

product CATALOG

WHAT'S YOUR
LEVEL OF
CONTAINMENT?



ENGINEERING SAFETY FOR THE CONTAINMENT OF YOUR APPLICATION



Flow Sciences, Inc. (FSI) designs and manufactures containment solutions for research and development laboratories, pilot plants, laboratory automation suites, manufacturing and production sites. Our commitment to safety and performance in the engineering, design, testing, and installation of containment enclosures has proven performance throughout pharmaceutical, biotech, chemical, forensic, academic, government and other industrial facilities.

As an innovator in customer focused containment solutions, FSI designs controlled airflow systems in a dynamic environment process, scalable to the size or scope of the application. During the 1990's FSI pioneered the Vented Balance Safety Enclosure (VBSE™) and introduced the first independent fan exhaust system to isolate vibrations for balance accuracy. Swiftly becoming the world leader in laboratory safety containment, FSI continued its innovative design techniques introducing waste chutes to the containment industry. Another industry first was achieved by connecting enclosures with "pass-throughs" allowing an entire process to be contained within a protected environment.

Entering the new millennium, FSI continued to engineer the advancement of safety containment beyond the laboratory. FSI scaled the VBSE™ concepts and designs to bulk powder and chemical processing containment in the pilot plant and production environments. This has allowed reduced costs and opened new application opportunities for its clients.

FSI's continued quest for high performance and customized safety containment advanced into the laboratory

automation arena. Incorporating Computational Fluid Dynamics (CFD), FSI employed this technology to expand its product portfolio to robotics and lab automation for either personnel protection, product protection, or both. These efforts produced a patented lateral flow enclosure.

The Flow Sciences team, the world leaders in containment solutions, is dedicated to delivering superior engineering quality and service at each level of controlled airflow containment systems.

Flow Sciences, Inc.

2025 Mercantile Drive,
Leland, NC 28451

For more information:

Visit our web site at www.flowsciences.com. Here you can become registered member of our online community and have unlimited access to:


- [Case Studies](#)
- [Product Sheets](#)
- [Product Catalog](#)
- [Test Reports](#)
- [Engineering Drawings](#)
- [Product Manuals](#)

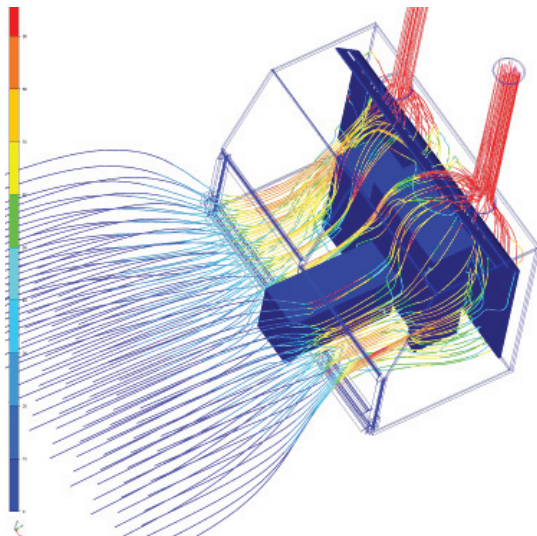
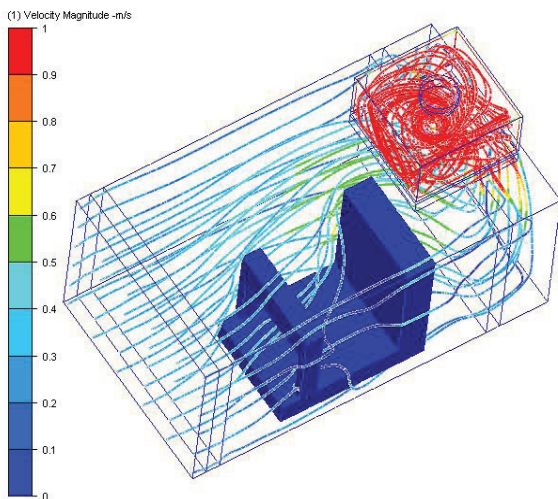
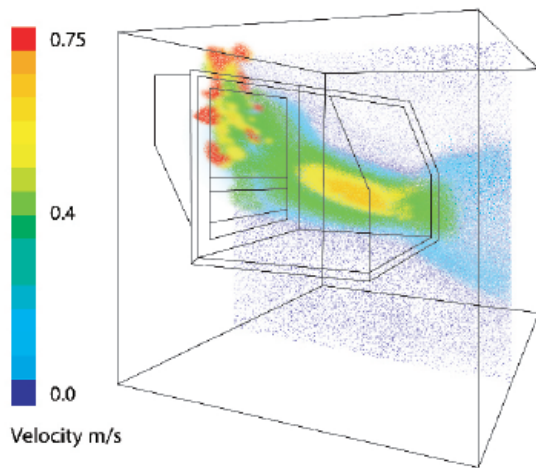
Call toll free: **1.800.849.3429**

Email: Information@FlowSciences.com

product CATALOG

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Computational Fluid Dynamics (CFD) is the study of the 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 advantages of using CFD in the designing process are the visualization opportunities. CFD affords 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 minimizes any potential product loss. With CFD we have the advantage of evaluating the performance of the enclosure even before it is built, and then verify those results in our testing lab. This results in our clients receiving enclosures that have proven performance.

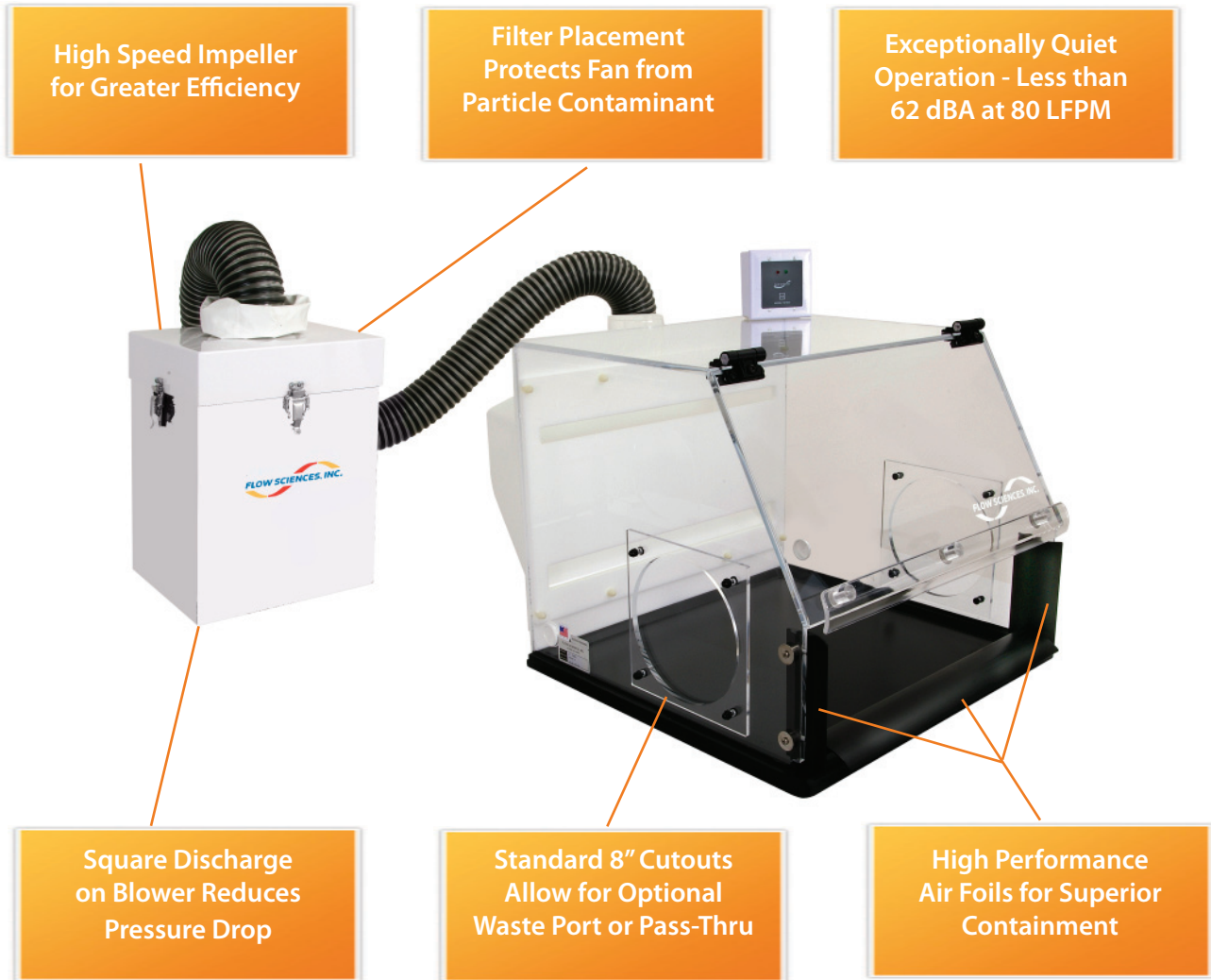
For more information on CFD please visit our website:
<http://www.flowsciences.com/>

BENCHTOP/ SCALE UP



Top Mount Vented Balance Safety Enclosure

The Flow Sciences FS2000 Series of Vented Balance Safety Enclosures (VBSE™) is designed specifically for applications where balance stability and accuracy are paramount concerns while still protecting personnel from potent powders and toxic chemicals. Available in 2' to 8' widths, 23" to 30" depths, and 19.5" and 30" heights.



