ports available in multiple configurations

- DESIGNED FOR WORK WITH HPAPI PROCESSING AND OTHER SENSITIVE APPLICATIONS
- HEPA INLET PROVIDES INTERIOR LAMINAR AIRFLOW THAT MEETS OR EXCEEDS ISO 5 ENVIRONMENT
- REDUCE TURBULENCE AND REPRODUCE CONSISTENT PERFORMANCE BASED RESULTS WITH BALANCE STABILITY TO THE 7TH DECIMAL PLACE.

SAFETY. The Glovebox Workstation series provides containment for highly toxic applications using APIs that need more safety than an opened face enclosure. Flow Sciences (FSI) engineering controls are built in to prevent loss of containment. Third Party testing has proven containment on these units to below 50 ng/m³ based on process and quantity.

DESIGN. Designed as the next step in containment above the FSI Hybrid Isolator, this unit is able to effectively contain using HEPA clean air inlet and HEPA air out. This creates laminar airflow across the interior. The Glovebox Workstation is equipped with dual 4" thick HEPA filters that can be recirculated into the lab or sent directly to house exhaust.

ISO 5 INTERIOR CLEANLINESS. The HEPA inlet provides the interior with a laminar airflow. This HEPA clean environment meets or exceeds ISO 5 for clean processing of work while protecting operators from exposure.

FRONT LIFT DOOR. The glove ports sit in a front lift door that opens vertically to effectively load and unload equipment. This door is hinged for ease of use.

PHENOLIC BASE. The chemically resistant phenolic base is dished to maintain spills and protects the work surface from harmful chemicals.

INTERNAL LED LIGHT. This enclosure features an internal LED light for improved visibility inside of the enclosure and can be adjusted directly on to the application. This light comes standard with every Glovebox Workstation Enclosure.

STANDARD SIZES. The Glovebox Workstation series is available in 4, 5, and 6 foot standard width options. Customs are available.

5’ GLOVEBOX WORKSTATION

SPACIOUS INTERIOR WORK SPACE

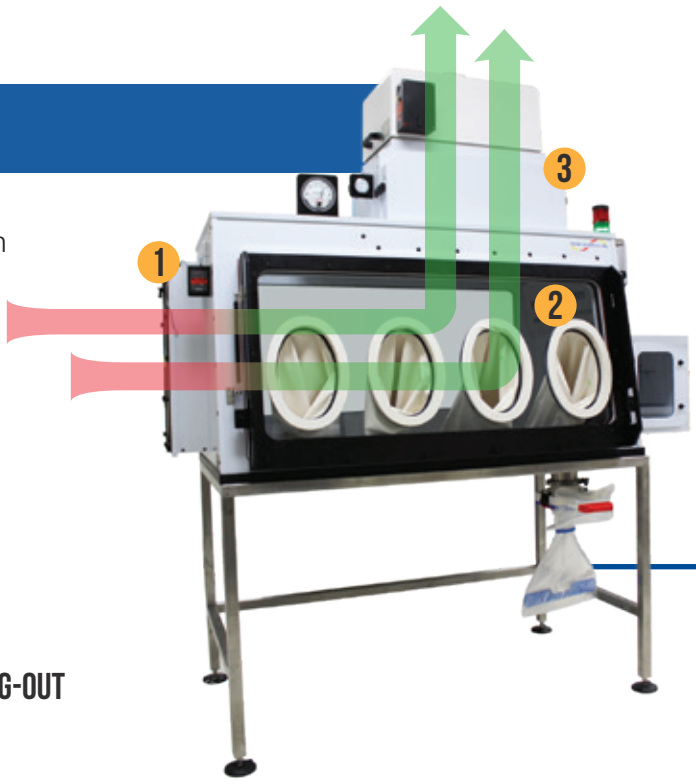
EXTERIOR WIDTH	61”	EXTERIOR DEPTH	34”	EXTERIOR HEIGHT	42.25”
INTERIOR WIDTH	59”	INTERIOR DEPTH	30”	INTERIOR HEIGHT	37.25”

ISO 5 INTERIOR CLEANLINESS

The HEPA inlet provides the interior with a laminar airflow. This HEPA clean environment meets or betters ISO 5 for clean processing of work while protecting operators from exposure.

The Bag-in/Bag-out Dual HEPA exhaust ensures safe recirculation of air into the room or connection to house exhaust.

1. INLET 4” HEPA FILTER
2. ISO 5 OR BETTER CLEAN INTERIOR
3. DUAL 4” HEPA FILTERS IN BAG-IN/BAG-OUT



Ezi-Dock high containment transfer system for use with highly potent pharmaceutical ingredients available upon request.

