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## VIVA® Animal Research Products

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# Introduction

Animal testing or animal research is the use of animals in experiments, typically applied in the following industries:

1. Drugs/Cosmetics
2. Pharmacology/Toxicology/Environmental and Biological Safety Testing
3. Medicine/Genetic Therapy
4. Biotechnology
5. Life Science
6. Food Science/Nutrition
7. Education

# Introduction

**Product testing** – animals are used to test the safety of products for consumption. Typically, these are linked to cosmetic testing, such as makeup and soap.

**Research** – tests are performed for advancements in medicine and science, such as experiments with new drugs.

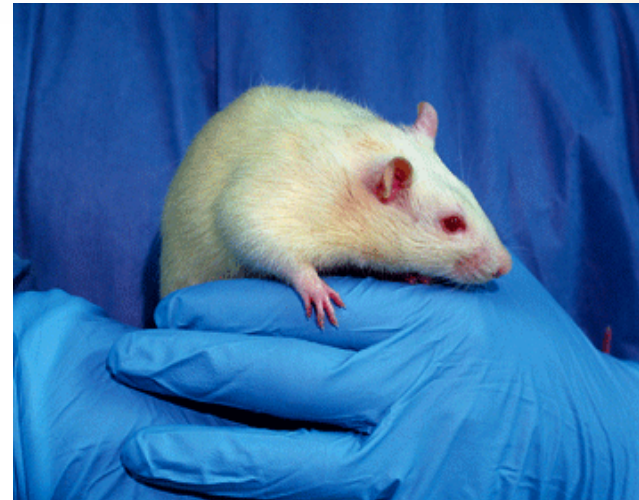
**Education and training** – these tests range from a high school dissection of a rodent to training medical students at a University.

# Laboratory Animal Research Facilities

*Esco's range of VIVA animal research products are designed for lab animal research applications involving rodents.*



*Wistar Rat*



*Rodent*

# Laboratory Animal Research Facilities

Typical equipments used in a lab animal research facility:

- Individual Ventilated Cages (IVCs)
- Cages
- Autoclave
- Cage and Rack Washers
- Bottle Wash Systems
- Safety Cabinets and Cage Changing Stations

# Laboratory Animal Research Facilities



# Laboratory Animal Research Facilities



# Laboratory Animal Research Facilities



# Laboratory Animal Research Facilities

Many factors should be considered in planning for adequate and appropriate physical & social environment, housing, space, and management. These include:

1. The species, strain, and breed of the animal and individual characteristics.
2. The ability of the animals to form social groups with conspecifics / whether the animals are maintained singly or groups.
3. The design and construction of housing.
4. The availability of enrichments.
5. The project goals and experimental design (e.g., production, breeding, research, testing, and teaching).

# Laboratory Animal Research Facilities

## Equipment

- Equipment should be designed to provide for ergonomically sound operations that reduce the potential of physical injury to personnel (such as might be caused by the lifting of heavy equipment or animals and the use of repetitive movements).
- Safety equipment should be properly maintained and routinely calibrated.

# Laboratory Animal Research Facilities

## Bedding Change

- Soiled bedding should be replaced with fresh material as often as is necessary to keep the animals clean and dry.
- The frequency is a matter of professional judgment of animal care personnel.

# Laboratory Animal Research Facilities

## Noise

- Exposure to noise levels above 85 dB can have auditory & nonauditory effects.
- Changes in patterns of sound exposure have different effects on different animals.
- Efforts should be made to minimize the production of unnecessary noise.

# Laboratory Animal Research Facilities

## Illumination

- Light can affect the physiology, morphology, and behavior of various animals.
- Potential photostressors include inappropriate photoperiod, photointensity, and spectral quality of the light.

# *Animal Research Hazards*

Personnel involved in the care and use of research animals work in an environment that presents a number of unique hazards from several sources:

- Hazards related to the equipment, materials and practices – used in performing routine animal husbandry.
- Hazards related directly or indirectly to animal contact.
- Hazards related to the techniques or materials (e.g., biohazardous substances) that may be used during the course of animal research.

# Animal Research Hazards

Regardless of the source of hazard, several basic measures should be taken to reduce the risk of personnel exposure.