The 2000 Series Features:

- Gentle, non-turbulent airflow to prevent balance fluctuation and loss of materials
- Dished resin base to provide easy cleanup and containment of spills
- Aerodynamic channels to ensure smooth airflow across the worksurface clearing contaminants within the enclosure.
- Side ports with blank plates for easy installation of optional Waste Disposal Chute or Pass Thru.
- Simple alarm to alert operator of face velocities below a specified range.
- Mounted airfoils around the face opening to direct airflow across the work surface to the back of the enclosure.



Model	Width	Depth	Height	Weight
FS2010	23.75" 60.3 cm	23" 58.4 cm	19.5" 49.5 cm	84 lbs 38.1 kg
FS2015	35.75" 90.8 cm	23" 58.4 cm	19.5" 49.5 cm	102 lbs 46.27 kg
FS2020	47.75" 121.3 cm	23" 58.4 cm	19.5" 49.5 cm	150 lbs 68.04 kg
FS2030	59.75" 151.8 cm	23" 58.4 cm	19.5" 49.5 cm	186 lbs 84.37 kg
FS2040	71.75" 182.2 cm	23" 58.4 cm	19.5" 49.5 cm	200 lbs 90.72 kg

Note: Dimensions are exclusive of external plenum.



System Options	
D	Enclosure System with Vent Kit
FD	Enclosure System with Fan/HEPA Filtration
WD	Enclosure System with Vent Kit & Waste Chute (FS2070)
WFD	Enclosure System with HEPA Filtration & Waste Chute
BFD	Enclosure System with Bag-in/Bag-out HEPA Filtration

complete line of
TABLES, CARTS, & ACCESSORIES
 available!



FS2240-12



FS2280



FS2350



FS2400



Model	Width	Depth	Height	Weight
FS2230	35.75" 90.8 cm	30" 76.2 cm	30" 76.2 cm	166 lbs 75.3 kg
FS2240	47.75" 121.3 cm	30" 76.2 cm	30" 76.2 cm	221 lbs 100.2 kg
FS2250	59.75" 151.8 cm	30" 76.2 cm	30" 76.2 cm	276 lbs 125.2 kg
FS2260	71.75" 182.2 cm	30" 76.2 cm	30" 76.2 cm	332 lbs 150.6 kg
FS2280	95.75" 243.2 cm	30" 76.2 cm	30" 76.2 cm	443 lbs 200.9 kg

Note: Dimensions are exclusive of external plenum.

System Options	
D	Enclosure System with Vent Kit
FD	Enclosure System with Fan/HEPA Filtration
WD	Enclosure System with Vent Kit & Waste Chute (FS2070)
WFD	Enclosure System with HEPA Filtration & Waste Chute
BFD	Enclosure System with Bag-in/Bag-out HEPA Filtration

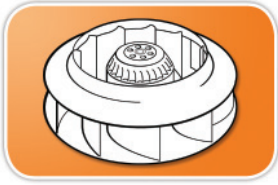
Model	Width	Depth	Height	Weight
FS2300	23.75" 60.3 cm	23" 58.4 cm	30" 76.2 cm	110 lbs 49.9 kg
FS2350	35.75" 90.8 cm	23" 58.4 cm	30" 76.2 cm	130 lbs 59.0 kg
FS2400	47.75" 121.3 cm	23" 58.4 cm	30" 76.2 cm	170 lbs 77.1 kg
FS2500	59.75" 151.8 cm	23" 58.4 cm	30" 76.2 cm	220 lbs 99.8 kg
FS2600	71.75" 182.2 cm	23" 58.4 cm	30" 76.2 cm	264 lbs 119.75 kg
FS2800	95.75" 243.2 cm	23" 58.4 cm	30" 76.2 cm	352 lbs 159.7 kg

Note: Dimensions are exclusive of external plenum.

For Customer Service or Information:

web: www.flowsciences.com **email:** information@flowsciences.com
toll-free: 800.849.3429 **fax:** 910.763.1220

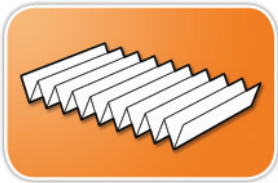
The Flow Sciences FS10000 Series Top Mount Bag-out safety containment systems are designed to recirculate filtered air back into the lab or attach to house exhaust with optional thimble accessory. The location of the filtration system directly above the enclosure provides maximum containment with minimal space and energy requirements. The specially engineered motor provides quiet, smooth operation without transmitting vibration to the work surface. An internal plenum allows for gentle, horizontal airflow. The turbulence-free airflow provides a stable work environment without balance fluctuations.



**High Speed Impeller
for Greater Efficiency**



**Exceptionally Quiet
Operation - Less than
50 dBA at 80 LFPM**



**Filter Placement
Protects Fan from
Particle Containment**

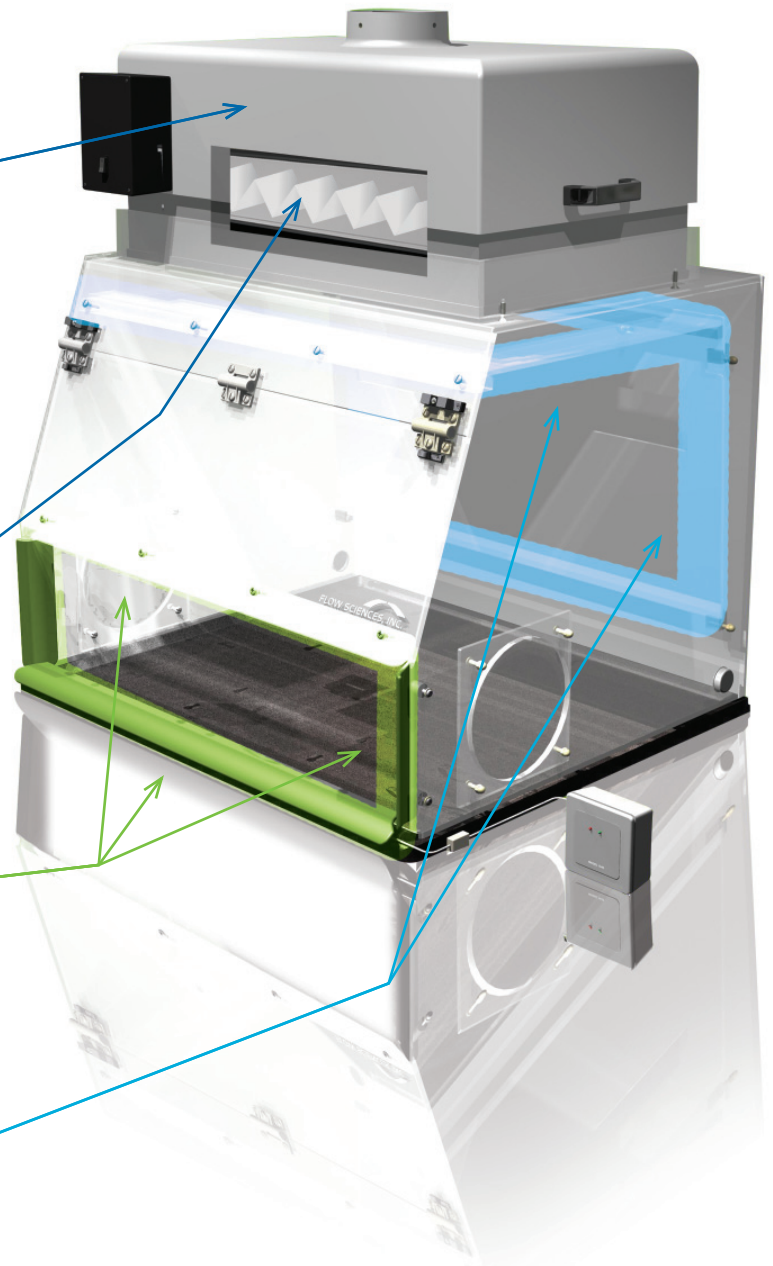
**4" Pleats for Extended
Filter Life**



**High Performance
Air Foils for Superior
Containment**



**Tool-less Removable
Baffles for Easy
Cleaning**





Model	Width	Depth	Height	Weight
FS10200	23.75" 60.3 cm	30" 76.2 cm	27.38" 69.5 cm	215 lbs 97.5 kg
FS10201	23.75" 60.3 cm	23" 58.4 cm	24" 61 cm	200 lbs 90.7 kg
FS10300	35.75" 90.8 cm	30" 76.2 cm	27.38" 69.5 cm	245 lbs 111.1 kg
FS10301	35.75" 90.8 cm	23" 58.4 cm	24" 61 cm	250 lbs 113.4 kg
FS10400	47.75" 121.3 cm	30" 76.2 cm	27.38" 69.5 cm	275 lbs 124.7 kg
FS10500	59.75" 151.8 cm	30" 76.2 cm	30" 76.2 cm	305 lbs 138.4 kg
FS10600	71.75" 182.2 cm	23" 58.4 cm	30" 76.2 cm	335 lbs 152 kg

Note: Measurements are exclusive of fan/filter housing



related
ACCESSORIES

FS2081PE - Thimble fitting used to send filtered air to house exhaust

FS2070 - Waste disposal chute accessory

FS2075 - Pass-thru accessory for connecting two enclosures

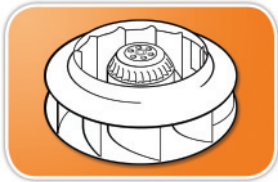
Tables, Carts, and ADA Lift Tables are also available!