HIGH POTENCY API PREP SYSTEM

High Potency API (HPAPI) Prep System LFBC™ is designed as an enclosure suite with 2 Hybrid Isolators and a Glovebox Workstation connected for processing. The system features a full transfer port system made of polypropylene for processing HPAPIs through the entire enclosure suite. The Glovebox Workstation features a lateral flow air filtration system with an ISO 5 or better interior environment. The Hybrid Isolators feature dual speed fans so the glove panels can be removed and operated with an open face as a modular feature. The dual speed fan automatically senses the removal or addition of the glove panel, and adjusts the fan speed accordingly to maintain proper face velocity. Size: 66" Exterior Width, 39" Exterior Depth, 31" Interior Height

HPAPI GLOVEBOX WORKSTATION

HPAPI Glovebox Workstation LFBC™ is designed to house 2 balances and maximize both personnel and product protection while weighing powder and liquid APIs and HPAPIs. Units can be configured with many different transfer systems, including Ezi-Dock as shown here, as well at RTP ports from Getinge, continuous liners, and many more. 4 x 10" glove ports at the front of enclosure, pass through for data and power cables as well as access door to maximize operational flexibility. ISO 5 or better interior environment.

Size: 80" External Width, 32" External Depth, 28" Internal Height

PERFORMANCE

Performace is paramount, and through consistent quality design and expert manufacturing, Flow Sciences' units set the industry standard. With surrogate powder testing, both in our facility as factory acceptance testing and at the customer facility as site acceptance testing, Flow Sciences consistently **exceeds our customers' expectations with containment targets and goals**.