These include:

- Understanding the hazards likely to be encountered during animal care and use.
- Using properly designed and maintained facilities and equipment to minimize exposures.
- Utilizing appropriate personal protective equipment (PPE) and demonstrating the technical proficiency necessary to accomplish experimental manipulations or animal care procedures in safe and humane fashion.

# Animal Research Hazards

## Allergen Management

- Animal or animal products such as dander, hair, scales, fur, saliva, and body wastes contain powerful allergens that can cause both respiratory and skin disorders.
- Workers at risk include laboratory animal and veterinary technicians, researchers, veterinarians, and other who have prolonged, close association with animals or their secretions or excretions.
- Also at risk are workers who handle animal products or associated materials such as bedding and feed. Inhalation is one of the most common ways for allergens to enter the body.

# Animal Research Hazards

## Allergen Management

- Allergic reactions to animals are among the most common conditions that adversely affect the health of workers involved in the care and use of animals in research.
- Laboratory Animal Allergy (LAA) is any kind of allergic reaction to laboratory animals normally rats and mice, but also cats, dogs, horses, rabbits etc.
- 11-30% of people who have contact with animals will develop allergies to them mostly within 2 years of exposure. Half of these will develop signs so severe, that they need regular treatment or must stop working with animals.

# Animal Research Hazards

## Allergen Management

- An estimated 10% of laboratory workers eventually develop occupation related asthma. Information from 159 American institutions and 93 facilities from 20 other nations indicated that an effective program to control the problem of occupational allergy to laboratory animals remains to be developed<sup>1</sup>.
- It has been demonstrated that three-quarters of all institutions with laboratory animals had animal-care workers with allergic symptoms.<sup>1</sup>

<sup>1</sup> “A worldwide survey of management practices in laboratory animal allergy” by Irving Lutsky, VMD, Department of Comparative Medicine, Hebrew University - Hadassah Medical School, Jerusalem, Israel (1987).”

# Animal Research Hazards

## Symptoms

- Allergies

1. Sneezing.
2. Nasal Congestion.
3. Itchy eyes.
4. Cough
5. Hives/Rashes

- Asthma

1. Coughing.
2. Wheezing.
3. Chest tightness.
4. Shortness of breath

# ***Animal Research Hazards***

**Working with animals can be a dangerous business!!!**

- Physical hazards
- Chemical hazards
- Protocol related hazards
- Allergens
- Zoonotic diseases

# *Animal Research Hazards*

Biosafety Levels for applications in which experimentally or naturally infected vertebrate animals are used:

Animal Biosafety Level 1 (BL-1) is suitable for work involving **little or no known potential hazard** to animal handling personnel and the environment.

# *Animal Research Hazards*

To minimize the release of dust and particularly the allergens when opening cages & handling animals or when changing cages, special containment devices & local exhaust ventilation may be used.

*E.g. BSCs, negative pressure animal transfer stations & locally exhausted down draft cage dumping stations.*

# Animal Research Hazards

Biosafety Level 2 (BL-2) is for work that involves agents which are associated with human disease and therefore **requires containment devices such as biosafety cabinets whenever aerosol generating procedures are conducted.**

All procedures that may generate aerosols, dusts or cause splatters must be performed in a BSC.

# Animal Research Hazards

Biosafety Level 3 (BL-3) is for work that deal with agents which may cause serious or lethal disease by the inhalation route

*Micro-isolator cages and BSC serve as a primary barrier and protect individual working within the room. E.g. Cage changing takes place within a BSC.*

*Special containment devices such as a class III BSC or a hepa filtered glove box are used when procedures are conducted that have a very high risk of generating aerosols of risk group 3 agents.*

# Animal Research Hazards

Biosafety Level 4 (BL-4) is required for all work with dangerous and exotic agents which pose a **high individual risk of aerosol transmitted laboratory infections and life threatening disease.**

# VIVA® Animal Research Products

**VIVA® Dual Access Workstation**



**VIVA® Universal Workstation**



# VIVA® Animal Research Products

## VIVA® Bedding Disposal Workstation



## VIVA® Airshower



# VIVA® Animal Research Products

- Specific range of animal research workstations from an industry leader in laminar air flow products
- Larger work access openings to facilitate cage transfers
- Pre-filtration to extend main filter lifespans
- Mobile on height-adjustable stands
- Ergonomic enhancements to accommodate standing operations