Top Mount Technology: 11000 Series



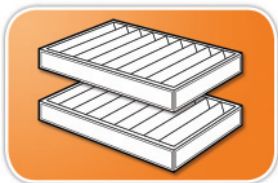
The Flow Sciences FS11000 Series Top Mount Bag-in/Bag-out safety containment systems are designed to recirculate filtered air back into the lab or attach to house exhaust with optional thimble accessory. The Bag-in/Bag-out system is designed for safe disposal and replacement of the HEPA filter by a certified technician. Convenient front panel access has an Easy-Lock system that secures the filter so NO tools are required. A secondary HEPA filter is located between the primary filter and the motorized impeller to prevent any contaminants that might migrate downstream during Bag-in/Bag-out disposal.



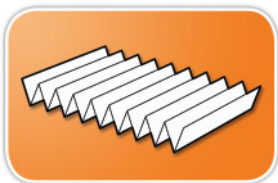
**High Speed Impeller
for Greater Efficiency**



**Exceptionally Quiet
Operation - Less than
50 dBA at 80 LFPM**



**Dual Filter Design
Protects Fan from
Particle Contamination**
**Primary Bag In/Bag
Out HEPA Filter and
Secondary HEPA Filter**



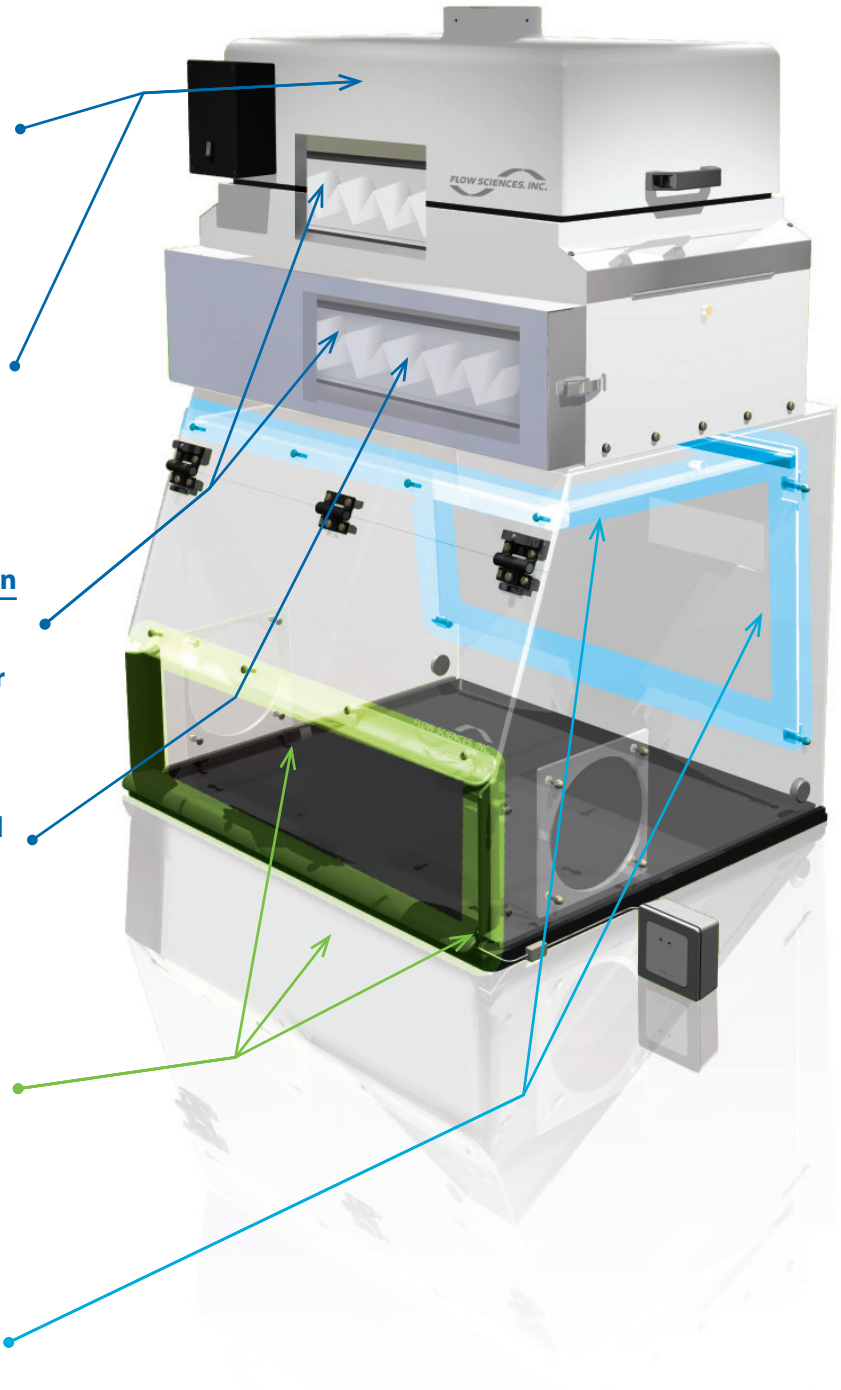
**4" Pleats for Extended
Filter Life**



**High Performance
Air Foils for Superior
Containment**



**Tool-less Removable
Baffles for Easy
Cleaning**





Model	Width	Depth	Height	Weight
FS11300	35.75" 90.8 cm	30" 76.2 cm	27.38" 69.5 cm	295 lbs 133.8 kg
FS11400	47.75" 121.3 cm	30" 76.2 cm	27.38" 69.5 cm	315 lbs 142.9 kg
FS11500	59.75" 151.8 cm	30" 76.2 cm	27.38" 69.5 cm	355 lbs 161.03 kg
FS11600	71.75" 182.2 cm	30" 76.2 cm	30" 76.2 cm	385 lbs 174.6 kg

Note: Measurements are exclusive of fan/filter housing



customized
SOLUTIONS
available!

Need a size that you don't see here? Do you want a smaller face opening or a door accessible from the side?

Contact Flow Sciences, Inc. to learn about our customized containment options. Our team of design engineers uses sophisticated air modeling technology to create enclosures on a custom basis. A representative will guide you through each phase of the custom order process:

CUSTOM QUOTATION REQUEST FORM

ENGINEERING & DESIGN

PRODUCTION

INSTALLATION & TRAINING



CONTAINMENT BY DESIGN

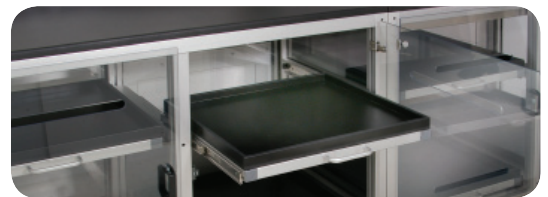
CASE STUDY: Benchtop / Scale Up



The system offers a 4' x 30" x 30" vented workspace and an additional 8' of vented storage.



Sink allows for drainage and collection of solvents.



Sliding drawers provide a place for items to dry.

CUSTOMER

Major Metropolitan Museum

PROJECT SCOPE

Customer is handling large quantities of noxious solvents for restoration of antique photography and text documents

DESIGN ISSUE

Client required personnel protection to remove organic solvent vapors from operators' breathing zone. Some vapors are heavier than air making removal difficult.

FLOW SCIENCES' SOLUTION

Due to the nature of the solvents being used, Flow Sciences' team of design engineers developed a vented Benchtop enclosure manufactured from all-clear, solvent and abrasion resistant polycarbonate. The enclosure is mounted on a Flow Sciences designed cabinet with an adjoining workbench and cabinet.

Airfoils placed on all four sides of the enclosure's work area provide the additional force needed to sweep the heavier solvent vapors to the rear of the system and up and out through a dedicated house exhaust.

A sloped, stainless steel sink replaces the traditional phenolic resin work surface to allow work to take place on the left via a semi-flat surface. The drain area is tapered for solvents to quickly and easily collect. Space beneath the drain and inside the cabinet allows for placement of "just right" collection vessels. This gives the user the option to capture and reuse solvents.

Both cabinets are vented and include sliding drawers with handles constructed from chemically resistant phenolic resin that provides a place for completed works to dry as well as additional solvent storage. All-clear construction enables the operator to quickly locate the required solvents without having to open cabinet drawers.

PRODUCT ANNOUNCEMENT

TABLES/ ACCESSORIES



FS4010 & FS6000 LIFT TABLE

FS4000SS has evolved into **FS4010**

FSI in its proud tradition of continuous improvement will be evolving our FS4000 Series Independent Fan Filtration System. Enlarged inlet to 6" to assist with reduced pressure drop. All Stainless Steel housing with white powder coat finish.

