# **REDISHIP** Biosafety Cabinets, Fume Hoods and Balance Enclosures


**Made in the USA.**

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LABCONCO®

# Select the Right Laboratory Ventilation Product

Fume hoods, biological safety cabinets and ventilation enclosures protect you from exposure to airborne contaminants. The right enclosure depends on your present and future applications and safety requirements. Size requirements further help to determine the right enclosure and accessories to meet your needs. Consider the following criteria before selecting a fume hood, ventilation enclosure or biological safety cabinet.

**1. What contaminants does your application generate?**

**Chemical fumes and vapors.** If your work primarily involves hazardous fumes and vapors, select a Protector® Premier® Laboratory Hood or Protector® XStream® Laboratory Hood. For introductory chemistry, select a Protector® XVS Ventilation Station.

**Particulates.** If your work involves hazardous airborne particulates, microorganisms, genetic material or carcinogens, select a Purifier® Logic®+ Biosafety Cabinet. These cabinets may also be used with minute quantities of toxic chemicals if ducted to the outside. If your work involves weighing hazardous powders, select an XPert® Balance Enclosure or XPert® Filtered Balance System.

**2. How much space do you need?**

**Laboratory space.** Space, ceiling height and location in your lab may limit your size selection. The enclosure should be located so that exit from the lab would not be impeded in the event of an emergency. It should be located away from high pedestrian traffic lanes and supply air vents to avoid airflow cross currents.

**Work space.** Select the width of your enclosure based on the space required to accommodate the person(s) and apparatus needed to conduct the procedures. OSHA 29 CFR-1910 recommends laboratories provide an average of 2.5 linear feet of hood space per person. Multi-step experiments may require more space.

**3. What options and accessories are required?**

Once you have narrowed your selection to the type of enclosure and size needed, select the options and accessories required to complete your ventilation system. Optional accessories may include service fixtures, electrical receptacles and airflow monitors. Required accessories are listed below.

The Selection Guide below provides an at-a-glance summary of the biological safety cabinets, fume hoods and ventilation enclosures presented in this brochure.

Purifier® Logic®+ Biosafety Cabinet

Protector® Premier® Fume Hood

XPert® Filtered Balance System

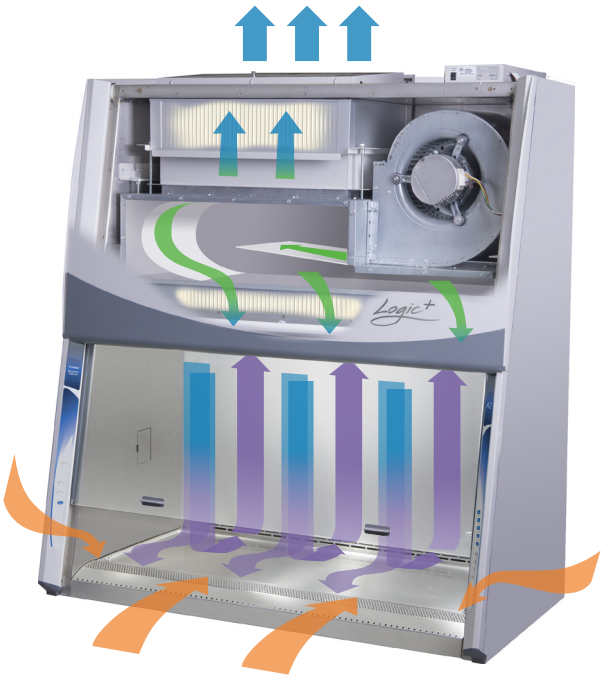
| | Airborne Contaminant Protection | Liner | Nominal Widths | Required Accessories | Pages |
|---|---|---|---|---|---|
| **Purifier® Logic®+ Biosafety Cabinets** | Biohazardous samples, microorganisms, genetic material, carcinogens | Stainless steel | 3', 4', 5', 6' | Supporting base stand **only if base stand option is not selected** | 3-5 |
| **Protector® Premier® Laboratory Fume Hoods** | Chemical fumes, vapors | One-piece molded fiberglass | 4', 5', 6', 8' | Work Surface, Base Cabinet/Stand, Remote Blower, Ductwork | 6-8 |
| **Protector® XStream® Laboratory Fume Hoods** | Chemical fumes, vapors | Fiberglass-reinforced composite panels | 4', 5', 6', 8' | Work Surface, Base Cabinet/Stand, Remote Blower/Ductwork | 9-12 |
| **Protector® XVS™ Ventilation Stations** | Chemical fumes, vapors | Glass and powder-coated aluminum and steel | 2', 3', 4' | Work Surface, Base Cabinet/Stand, Remote Blower, Ductwork | 18-19 |
| **XPert® Filtered Balance Systems** | Hazardous powders, particulates | Glass and powder-coated metal | 3', 4' | Work Surface, Base Cabinet/Stand | 20-21 |
| **XPert® Balance Enclosures** | Hazardous powders, particulates | Glass and powder-coated aluminum and steel | 2', 3', 4' | Work Surface, Base Cabinet/Stand, Remote Blower/FilterMate, Ductwork | 22-23 |