# VIVA® Animal Research Products

<b>Product Name</b>	<b>Primary Application</b>	<b>Allergen Control</b>	<b>Biohazard Protection</b>
VIVA Dual Access Workstation (VDA)	Cage changing	Yes	No
VIVA Universal Workstation (VA2)	Research procedures	Yes	Yes
VIVA Bedding Disposal Workstation (VBD)	Bedding disposal from soiled cages after changing	Yes	No
VIVA Air Shower (EAS)	Allergen control for personnel entering / exiting the facility	Yes	Not applicable

# VIVA® Dual Access Workstation

Minihelic™ Pressure Gauges

Angled sash

Sentinel™ Microprocessor Control

Lamps deliver 1100 Lux

Recessed Work Surface

14" high access opening

304 Grade Stainless Steel Work Area

ULPA Supply & Exhaust Filters

Hydraulic Height Adjustment

Dual sided access

Large 5" wheels



# VIVA® Dual Access Workstation

## Features and Benefits

- Sentinel™ **Microprocessor Controller** supervises all functions
- Independent **Minihelic™ gauge** indicate both supply & exhaust airflow.
- Long-life **ULPA filters** protect and supply and exhaust airflow
- Activated carbon filter removes odors
- Work area lighting is bright and uniform to help improve productivity

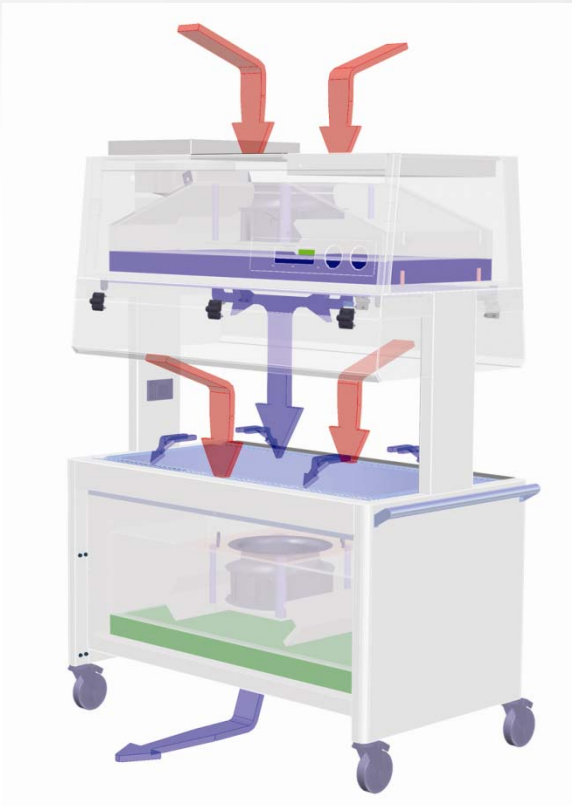
# VIVA® Dual Access Workstation

## Features and Benefits

- **Angled edges** on drain area & integral work surface/grille component simplifies cleaning
- **Recessed air grilles** prevents blockage
- **Esco Isocide™ anti-microbial coating**
- **Retractable power cord** stores easily for moving workstation from one lab to another  
*(115V, AC Model only)*

*Applications: cage-changing, no protection against biological hazards, protection against allergens.*