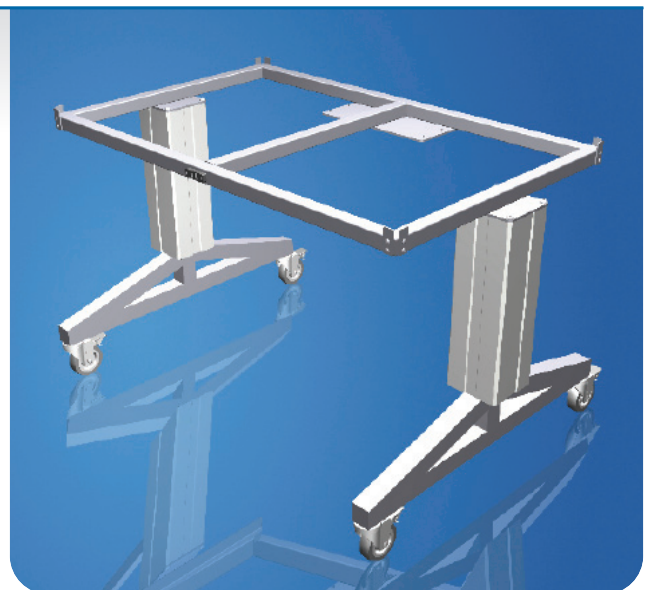
- Improved performance
- Cleaner look



FS6000 LIFT TABLE

Combined weights of apparatus and containment enclosures often exceed normal table capacity. Flow Sciences, Inc.'s engineered tables and carts answer capacity and ergonomic challenges. The new FS6000 Series Lift Tables offer lifting solutions up to 1800lbs whether in the lab or production environment.

- Available with casters or leveling pads
- Customized to your enclosure and application



PILOT PLANT/ MANUFACTURING



Top Mount Bulk Powder Chemical Transfer Station

In the 10050 Series of Bulk Powder Chemical Transfer Stations, the HEPA filtration system is housed on top of the acrylic enclosure. This filtering configuration provides maximum containment while minimizing space and energy demands. The turbulence free airflow provides a stable working environment that prevents balance fluctuations. The base of the unit is roomy enough for larger balances and comes with a standard 20" (50.8 cm) diameter cutout in the base to accommodate a large drum. Multiple filtering options are available including HEPA with 99.99% efficiency. Each system comes equipped with a face velocity alarm to continuously monitor airflow.



Model	Width	Depth	Height	Weight
FS10450	47.75" 121.3 cm	30" 76.2 cm	27.38" 69.5 cm	275 lbs 124.7 kg
FS10550	59.75" 151.8 cm	30" 76.2 cm	30" 76.2 cm	305 lbs 138.4 kg
FS10650	71.75" 182.2 cm	30" 76.2 cm	30" 76.2 cm	335 lbs 152 kg

Note: Measurements are exclusive of fan/filter housing



Custom: 8 foot enclosure with recessed table. Shown with optional table

related
ACCESSORIES

FS2081PE - Thimble fitting used to send filtered air to house exhaust

FS2070 - Waste disposal chute accessory

FS2075 - Pass-thru accessory for connecting two enclosures

FS6000 - Custom Lift Table

FS6550 - Hydraulic Drum Lift

did you know?

You can visit our website at www.flowsciences.com. Here, you can become a registered member of our online community. Once registered you will have full and complete access to:

- » Product sheets
- » Case Studies
- » Specification Drawings
- » Test Reports
- » Product Manuals
- » And MORE!

Flow Sciences' Top Mount Bulk Powder with Bag-in / Bag-out Filtration is engineered to provide a safe, stable working environment. Internal plenums and mounted aerodynamic airfoils around the face opening ensure a smooth, horizontal airflow pattern across the work surface. In Flow Sciences' "Filter First" design, the fan is positioned to remain contaminant-free even when working with potent powders. The system comes with a standard 20" diameter cutout in the base to accommodate a large drum.

Units may be configured to discharge to house exhaust or to re-circulate back into the lab. Units configured for recirculation are portable and can easily be moved when necessary. "Stationary" installation is not required allowing for greater flexibility in the laboratory. A secondary filter is located between the primary filter and the fan box (patent pending) making this the safest enclosure of its kind. The non-loading secondary HEPA filter prevents any contaminants that might migrate

downstream during Bag-in/Bag-out disposal from coming in contact with the exhaust unit and being discharged to house exhaust or re-circulating into the room.

Clean-up is a breeze with quick, tool-free removal of internal top and rear plenums which allows access to all surfaces inside the work area for an easy wipe-down with diluted alcohol mixture while the exhaust unit is operating. Engineered with a minimum of crevices for superior clean-ability minimizing cross-contamination risks. The operation of the fan is exceptionally quiet providing a better work environment. The front of the enclosure is angled for easy viewing while maintaining a safe, comfortable working position. The base of the unit is black for easy powder detection and dished for spill containment. Each system comes equipped with a Face Velocity Alarm to alert the operator of air flow velocities below a preset range.



Model	Width	Depth	Height	Weight
FS11550	59.75" 151.8 cm	30" 76.2 cm	30" 76.2 cm	355 lbs 161.03 kg
FS11650	71.75" 182.2 cm	30" 76.2 cm	30" 76.2 cm	385 lbs 174.6 kg

Note: Measurements are exclusive of fan/filter housing



The Flow Sciences' Chemical Transfer Station™ is an engineered product solution combining proven technologies from three industry leading companies. It features:

- Flow Sciences' Bag-in/Bag-out Bulk Powder Enclosure (FS11550)
- EHS Solutions Drum Manipulator
- ILC Dover Gloved Flexible Enclosure



MAXIMUM CONTAINMENT minimizes loss of product and ensures operator safety.

- Station was third party tested and shown to contain less than 1 µg/m³

"... results are particularly noteworthy due to large amounts of surrogate materials handled during this task..."

- Turbulence-free horizontal airflow inside Flow Sciences' enclosure

EASE OF OPERATION, MAINTENANCE & CLEANABILITY

- Quick release plenum on bulk powder for easy clean-up
- Combination of passive and active enclosures eliminates potential for cross contamination
- Exceptionally quiet operation
- Ergonomically designed for comfort
- Pneumatically powered and controlled EHS drum manipulator positions easily
- ILC Dover gloved flexible enclosure allows safe, easy access to powder drum

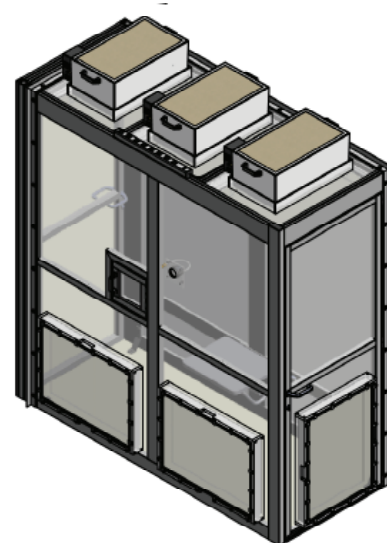


CONTAINMENT BY DESIGN

CASE STUDY: Pilot Plant / Manufacturing



Modular unit custom designed for continuous process capsule operation



De-Gowning room designed for removal of personnel protective equipment after completion of process operation

CUSTOMER

One of the world's foremost biotechnology companies, with products and services in over 90 countries

PROJECT SCOPE:

Customer required powder containment for a pilot plant formulation suite that used a continuous process for a capsule line. Process included granulating, balance weighing, polishing, press operation, and blending.

DESIGN ISSUE:

Entire process was performed inside one room and had to be enclosed from start to finish while maintaining mobility.

FLOW SCIENCES' SOLUTION:

Flow Sciences' team of design engineers developed a set of custom designed modular enclosures to contain at the OEB 2 level. The entire unit was comprised of four distinct enclosures connected by pass-thrus on both the left and right sides with either a sliding door or hinged door for segregation. The pass-thrus were aligned so that the enclosures can trade positions as required.

Each enclosure sits on interchangeable carts allowing enclosures to be used for other pieces of equipment as desired by the customer. Each enclosure included in

the modular unit features dual Bag In/Bag Out HEPA filtration for maximum containment and was built with removable panels giving the user the ability to easily change access points.

Front access openings and/or doors were designed for access either before, during or after the process. Some of the enclosures featured side access doors as well. The sides and back of the enclosure featured removable panels for ease of cleaning and periodic decontamination.

Flow Sciences incorporated a tube in the rear of the equipment enclosure that allows the process equipment enclosed in the unit to pull in air from an adjoining clean room.

During the custom design process, the customer added a De-gowning Room to provide a down flow of HEPA filtered air so that particles from the personnel's protective equipment cannot migrate into the breathing zone of the de-gowner. The De-gowning Room was located positively to the process room and negatively to the hallway.



CONTAINMENT BY DESIGN

CASE STUDY: Pilot Plant / Manufacturing



Customized enclosure suite for Raw Material Dry Granulation to Direct Compression



Carts are removable for cleaning and servicing of equipment. Additional carts were provided to allow for more than one piece of equipment to be placed in each enclosure.

CUSTOMER:

Top Five Pharmaceutical Company

PROJECT SCOPE:

Pharmaceutical site required small version of Pilot Plant in proximity to laboratory in order to reduce turn-around time of tablet formulation.

DESIGN ISSUE:

Required scaled down Pilot Plant capabilities for various tablet formulations with containment levels to less than $10 \mu\text{g}/\text{m}^3$. Process traditionally had required interruption of Pilot Plant operations to run small batches.

FLOW SCIENCES' SOLUTION:

Flow Sciences' team of design engineers developed a modular unit that could take product from bulk powder to finished tablet and contain to less than $10 \mu\text{g}/\text{m}^3$. The unit was comprised of three distinct enclosures.