# **Purifier® Logic®+** Class II, Type A2 Biosafety Cabinets

## Introduction

### Performance

Unique to the **Purifier Logic+ Biosafety Cabinet** is its built-in intelligence to accurately maintain proper airflow, even as the HEPA filters load. Accuracy is achieved with an **Electronically Commutated Motor (ECM)** coupled with Labconco's exclusive **Constant Airflow Profile™ (CAP) Technology.** The result is **increased energy efficiency, a comfortable working temperature** and **quiet operation (< 63 dBA).**




R om Air

HEPA-Filtered Air

Unfiltered Air under Negative Pressure

Unfiltered Air under Positive Pressure

During operation, room air is drawn into the grille located in the air foil. The air in the plenum beneath the work surface is a mixture of unfiltered room air, and air that has just passed through the work area. This contaminated air is drawn by the blower through the back plenum of the cabinet, where approximately 70% of the air is recirculated through the supply HEPA filter and back over the work area. The balance of the contaminated air is discharged to the environment after passing through the exhaust HEPA filter.

### Safety

A unique line-of-sight **LCD information center featuring MyLogic™ OS**, visible while seated, is in constant communication with the ECM. It continuously monitors and displays the cabinet's performance for maximum safety. Mounted on the right interior of the side wall, the display is easy to read and provides user-friendly status updates, alerts and alarms.


The "Filter Remaining" bar graph provides assurance and lets you plan for filter replacement. The display is positioned behind safety glass for easy decontamination. Shown with optional Inflow/Downflow monitor kit.

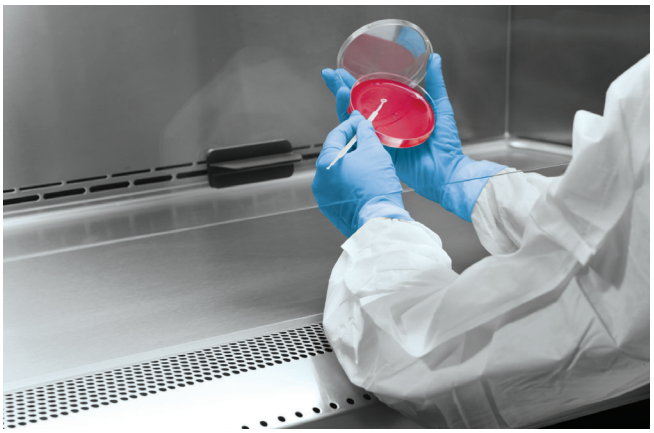

Easy-to-understand notifications leave nothing to interpretation. Step-by-step instructions are provided for programming. Visual and audible alarms warn of cabinet errors, explain the meaning of the alarm with a diagram showing where the cabinet has been affected, and give intuitive trou-ble-shooting tips.

# **Purifier® Logic®+** Class II, Type A2 Biosafety Cabinets

## Introduction & Ordering Information

### Comfort

We have thoughtfully designed every feature to reinforce what humans are inclined to do. We ensured that form follows function and the shape of the human body. Features include an **angled sash**, which allows closer, more comfortable viewing without glare. **Bright LED lighting** illuminates the work surface.



The curved inlet grille provides an ergonomic surface for forearms to rest. No additional armrest is needed.

The electrical outlet cover opens with just a finger. A dampened hinge slowly self-closes to prevent gloves from being ripped. It mounts flush and flat against the side wall for easy cleaning.

Unobtrusive lift knobs on the front corners of the dished stainless work surface allow the work surface to be easily lifted up for cleaning.