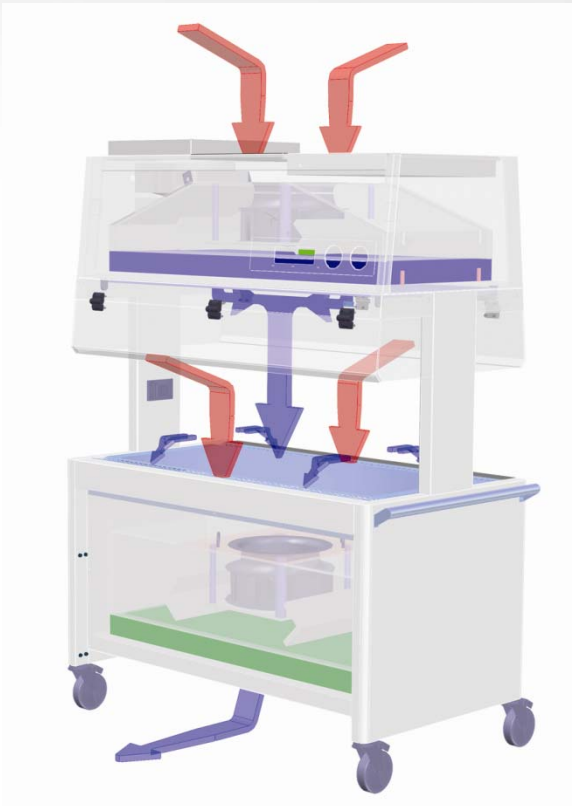
# VIVA® Dual Access Workstation



## Cabinet Airflow

- VDA employs a total exhaust, non-recirculating airflow configuration
- The blower system pulls ambient in-take air through the pre-filter, trapping larger particles and extending the useful life of the ULPA filter
- Air flows through the main ULPA supply filter and bathes the work zone in clean air with a non-turbulent airflow

# VIVA® Dual Access Workstation



## Cabinet Airflow

- Recessed air grille on the peripheral work surface collect ambient air. Combined with vertical laminar downflow, the VDA creates an air curtain to protect the operator from contaminants released into the work surface
- An activated carbon filter removes odors
- The exhaust ULPA filter removes contaminants before air is released into the environment

# VIVA® Dual Access Workstation

Touchpad data entry buttons permit control settings and access to diagnostics, default settings and hierarchical menus



**Sentinel Microprocessor Control System, Programmable**

# VIVA® Dual Access Workstation

Color coded indicator lamps display green for primary function (fan operation); blue for secondary function (fluorescent lights and electrical outlet); an orange for caution (UV lamp ON)



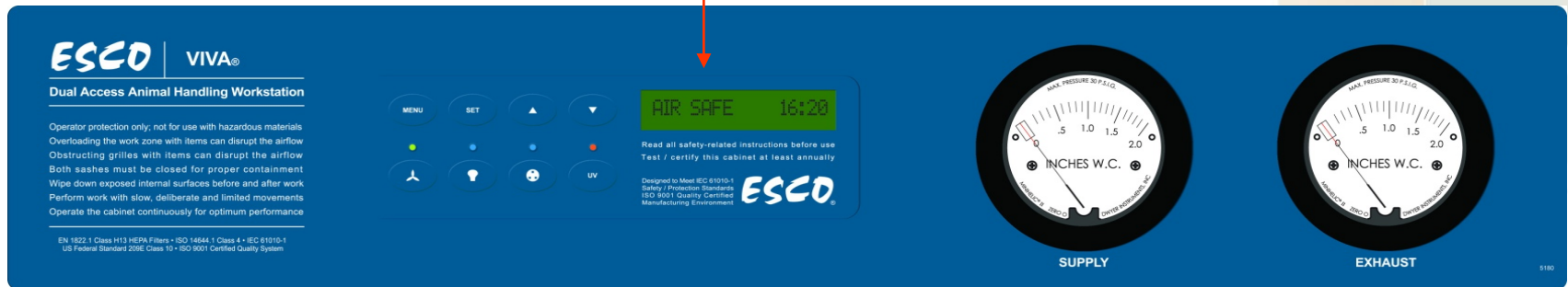
**Sentinel Microprocessor Control System, Programmable**

# VIVA® Dual Access Workstation

A graphical interface indicates cabinet performance

Digital read-out with alpha-numeric display indicates all Input, status and alarm functions

All functions can be user activated through touch-pad  
Programming access; see Operations Manual



***Sentinel Microprocessor Control System, Programmable***

# VIVA® Dual Access Workstation



Independent MiniHelic™ gauges indicate both supply and exhaust filter pressures

# VIVA® Dual Access Workstation



- The VDA is easily accessible from two sides permitting multiple users to work at the same time
- A large 350mm (14") opening accommodates standard size animal cages
- The transparent side panel opens and stays to simplify loading or unloading of the work surface