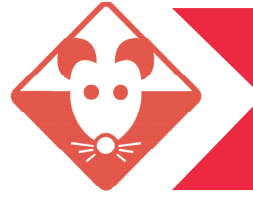
The enclosed process begins when a bulk powder drum is raised into the right side enclosure where it can be opened. The powder is dispensed into measured aliquots and transferred, via pass-thru, to the middle enclosure where a high shear granulator, a laboratory fluid bed, and a blender are housed.

The tablet press is housed in the left side enclosure. Here, the finished product is produced and packaged prior to exiting the system.

Two enclosures house interchangeable carts allowing for other pieces of equipment to be accommodated as desired by the customer. Each enclosure included in the modular unit features dual Bag In/Bag Out HEPA filtration for maximum containment.

After factory acceptance testing (FAT) and surrogate sampling, this three enclosure suite had exposure level results of 1 to $5 \mu\text{g}/\text{m}^3$.

LABORATORY ANIMAL RESEARCH



Microscope Workstation

Flow Sciences, Inc. offers a complete range of products specifically designed for the animal researcher. We understand that the humane and responsible use of animal research is vital to the development of new and effective drugs and medical treatments. Our containment enclosures are designed to protect you while provide a comfortable place for your animals.

VENTED WORKSTATIONS

Flow Sciences' Vented Containment Workstation provides a safe contained working environment for a variety of standard bench-focused lab procedures. The increased angle at the front of the Workstation allows close-up work without sacrificing safety or comfort. Each workstation offers multiple user options and tremendous laboratory flexibility. Units can also be customized with sink insert.

Flow Sciences offers a variety of filter options to meet specific containment needs. Systems are available with HEPA, Organic or Aldehyde filtration. Filters can be combined using a Dual Fan/Filter Housing.

The Flow Sciences' Vented Workstations meet and exceed the ASHRAE 110 standard for containment.



MICROSCOPE WORKSTATIONS

Flow Sciences' Microscope Workstations offer maximum protection while handling delicate samples. Enclosures are designed with a cutout customized to accommodate *your* microscope dimensions. Units provide a safe, turbulence-free work environment while protecting personnel from exposure to harmful substances.

Although there are standard microscope enclosures, quite often it is necessary to customize these units to accommodate the equipment and/or application needs. Flow Sciences can provide a cardboard mock-up of the desired enclosure to help alleviate any concerns about space restraints or access issues.



ANESTHETIC WORKSTATIONS

Flow Sciences' Anesthetic Containment Enclosure provides a safe work environment for the anesthetizing of animals in the laboratory. Using the same design criteria behind the Vented Balance Safety Enclosure (VBSE™), each enclosure is manufactured with a draft shield and internal shelf to house an anesthetizing device.



FS3000



Shown with FS4010 - Single Fan/Filter Housing

These enclosures are suited for applications involving:

- Tissue Trimming
- Animal Necropsy
- Cover Slipping
- Staining
- Titrating
- Transfers
- Pipetting
- Chemical Transfers
- Slide Preps

Filtration options include:

- FS4010 - Single Fan/Filter Housing
- FS4020 - Bag-in/Bag-out Fan/Filter Housing
- FS4510- Dual Stage Fan/Filter Housing

FS3060

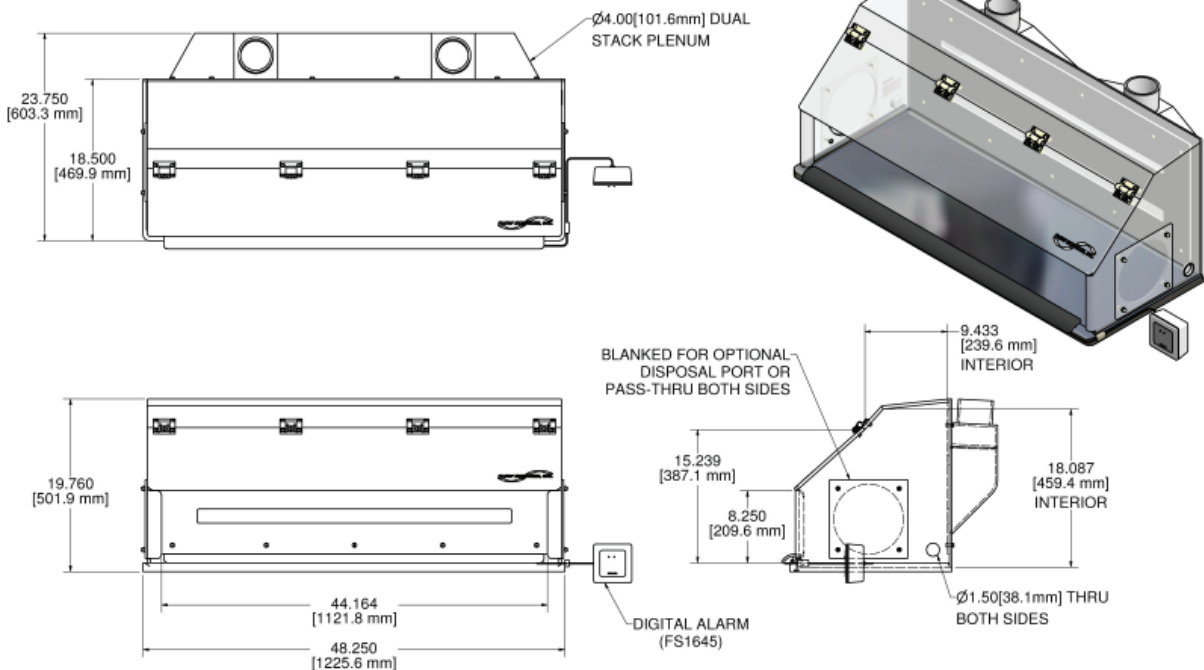


Shown with FS4010 - Single Fan/Filter Housing
Table available and sold separately.

Model	Width	Depth	Height	Weight
FS3000	23.75" 60.3 cm	18.5" 47 cm	19.5" 49.5 cm	74 lbs 33.6 kg
FS3060	35.75" 90.8 cm	18.5" 47 cm	19.5" 49.5 cm	92 lbs 41.7 kg
FS3100	47.75" 121.3 cm	18.5" 47 cm	19.5" 49.5 cm	145 lbs 65.8 kg

Note: Dimensions are exclusive of external plenum.

Engineering Specifications for the FS3100



FS3100M



Table available and sold separately.

Available filters include:

- FS4060 - Bag-out HEPA
Traps dander, biological aerosols, asbestos, and bacterial and viral agents
- FS4255 Aldehyde Filter
Traps gluteraldehyde, formaldehyde, formalin, organic solvents, and odors.
- Contact us for other filter options or visit our website at www.flowsciences.com

Filtration options include:

- FS4010 - Single Fan/Filter Housing
- FS4020 - Bag-in/Bag-out Fan/Filter Housing
- FS4510- Dual Stage Fan/Filter Housing

Venting options include:

- Filter air using Fan/Filter housing and vent to your in-house exhaust
- Filter air and recirculate back into the lab.
- Vent directly to your in-house exhaust

Model	Width	Depth	Height	Weight
FS3000M	23.75" 60.3 cm	18.5" 47 cm	19.5" 49.5 cm	74 lbs 33.6 kg
FS3060M	35.75" 90.8 cm	18.5" 47 cm	19.5" 49.5 cm	92 lbs 41.7 kg
FS3100M	47.75" 121.3 cm	18.5" 47 cm	19.5" 49.5 cm	145 lbs 65.8 kg

Note: Dimensions are exclusive of external plenum.



customized
SOLUTIONS
available!

Client required Top Mount Bag-in/Bag-out Filtration while containing potent samples to be studied with their microscope. Flow Sciences customized a Microscope Workstation to meet this specification. Microscope cut-out was designed around client’s exact microscope!

Let our solutions work for you!

FS3915



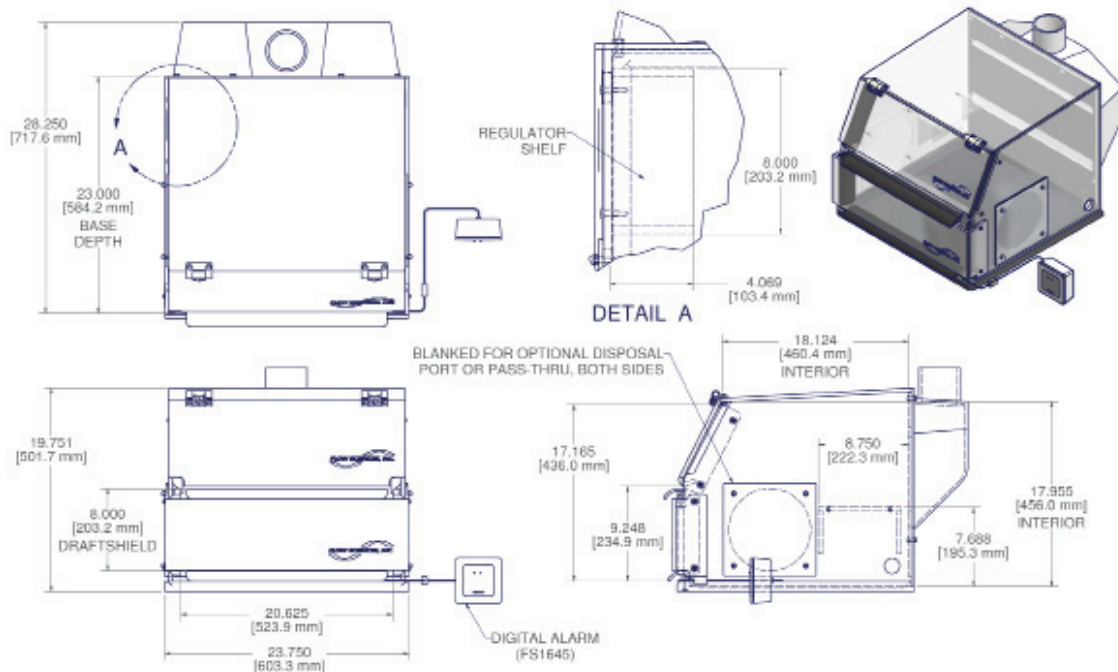
Our Anesthetic Workstations are designed specifically for anesthetizing animals. They feature:

- Effective containment of:
 - Anesthetic gases
 - Animal dander
 - Bacterial and viral agents
- Face Cover that permits effective containment without rousing anesthetized animals
- Access to anesthetizing device within a contained environment
- Internal shelf to house anesthetizing device

Model	Width	Depth	Height	Weight
FS3910	23.75" 60.3 cm	23" 58.4 cm	19.5" 49.5 cm	98 lbs 44.5 kg
FS3915	35.75" 90.8 cm	23" 58.4 cm	19.5" 49.5 cm	125 lbs 56.7 kg
FS3920	47.75" 121.3 cm	23" 58.4 cm	19.5" 49.5 cm	155 lbs 70.31 kg

Note: Dimensions are exclusive of external plenum.

Engineering Specifications for the FS3910



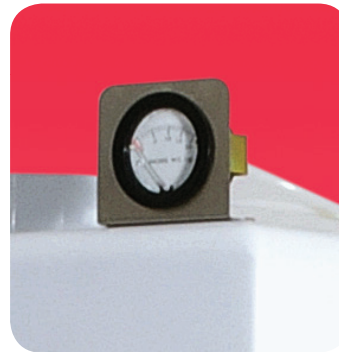


CONTAINMENT BY DESIGN

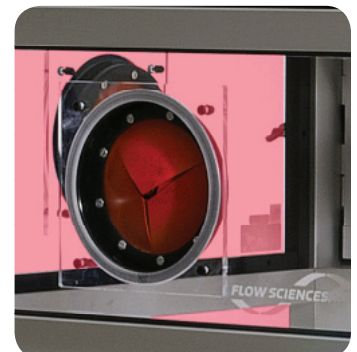
CASE STUDY: Laboratory Animal Research



Anesthetic containment enclosure accepts mobile restraining unit through swinging door in front



Mini-helic pressure gauge monitors HEPA filter for contaminant loading.



Iris ports located on four sides allow researcher to access subject during delivery of anesthesia.

CUSTOMER:

International Research Facility

PROJECT SCOPE:

Researchers use a mobile chair to safely restrain and anesthetize small animals in an open environment.

DESIGN ISSUE:

Enclosure needed to accept and isolate existing restraint chair with nebulizer but still provide access during the procedure. Process traditionally had researchers directly exposed to anesthetic gases.

FLOW SCIENCES' SOLUTION:

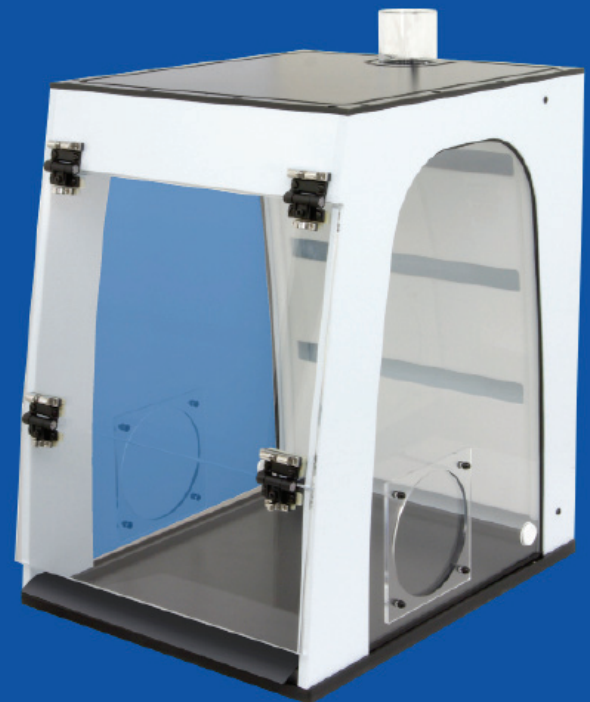
Flow Sciences' team of design engineers developed a framed unit that would allow a mobile restraining chair to be wheeled into the enclosure and capture the release of excess anesthetic gases.

After subject is situated in restraint chair, the chair is wheeled into the specially designed enclosure and the door is closed. Anesthetic gas is administered to subject through a nebulizer that is incorporated into chair.

During the process, iris ports positioned on four sides of the enclosure allow the researcher to maintain contact with the subject to help keep them calm and relaxed. This also allows for any last minute adjustments without having to re-open the enclosure.

A mini-helic pressure gauge is incorporated into the system to monitor the HEPA filter for loading of dander and particulate.

SPECIALTY HOODS



Polypropylene Framed Enclosure



Polypropylene offers the durability and chemical resistance required for laboratory applications involving the handling of highly corrosive solvents and vapors. Unlike stainless steel, polypropylene sheets can be manipulated quickly and easily to form customized workstations for unique applications.

All polypropylene enclosures come standard with a dished phenolic resin base for added chemical resistance and cleanability in case of spills.

Polypropylene adds the following features to Flow Sciences' industry leading containment enclosures:

- Excellent chemical and corrosion resistance
- Meets ASTM specifications for polypropylene
- Exceptionally durable
- Design Flexibility
Contact us to ask about our custom design process!
- Can be used in combination with various materials such as tempered glass and acrylic.

WHAT'S YOUR LEVEL OF CONTAINMENT?

FLOW SCIENCES, INC. designs and manufactures safety containment solutions for applications ranging from benchtop through production. Flow Sciences can customize any enclosure for your robotic or other unique application.



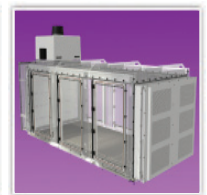
FS10301



FS5000-107



FS11550



LFBC™

www.FlowSciences.com



- Proven Containment
- Energy Efficient
- Ergonomically Designed

FOR ORDERING INFORMATION CONTACT:

information@flowsciences.com

FAX: 910.763.1220 • TOLL-FREE: 800.849.3429

These Biological Safety Cabinets (BSC) are a Class II, Type 2 and are designed for hospitals, research laboratories, pharmacies, and pharmaceutical companies (for cGMP) to protect both users and experiments from contamination when working with potent powders and toxic chemicals.



how it works

Minimum airflow velocity is 100 lfpm (0.51 m/s) through face opening. HEPA filtered downflow air is a portion of the mixed downflow and inflow air from a common exhaust plenum. All contaminated ducts and plenums are under negative pressure or surrounded by negative pressure.

features

- Class II Design: Personnel, Product, & Environmental Protection
- US Standard NSF & European Standard EN 12469 Tested
- Safe: HEPA Filtration for 99.99% Efficiency
- Easy to Use: Microprocessor controlled System with Alarm
- Ergonomic: Slanted Front Design

personnel protection

Protect personnel from harmful agents used inside the cabinet

product protection

Protect the product/experiment from contaminants in the room environment or from cross-contamination inside the cabinet

environmental protection

Protect your environment from contaminants generated or used inside the cabinet

Nanotechnology is an exciting new science in which cutting edge materials such as quantum dots, nanowires, and nanocrystals are engineered instead of the more conventional approach of sculpting parts from pre-existing materials. Nanomaterials exhibit novel or enhanced properties which present opportunities to create new and better products. As with any new technology, the earliest and most extensive exposure to engineered nanomaterials is likely to occur in the organization when scientists and researchers are in the early phases of understanding exposure risks.

know the EXPOSURE RISKS

Carbon nanotubes can be taken up by a human skin cell line and alter protein production.*

Nanomaterials have vastly different properties than their bulk counterparts, and therefore very different toxicology.*

Working with liquid nanomaterials during pouring or mixing operations will lead to increased likelihood of inhalable and respirable droplets being formed.**

Generating nanomaterials in the gas phase in a nonenclosed system will increase the chances of aerosols released to the workplace.**

*Source: Jackson, Sarah, Maria Rapoza, PhD, Rudy Juliano, PhD, Kenneth Gonsalves, PhD, Ken Tindall, PhD. Nanobiotechnology in North Carolina, April 2007.

how can you PROTECT YOURSELF?

According to a 2006 report by NIOSH, Approaches to Safe Nanotechnology: An Information Exchange with NIOSH**:

...control techniques such as source enclosure and local exhaust ventilation should be effective for capturing airborne nanomaterials...

...a well-designed exhaust ventilation system with a high-efficiency particulate air (HEPA) filter should effectively remove nanomaterials.

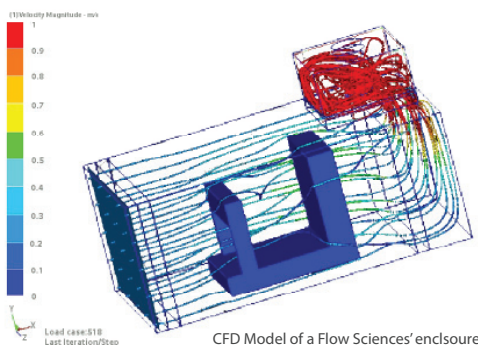
HEPA filters should be coupled with a well-designed filter housing.