### Ordering Information

| Description (Base Stand *Included*) | Dimensions (w x d x h) | Shipping Weight | VWR Cat. No. with Base Stand |
|---|---|---|---|
| 3' Cabinet with 8" Sash Opening | 42.3" x 32" x 61.8" | 585 lbs. | **76317-614** |
| 4' Cabinet with 8" Sash Opening | 54.3" x 32" x 61.8" | 670 lbs. | **76317-626** |
| 5' Cabinet with 8" Sash Opening | 66.3" x 32" x 61.8" | 810 lbs. | **76317-634** |
| 6' Cabinet with 8" Sash Opening | 78.3" x 32" x 61.8" | 905 lbs. | **76317-642** |
| 3' Cabinet with 10" Sash Opening | 42.3" x 32" x 61.8" | 585 lbs. | **76318-336** |
| 4' Cabinet with 10" Sash Opening | 54.3" x 32" x 61.8" | 670 lbs. | **76317-622** |
| 5' Cabinet with 10" Sash Opening | 66.3" x 32" x 61.8" | 810 lbs. | **76317-630** |
| 6' Cabinet with 10" Sash Opening | 78.3" x 32" x 61.8" | 905 lbs. | **76317-638** |

| Description (Base Stand *Not Included*) | Dimensions (w x d x h) | Shipping Weight | VWR Cat. No. without Base Stand |
|---|---|---|---|
| 3' Cabinet with 8" Sash Opening | 42.3" x 32" x 61.8" | 510 lbs. | **76317-612** |
| 4' Cabinet with 8" Sash Opening | 54.3" x 32" x 61.8" | 585 lbs. | **76317-624** |
| 5' Cabinet with 8" Sash Opening | 66.3" x 32" x 61.8" | 715 lbs. | **76317-632** |
| 6' Cabinet with 8" Sash Opening | 78.3" x 32" x 61.8" | 805 lbs. | **76317-640** |
| 3' Cabinet with 10" Sash Opening | 42.3" x 32" x 61.8" | 510 lbs. | **76318-334** |
| 4' Cabinet with 10" Sash Opening | 54.3" x 32" x 61.8" | 585 lbs. | **76317-616** |
| 5' Cabinet with 10" Sash Opening | 66.3" x 32" x 61.8" | 715 lbs. | **76317-628** |
| 6' Cabinet with 10" Sash Opening | 78.3" x 32" x 61.8" | 805 lbs. | **76317-636** |

Ordering information for Base Stands on page 5.

# **Purifier® Logic®+** Class II, Type A2 Biosafety Cabinets

## Features & Benefits

The Purifier Logic+ Class II Biosafety Cabinet is designed to handle all biological hazards. These Type A2 cabinets are available with 8" or 10" sash opening and have a nominal inflow velocity of 105 feet per minute. They include UV lamp, service fixture(s) and Vacu-Pass Cord & Cable Portal. Purifier Logic+ Class II, Type A2 Biosafety Cabinets can be canopy ducted to the outside when minute quantities of chemicals or radionuclides are used in conjunction with the application. (Canopy kits are sold separately)

**To place an order, call VWR at 1-888-624-2432 or visit vwr.com.**

**Smart-Start™ System** automates start up and shut down procedures

**Night-Smart™ System** idles the blower during periods of non-use to maintain a particulate-free interior

**Factory-installed 254 nm UV lamp**

**Bright LED lighting**

**Over 27" of viewing height**

**Angled, fully-closing counter-weighted sliding tempered safety glass sash**

❇ **Crevice-free, type 304 stainless steel interior and removable work surface with lift knobs**

❇ **Interior offers the largest work area in the industry**

**Non-Welded Telescoping Base Stand (included with some models)** is constructed of durable 1.75" glacier white powder-coated steel. Includes leveling feet. Height of base stands is adjustable from 27.5" to 34.5" in 1" increments, to provide a working height from 30" to 37". Base stands are ADA* compliant and meet NSF Standard for construction and stability. Some assembly is required.


❇ **Energy-efficient ECM motor** automatically adjusts airflow to keep users safe.

❇ **ADA*-compliant electrical duplexes with GFCI and gently closing splash covers** (one each side)

❇ **Line-of-sight LCD information center, viewable while seated, with easy-to-understand MyLogic OS**

**Easy-to-clean touchpad controls** for activation of blower, light, timer and LCD menu selection

**Vacu-Pass™ cord & cable portal** is NSF-approved and allows cords to pass through the side of the cabinet without disrupting airflow.