# VIVA® Dual Access Workstation



- The entire cabinet elevation can be adjusted by an integrated electric hydraulic lift with an up/down switch mounted on the control panel
- The cabinet lowers to 1918 mm (75.5") for easy transport from lab to lab through a standard doorway. Cabinet shown in a semi-elevated position to fit the user preference

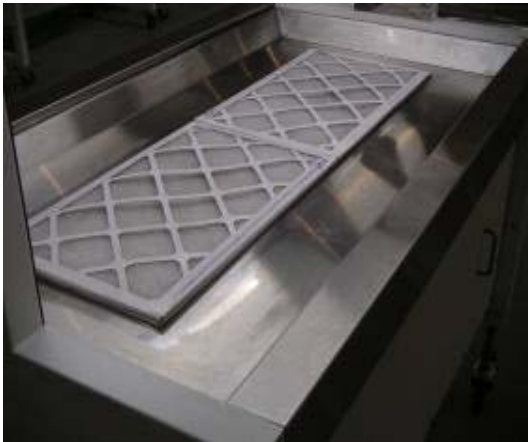
# VIVA® Dual Access Workstation

- **Bottom edge of sash is angled inward** to enhance containment
- **Thick frameless polycarbonate sash** for greater visibility
- **Prop up stand** for easy cleaning of drain pan



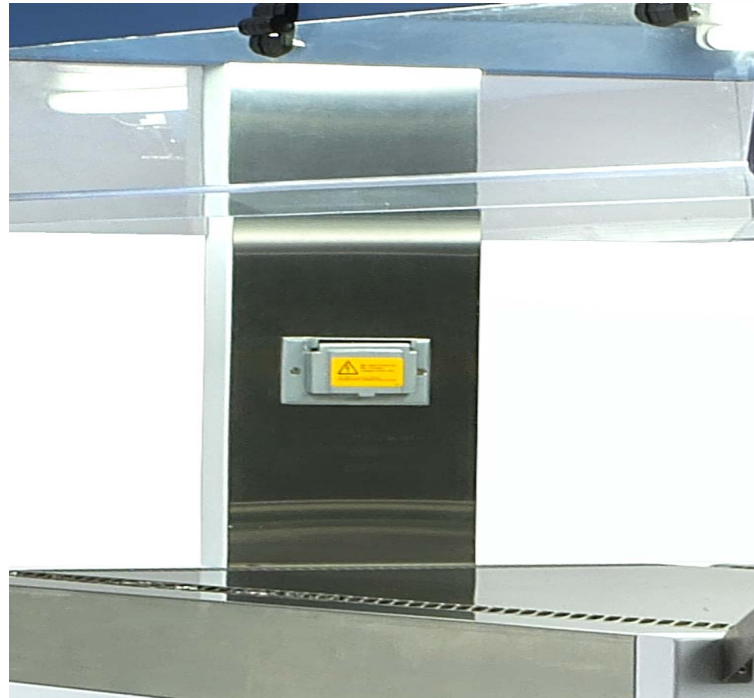
# VIVA® Dual Access Workstation

- **Disposable upper & exhaust prefilters** trap large particulates
- **Independent Minihelic™ gauges** are mounted across each ULPA filter to monitor differential pressures



# VIVA® Dual Access Workstation

- **Two electrical socket with overload protection** controlled from Sentinel™ Microprocessor controller.



# VIVA® Dual Access Workstation

ULPA Supply & Exhaust Filters

Carbon Filter

Sentinel Microprocessor Control

Stainless Steel Pull/ Push Handles

Staggered Service Fixtures with concealed plumbing

Electric Hydraulic Lift System

Large 5" Wheels



Available in 4ft / 1.2m and 6ft / 1.8m width ONLY

# VIVA® Universal Workstation

## Features and Benefits

- Provide Class II protection biological safety cabinet protection
- Unique **Unique Dynamic Chamber™** plenum delivers quiet, uniform airflow
- **Negative pressure plenum** surrounds contaminated
- Single piece work surface (no fasteners, easy to clean)
- Triple side walls (Nuair is single piece; Labconoco and Baker are two pieces)
- **Long-life ULPA filters** for supply & exhaust airflow
- **Raised airflow grille** prevents blockage to airflow; maintains safety