** Source: NIOSH, Approaches to Safe Nanotechnology: Guideline for working with Engineered Nanomaterials.

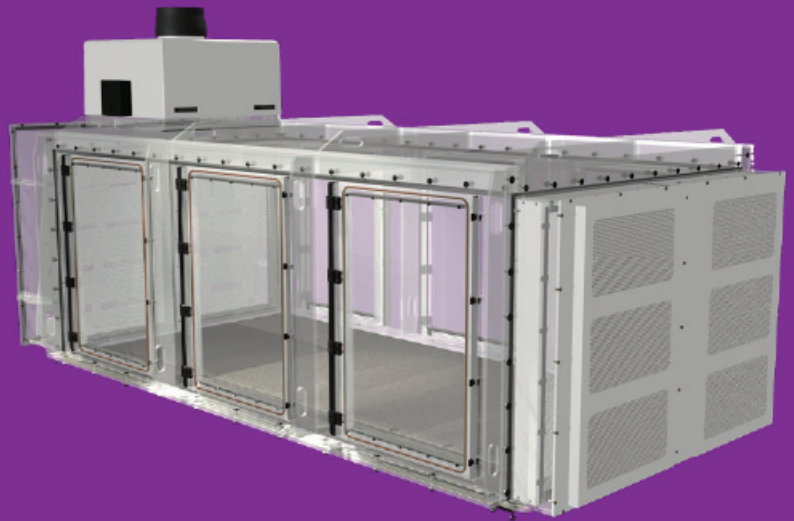
Flow Sciences engineers SOLUTIONS FOR CONTAINING NANOMATERIALS!

Our enclosures feature:

- Directional air flow with low face velocity proven not to disturb manipulation of nanomaterials
- Come equipped with HEPA filters for maximum protection
- HEPA filters are contained inside an engineered filter housing
- CFD technology to provide negligible airflow disturbance to precious nanomaterials.



LAB AUTOMATION/ ROBOTIC EQUIPMENT



Lateral Flow Bio-Containment (LFBC™)
Patent 6,896,712

Provides Maximum Product, Personnel, and Product & Personnel Protection:

Flow Sciences, Inc. (FSI) continues to lead the market with the development of our Lateral Flow Robotic Containment (LFBC™) enclosures. We recognize that traditional downward flow bio-safety cabinets cannot adequately contain robotic applications without moving large amounts of air due to the robot model's footprint, and thus introduced the innovative LFBC™.

Features Include:

- Maximum efficiency and containment assured through CFD engineering (read more about CFD on page ##).
- Flexible, patented lateral flow design developed specifically to accommodate robot model footprints
- Clear acrylic construction provides excellent visibility
- All contaminated areas under negative pressure.
- Enclosure easily sealed for decontamination
- Easily modified to accommodate service needs of robot.

FS5000-123



Personnel Protection for Buchi Spray Dryer

FS5000-138



Containment for LyoStar II Tray Dryer

Containment Solutions Available for:

Alexanderwerk	MoFlo	Teledyne Isco
Beckman Coulter	Nilfisk	Tomtec
Buchi	Sympatec	Vankel (Varian)
Caliper Life Services	Niro	Schenk
Capsugel	Perkin Elmer	Fitzpatrick
Cybio	QIAGEN	Symyx
Gilson	Quadro	<i>and many more!</i>
Globepharm	ReactArray	
Malvern	Tecan	



Personnel Protection

A vented enclosure with a face opening that provides negative pressure allowing particles and vapors to be drawn out of the enclosure and into a HEPA filtration unit or to existing house-exhaust. Vented Robotic Enclosures are designed to provide protection for laboratory workers. Flow Sciences' turbulence-free design optimizes containment providing a safe work environment.

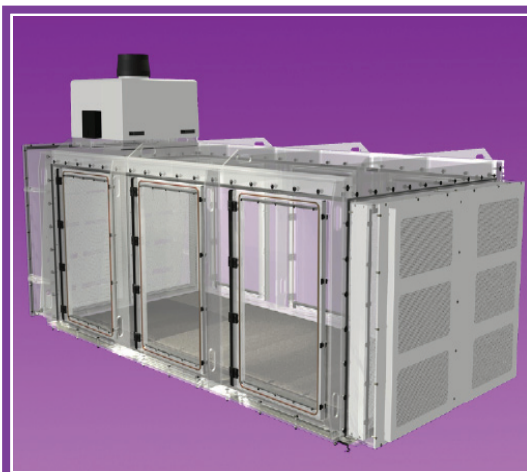
- Designs have been created for the most popular robot manufacturers
- Custom designed to meet the unique access needs of each robot
- Filters directly to house exhaust, FSI Filtration System or both



Product Protection

Flow Sciences offers a clean environment to protect cultures and other samples handled by lab automation equipment. Enclosures provide product with a better than Class 1000 clean air environment. Because this enclosure is always custom designed, a Flow Sciences' Representative will work closely with both the client and the robot manufacturer to ensure that the enclosure meets the robot's specific dimensional and operational requirements.

- HEPA filtered downflow provides a clean air curtain around equipment
- Cell cultures are kept uncontaminated by laboratory air
- Enclosures provide easy access to operational and maintenance points



Personnel and Product Protection

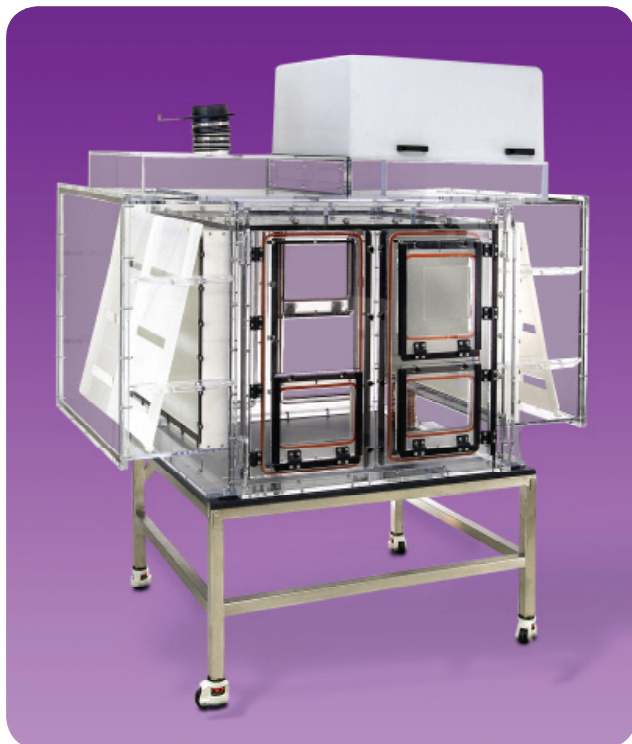
Traditional downward flow bio-safety cabinets cannot adequately contain automated equipment without moving large amounts of air due to the robot models' lengthy footprints. Flow Sciences' flexible, energy efficient lateral flow design was developed specifically to accommodate the longer layouts and various shapes encountered on robotic designs. The lateral airflow combined with dual filtration provides the highest level of containment available.

- Flexible, energy efficient Lateral Flow Design (Patent 6,896,712) developed specifically to accommodate longer robot model footprints
- All contaminated areas are under negative pressure and enclosure is easily sealed for decontamination
- Fan can be accessed without danger of contamination



CONTAINMENT BY DESIGN

CASE STUDY: Lab Automation / Robotic Equipment



Dual Protection Containment for Xcelodose™ 600 Precision Powder Micro-filling System.



Multiple openings allow accessibility to refill powder and empty capsules.

CUSTOMER:

Contract Manufacturing Organization

PROJECT SCOPE:

Personnel and product protection required for existing Xcelodose™ automated powder filling system and micro balance

DESIGN ISSUE:

Required dual protection enclosure for existing equipment with containment levels to less than 10 µg/ m³. Traditionally personnel performed this operation working in a full suit and respirator

FLOW SCIENCES' SOLUTION:

Flow Sciences' team of design engineers developed a Lateral Flow Bio-Containment (LFBC™) recirculating enclosure that provides both personnel and product protection within the defined space. The enclosed system is engineered to provide Class 10 to Class 1000 containment.

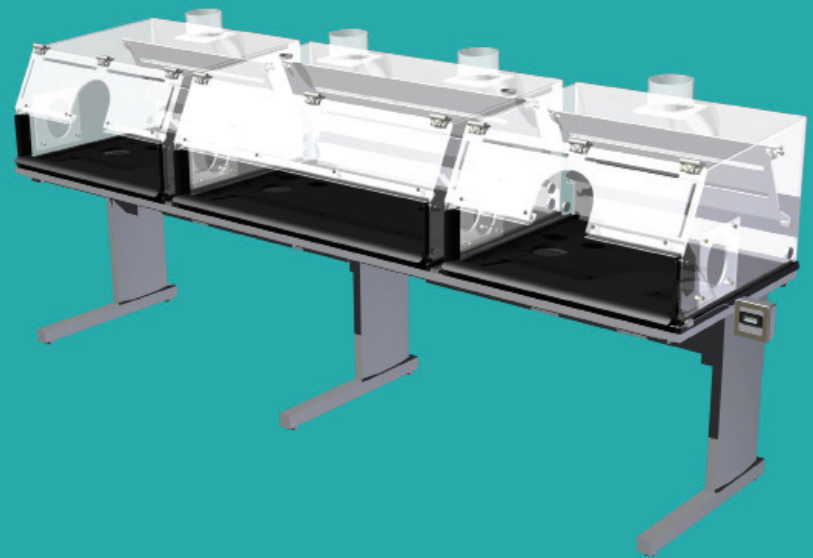
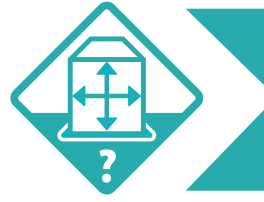
Traditional downward flow BSCs cannot adequately contain automated equipment without moving large amounts of air due to the robotic models' lengthy footprints. Flow Sciences' flexible, energy efficient lateral flow design was developed specifically to accommodate the longer layouts and various shapes encountered on robotic designs.