Containment Target : .05 µg/m³
Result : .0004 µg/m³

Equipment : Balances
Operation : Weighing / Transferring

Containment Target : .2 µg/m³
Result : .009 µg/m³

Equipment : Balances, Mortar & Pestle
Operation : Weighing, Grinding

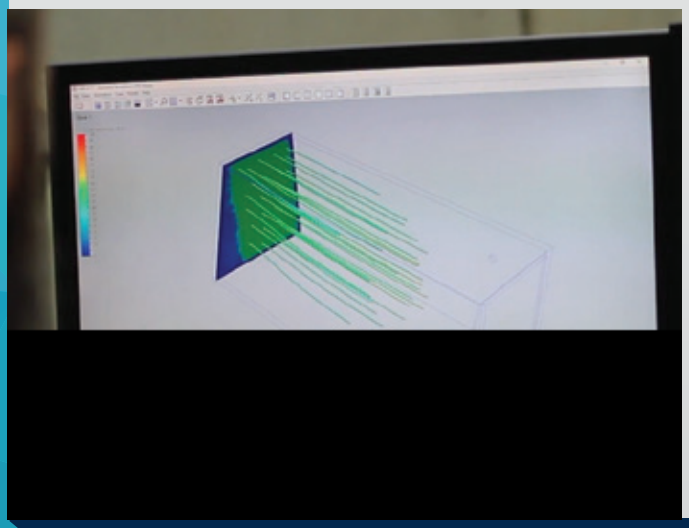
DESIGN PROCESS

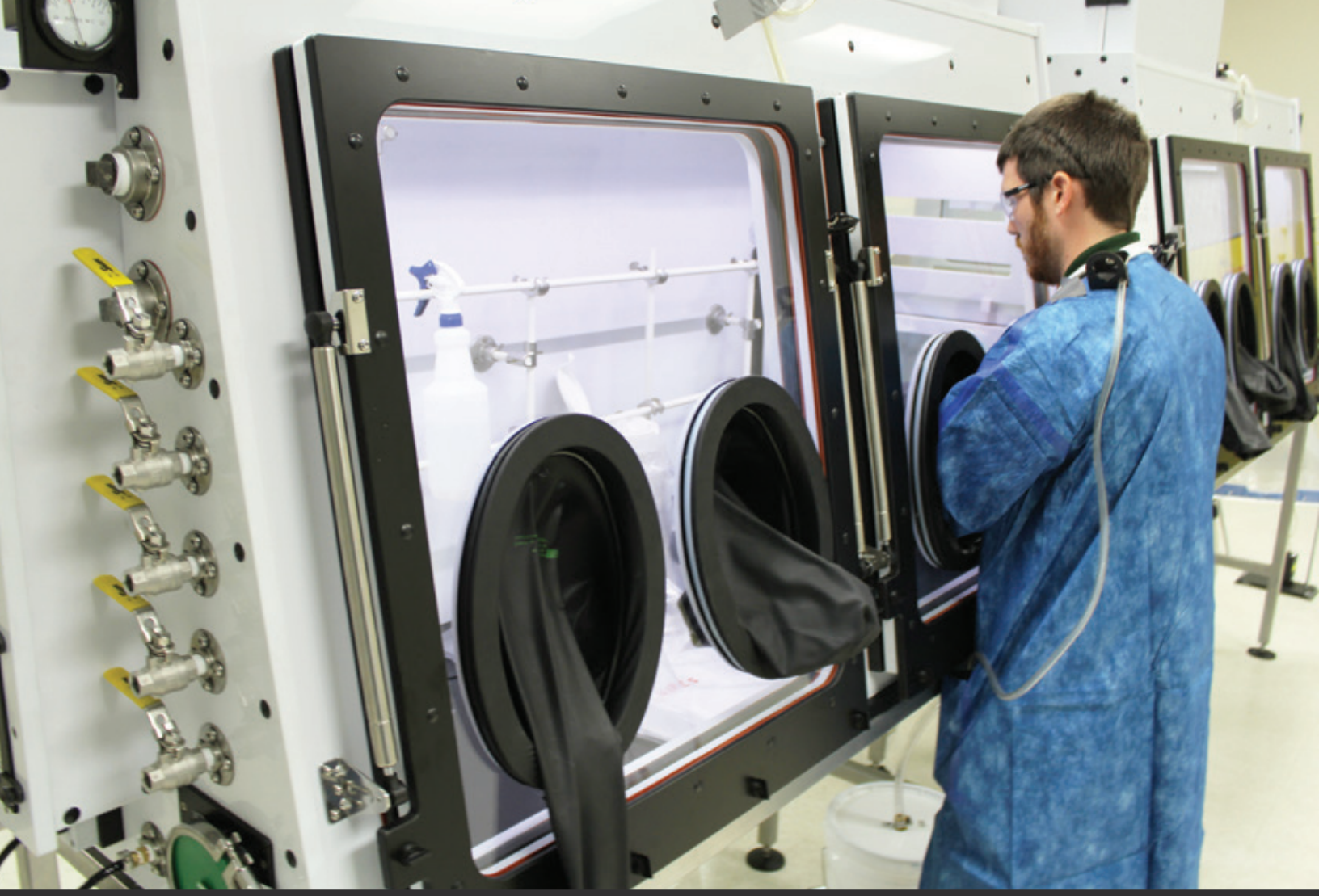
Computational Fluid Dynamics (CFD) is the study of fluid dynamics using sophisticated computing technology. Computational Fluid Dynamics uses or solves the governing equations of fluid or gas flows to predict the characteristics and the structure of a flow field. The most important feature or advantage of using CFD in the design process is the ability to see airflow. CFD allows the user to see the results of engineering design more effectively than in the real world. The effects of minute features in the designing process can be seen and compared using CFD which cannot be done in an otherwise efficient manner. Another added advantage of using CFD is the repeatability of the results.

Flow Sciences uses CFD in the design process in order to concentrate and study the effects of changes in airflow (large and small) in the enclosure design. Any changes to an enclosure's design affect the airflow structure inside the enclosure and FSI's goal is to maintain stable airflow that improves containment while also providing a low turbulent atmosphere that allows sensitive equipment to perform properly and minimize any potential product loss. With CFD, we have the advantage of evaluating the performance of the enclosure even before it is built. We then verify those results in our testing lab. This results in our clients receiving enclosures that have proven performance.

CONTAINMENT SOLUTIONS FROM RESEARCH TO PRODUCTION

Flow Sciences, Inc. provides engineered containment solutions from research to production. From Occupational Exposure Bands (OEB) 3 to 5, we build to suit your application. Whether in powder manipulation where balance stability is paramount, or using specific manufacturer equipment needing containment, or operating in a temperature and humidity controlled environment, Flow Sciences keeps your personnel and product safe.





TESTING

Flow Sciences possesses a laboratory capable of testing products for conformance to the relevant standards (ie. ASHRAE 110-2016 Tracer Gas Testing). Every unique enclosure or hood that is manufactured in the facility is tested to these standards to ensure quality and performance to the ISO 9001:2016 standard.

Additionally, the facility can be used to perform further testing, using surrogate materials to determine expected enclosure containment capabilities. This factory acceptance testing using surrogate materials is often accompanied by a third party industrial hygiene group, as well as the customer. This helps to replicate the end process exactly, and also to suggest SOPs and GLPs for best use of the equipment.

Flow Sciences' team of industrial engineers design workstations and enclosures that reduce product contamination and maximize protection for professionals who work with toxic substances and uncertain risks. All of our products are engineered and manufactured at our corporate headquarters in Leland, NC and are backed by our sophisticated design process and award-winning excellence in engineering, including 11 U.S. Government patents. We have worked with pharmaceutical companies, research and development laboratories, manufacturing, and production facilities for 30 years. Our task-specific designs are dynamic solutions that are adaptable to our clients' workflow and specific needs.

Flow Sciences was one of the first companies in the U.S. to use computational fluid dynamics (CFD) in drafting our enclosures to ensure optimum airflow. Our engineers use CFD algorithms to simulate fluid flows and interactions within contained spaces. This enables us to predict and control airflow through design, which we then test in our state-of-the-art laboratory. Working closely with our clients to mimic real-world applications, we develop testing protocols based on the intended use of our enclosures and measure them against industry-accepted standards to ensure proper containment. We have designed, manufactured, and tested over 13,000 enclosures, generating a wealth of data on situational flow dynamics, which allows us to control for consistency, safety, efficacy, and overall quality.

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