# VIVA® Universal Workstation

## Features and Benefits

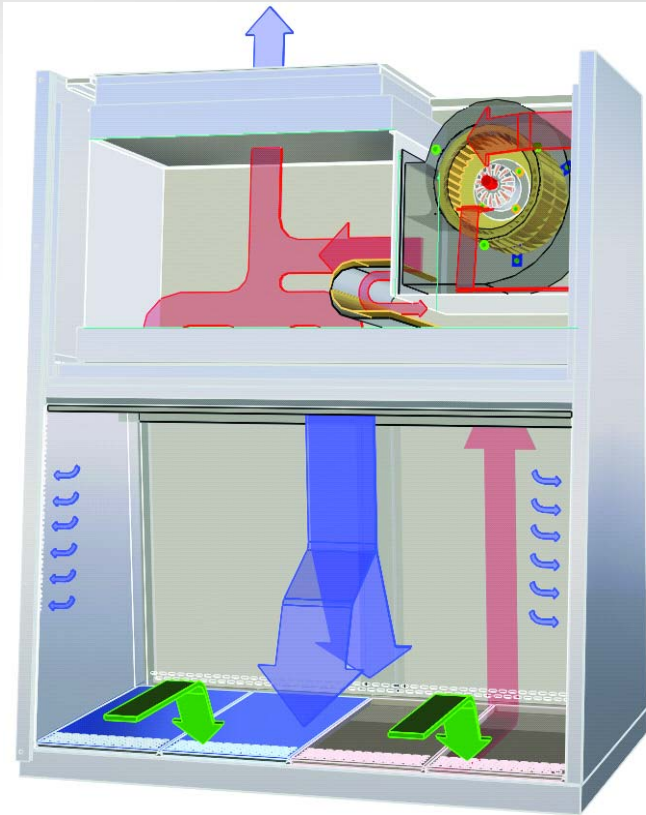
- **Sentinel™ microprocessor**, programmable, supervises all cabinet functions
- **Frameless, shatterproof sash** is easier to clean, offers larger, unobstructed viewing area
- **Ergonomically angled front** improves reach and comfort
- **Angled supply filter** matches cabinet profile to achieve best downflow uniformity
- **One piece work surface removal** simplifies cleaning

# VIVA® Universal Workstation

## Features and Benefits

- **Improved lighting** is brighter, more uniform, reduces glare
- **Optional UV lamp** is located away from direct line of sight; lamp operates on programmable timer
- **Esco ISOCIDE™ antimicrobial surface** on all painted surface
- **Activated carbon filter** removes odors