The lateral airflow combined with dual filtration provides the highest level of containment available. All contaminated areas are under negative pressure and the enclosure is easily sealed for decontamination.

Both factory acceptance testing (FAT) and site acceptance testing (SAT) were performed to validate and certify the enclosure system.

Xcelodose™ is a registered trademark of Capsugel

CUSTOM DESIGN/ BUILD



Necropsy Workstation



Flow Sciences team of engineering professionals can provide custom solutions for any of your containment needs!

DESCRIPTION

For over 15 years, FSI has been providing containment solutions for the pharmaceutical, chemical, and biotech industries. With a commitment to independent testing and the use of sophisticated engineering sciences such as Computational Fluid Dynamics, Flow Sciences' ensures the highest level of protection.

The procedure for custom engineered enclosures is very thorough. Flow Sciences' engineering team evaluates each process or product that is being enclosed and strives to understand the containment issues at hand and then designs a system to meet those requirements.

Flow Sciences' Representatives guide each client through every phase of the custom order process:

- Custom Quotation Request Form
- Engineering & Design
- Production
- Installation

CUSTOM QUOTATION REQUEST FORM

The first step of the custom enclosure process is The Custom Quotation Request Form. With this form, a Flow Sciences' Representative will contact the client to review the requirements for containment. In some instances, an onsite visit may be necessary. The representative will then generate a Custom Quote Request Form with the collected data for evaluation by

the Flow Sciences Engineering and Design staff.

ENGINEERING AND DESIGN SUPPORT

Flow Sciences' skilled team of engineering and design professionals thoroughly evaluate each custom enclosure request. A containment system is designed and a preliminary dimensional drawing is generated. When enclosing a piece of equipment, our Representatives often work directly with the manufacturer of the product being enclosed to ensure all aspects of our design meet operational requirements.

PRODUCTION

After client approval, the designs are sent to our production facility where Flow Sciences' experienced technicians begin the manufacturing process. A cardboard mock-up of the custom enclosure can be created if deemed necessary by the customer. Each unit undergoes strict quality control to ensure that all units that leave the Flow Sciences' plant are of the highest standards.

INSTALLATION

Flow Sciences provides installation support via phone Monday through Friday, 7:30 AM to 5:30 PM EST. If onsite installation is required, the Flow Sciences' Representative must be notified before a quote is generated.

Please call **800.849.3429** to speak to a **Flow Sciences Customer Support Specialist** for additional information on Custom Engineered Enclosures.



5000-107 Small Animal Anesthetizing Unit

FS8400-136



Powder drum sampling cabinet designed to sit over conveyor

FS5000-80



Chemical Storage Cabinet.

FS5000-145



Containment Workstation for QIAGEN BioRobot Universal System.

FS8400-12



Ventilated Bulk Powder Isolator. Stainless Steel construction with ADA lift table.

ORDERS CAN BE PLACED VIA:

- Phone **1-800-849-3429**
- Fax **1-910-763-1220**
- Email **information@flowsciences.com**

Every effort is made to process your order the same day. There is no minimum order.

- Statements are sent out the day after confirmation of shipment.
- Flow Sciences, Inc. also accepts payment by Visa, MasterCard, and American Express.
- Operating hours 7:30 AM to 5:00 PM, EST, Monday through Friday. Any calls received during non-operating hours will be prompted to leave a message with contact information for a return call.

FLOW SCIENCES, INC. PRICING

Although pricing is not included in this catalog, please contact your Flow Sciences, Inc. Representative for a quotation on any product.

The information in this catalog is current at the time of printing; however, specifications are subject to change without notice.

SPECIAL ORDER ITEMS

Special order items (or Custom Products) are not regularly stocked items. Flow Sciences, Inc. works directly with the customer to ensure proper design and fit for the intended application. Lead times are typically extended.



General Services Administration

Flow Sciences, Inc. provides GSA clients products through FSC Group 66 Contract Number GS-07F-9183S. Contract period: October 15, 2005 – October 14, 2010

For more information on ordering from Federal Supply Schedules click on the FSS Schedules button at fss.gsa.gov. Online access to contract ordering information, terms and conditions, up-to-date pricing, and the option to create an electronic delivery order are available through GSA Advantage!, a menu-driven database system.

The internet address for GSA Advantage! is **www.GSAAdvantage.gov**

GSA Contractor for Flow Sciences, Inc. products:

Hanover Scientific Company
P.O. Box 241301
Charlotte, NC 28224-1301
Phone number: (704) 552-9860
Toll-free (888) 552-8318
Fax number: (704) 552-2560
Email: hanover@caro.net

Geographic Coverage: Domestic, 50 states, Washington, DC, and to a CONUS port or consolidation point for orders received from overseas activities.

Delivery time: 60 days or less after receipt of order
Expedited delivery: 5-7 days with confirming phone call, if items are in stock

Overnight and 2-day Delivery: Overnight and 2-day delivery are available. Contact the Contractor for rates.

Urgent Requirements: Agencies can contact the Contractor's representative to effect a faster delivery. Customers are encouraged to contact the contractor for the purpose of requesting accelerated delivery.

Terms and Conditions of Government Purchase Card Acceptance: any threshold
DUNS Number: 130701550

CFM REQUIREMENTS



This is just a guideline. Each installation is different. Hose size and layout impact pressure drop. The pressure drop for an enclosure connected to house exhaust is typically 0.2" wc. With the FSI filtration system connected the pressure drop is eliminated. Enclosures are designed to operate between 60 and 100 lfpm at the face opening. Optimal flow is 70 - 75 lfpm. If you have any questions, please call Technical Service at 800-849-3429.

FS Model	Face Opening Width (in.)	Face Opening Height (in.)	Face Area (ft ²)	CFM at 60 fpm	CFM at 70 fpm	CFM at 80 fpm	No. of FS4010 Required for 80 fpm	CFM at 100 fpm	No. of FS4010 Required for 100 fpm	No. of FS4700 Required for 100 fpm
2010	22.19	7.5	1.16	69	81	92	1	116	1	n/a
2015	34.19	8	1.90	114	133	152	1	190	1	n/a
2020	46.19	9	2.57	154	180	205	1	257	1	n/a
2030	58.18	8	3.23	194	226	259	1	323	2	n/a
2040	68.29	8	3.78	227	265	302	2	378	2	n/a
2230	34.19	12	2.85	171	199	228	1	285	2	n/a
2240	46.16	12	3.85	231	269	308	2	385	2	n/a
2250	58.18	12	4.85	291	339	388	2	485	2	n/a
2260	67.79	12	5.65	339	395	452	2	565	3	n/a
2300	20.34	9.5	1.34	81	94	107	1	134	1	n/a
2350	34.16	9	2.14	128	149	171	1	214	1	n/a
2400	46.19	9	2.89	173	202	231	1	289	2	n/a
2500	58.16	9.5	3.84	230	269	307	2	384	2	n/a
2600	68.29	9.5	4.51	270	315	360	2	451	2	n/a
2930	31.84	8.3	1.83	110	128	147	1	183	1	n/a
2940	46.18	8	2.57	154	180	205	1	257	1	n/a
3000	20.17	8.25	1.16	69	81	92	1	116	1	n/a
3060	30.79	8.25	1.76	106	123	141	1	176	1	n/a
3100	46.18	8	2.57	154	180	205	1	257	1	n/a
3910	20.63	7.92	1.13	68	79	91	1	113	1	n/a
3915	32.15	7.92	1.77	106	124	141	1	177	1	n/a
3920	44.18	7.92	2.43	146	170	194	1	243	1	n/a
10200	22.19	9.5	1.46	88	102	117	n/a	146	n/a	1
10300	34.19	9.5	2.26	135	158	180	n/a	226	n/a	1
10400	46.19	9.5	3.05	183	213	244	n/a	305	n/a	1
10500/10550	58.19	12.5	5.05	303	354	404	n/a	505	n/a	2
10600/10650	70.19	12.5	6.09	366	427	487	n/a	609	n/a	2
11300	34.19	9.5	2.26	135	158	180	n/a	226	n/a	1
11400	46.19	9.5	3.05	183	213	244	n/a	305	n/a	1
11500/11550	58.19	12.5	5.05	303	354	404	n/a	505	n/a	2
11600/11650	70.19	12.5	6.09	366	427	487	n/a	606	n/a	2

*With Thimble Connection, increase CFM by 15%



For customer service or information,
Web: www.flowsciences.com
Email: information@flowsciences.com
Toll-Free: 800.849.3429
Fax: 910.763.1220