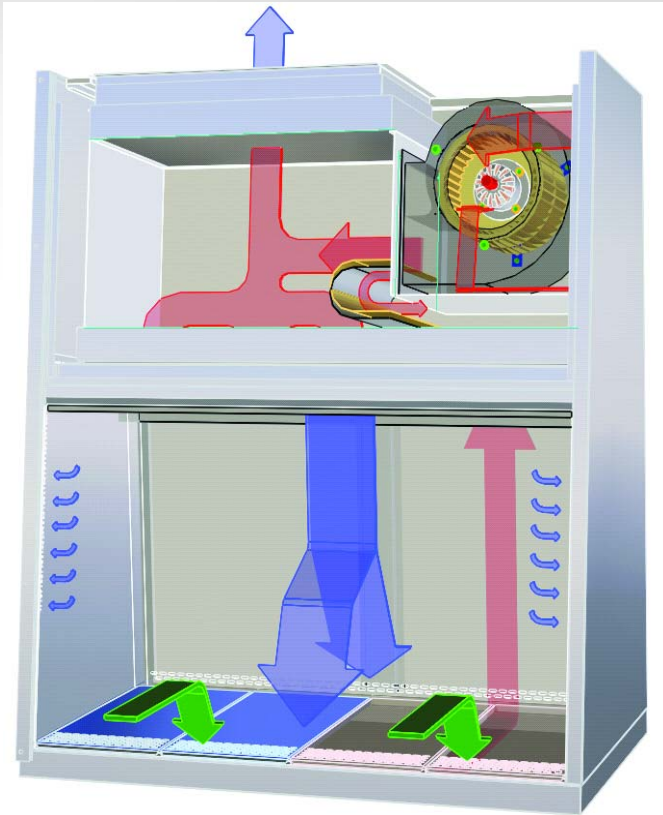
# VIVA® Universal Workstation



## Cabinet Airflow

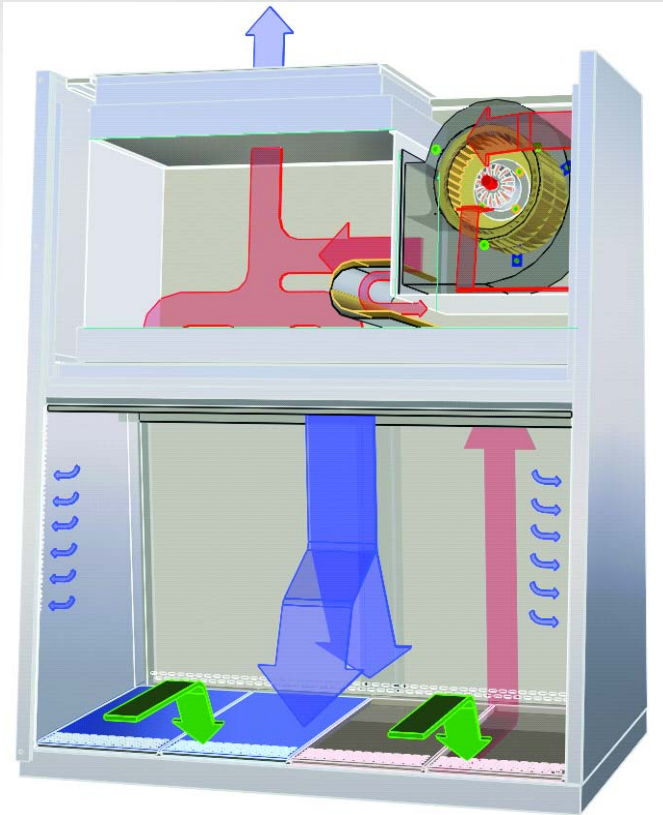
- Ambient air pulled through the perforations towards the work zone front prevents contamination of the work surface and work product. The inflow does not mix with the clean air within the cabinet work zone. Inflow air travels through a return path toward the common air plenum (blower plenum) at the top off the cabinet.

# VIVA® Universal Workstation



- Approximately 40% of the air in the common plenum is exhausted through the ULPA filter to the room. The remaining 60% of the air is passed through the downflow ULPA filter and into the work area as a vertical laminar flow airstream bathing the work surface in clean air
- The uniform, non-turbulent airstream protects against cross contamination within and throughout the work area

# VIVA® Universal Workstation



- Near the work surface, the ULPA-filtered downflow airstream splits with a portion moving toward the front airgrille, and the remainder moving to the rear air grille. A small portion of the downflow enters the size zones at a velocity (small blue arrows)
- A combination of inflow and downflow airstreams form an air barrier that prevents contaminated room air from entering the work zone, prevents work surface emissions from escaping the work zone

# VIVA® Universal Workstation vs LA2-4

<b>Product Name</b>	<b>VIVA® Universal Workstation (VA2)</b>	<b>Labculture Class II, Type A2 Biosafety Cabinet</b>
<i>Disposable carbon pre-filter</i>	Yes	Not applicable
<i>Activated carbon filter</i>	Yes	Not applicable
<i>Working Opening</i>	305 mm	218 mm

# VIVA® Bedding Disposal Workstation

Sentinel™ Microprocessor controller

Pre-filter

A 40-gallon NSF listed waste container



Carbon filter

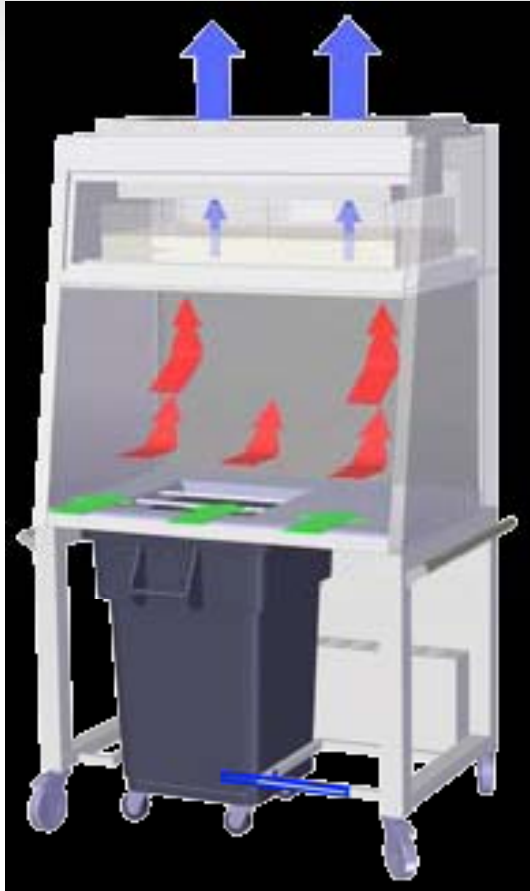
Ulpa filter

Single piece stainless steel work zone

# VIVA® Bedding Disposal Workstation

- Operator protection during the bedding disposal process
- When fully lowered on the motorized hydraulic stand, unit height is below 2m and fits below a standard lab door
- When in position, unit be raised to accommodate users of varying heights for standing operation
- Built-in large NSF-listed waste container accessible from work surface
- Air is pre, ULPA and carbon-filtered before exhaust back to the laboratory
- Bang bar, push bars, angled front are one of many ergonomic enhancements
- Microprocessor control monitors airflow

# VIVA® Universal Workstation



- Room air is drawn in across the front of the cabinet with an average velocity of 0.35 m/s (70fpm)
- Air is drawn up through the cabinet's workzone and forced through the ULPA filter (> 99.99 % typical efficiency for 0.3 micron sized particles)
- The full work zone ceiling extraction system ensures airflow uniformity throughout the cabinet's main chamber
- The ULPA filtered air then returns to the laboratory stripped of all airborne contaminants

# VIVA® Air Shower



- Removes particulates and allergens from the surface of garments entering and exiting the animal area
- Useful for reducing migration of allergens from the animal area to the external environment
- Suitable as a barrier between 2 distinct areas
- Particle removal efficiency has been using the Esco body box test

# Appendices

- Cage Changing Process
- VIVA Dual Access Competitor Comparison
- VIVA Universal Competitor Comparison

# Animal Cage Changing Procedure

## Cage Changing Process:

- At the ventilated rack system, remove one rodent cage from its slot and bring into the Cage Changing Station.
- With, the cage in the workstation, remove the metal cage ID tag from the cover top and set aside. Then remove the cover top, used water bottle and used wire lid and place the items on the “dirty” cart.
- Place your gloved hands with the disinfectant. It is not necessary to wipe dry.

# Animal Cage Changing Procedure

- Proceed to remove the rodent, holding it via mid-base of the tail, from the soiled cage and transfer it to a clean cage. If there is more than one rodent in the cage, pick up the rodent one at a time while transferring them to the clean cage. Count the number of animals in the cage.
- Leaving clean cage with newly transferred animals in the changing station, remove the soiled cage and place it in “dirty” cart.
- Place a clean wire lid on top of the clean cage correctly; the feeder being on your left, the water bottle slot on your right and the edges of the wire lid sitting evenly on the cage lip edge.

# Animal Cage Changing Procedure

- After checking to make sure the water cap is properly tightened, place a pre-filled water bottle in the designated spot on the wire lid.
- Leaving the clean cage in the changing station, scoop 1 cup (250ml) of the proper diet or as per approved protocols, pour it into the feeder section of the wire lid.
- Place the cover top on the cage with the ventilation holes away from your body, on the rear side of the cage. Make sure the top is fitted properly on the cage and is locked in.

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- *Assessment and Treatment of Laboratory Animal Allergy*

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- *Special Thanks to Institutional Supporters*

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