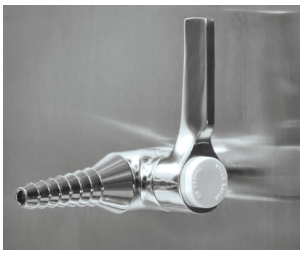
❇ **Curved inlet grille**

**Two 99.99% efficient HEPA filters**

**Five year warranty** on parts and labor

| Description | VWR Cat. No. | Electrical |
|---|---|---|
| 3' Stand | **43100-014** | **115V, 60 Hz** |
| 4' Stand | **43100-010** | |
| 5' Stand | **89003-088** | |
| 6' Stand | **43100-012** | |

**3-foot, 4-foot and 5-foot cabinets have one service fixture mounted on right side; 6-foot cabinet has two service fixtures, one on each side.** Service fixture is chrome-plated forged brass with a ball valve, serrated hose tip valve and quarter turn control handle.



Intertek

❇ Labconco exclusive feature

Contact VWR at 1-888-624-2432 for technical information.

*Americans with Disabilities Act

# **Protector® Premier®** Laboratory Hoods

## Features & Benefits

Protector Premier Laboratory Hoods have a sleek interior with a one-piece molded fiberglass liner to handle a broad range of chemical applications. Testing confirms the Protector Premier exceeds the SEFA 1 standard of a high performance fume hood and may be operated as low as 60 fpm. Dished work surfaces with a left rear corner cutout and oval cupsink with cover fit VWR Contour or Labconco base cabinets and are sold separately. These hoods are for use with a remotely-located blower. See Blower Selection Guide on page 14. For 115V operation.

**To place an order, call VWR at 1-888-624-2432 or visit vwr.com.**

**Front and side panels** may be easily removed for lamp replacement and access to electrical supply connections.

**By-pass design** restricts airflow allowing the hood to operate as a constant air volume (CAV) or variable air volume (VAV) system with no modifications.

**High 37.5" sightline** from the work surface to the header panel.

**LED lighting illuminates the interior**
Pre-wired LED lighting with vapor-proof design is rated for 50,000 hours.

**Factory-prepared** to accept external vacuum breaker.

**Performance tested to ASHRAE Standard 110**

**Upper right fixture panel** is factory-prepared to accommodate a Guardian™ Airflow Monitor. Monitor checks the hood's face velocity and alerts the operator to airflow that drops below a preset level. Sold separately. See page 17.


**Service access panels** allow accessibility to plumbing and electrical wiring.


**One-piece molded fiberglass reinforced polyester liner** gives superior corrosion and chemical resistance, durability and light reflectivity.

**Vertical-rising tempered safety glass sash** is anti-racking for smooth operation.

**Each hood is factory-prepared to accommodate up to 4 service fixtures on each side** (sold separately).

**Factory-wired lights and blower switches** speed hood installation. Switches are located within easy reach of the operator.

**Preset baffle** requires no adjustment, ensuring safe and rapid fume removal and uniform face velocity.

**Two 115V, 20A duplex GFCI electrical receptacles, one on each side** factory-wired to hood junction box. Hood accommodates up to four duplexes. Additional receptacles need to be wired to hood junction box.

❇ **Ergonomic Eco-Foil™ air foil, with Cord-Keeper™ slots on each side, has patented* Clean-Sweep™ airflow openings** that pull inflow air from under the air foil so that clean room air continually flows into the hood.

**ETL-listed**
Hoods carry the ETL mark signifying that they are certified to UL Standard 61010-1, UL-1805 and CAN/CSA C22.2 No. 61010.1.

Intertek

Contact VWR at 1-888-624-2432 for technical information.

**Requires work surface, base cabinet, blower and ductwork** (sold separately). See pages 8, 15, 16, 26 and 27.

❇ Labconco exclusive feature

*U.S. Patent No. 6,461,233

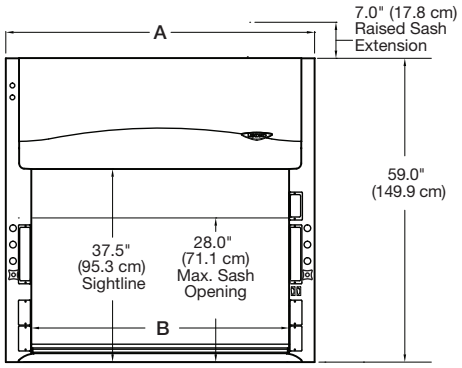
# Protector® Premier® Laboratory Hoods

## Ordering Information & Dimensional Data

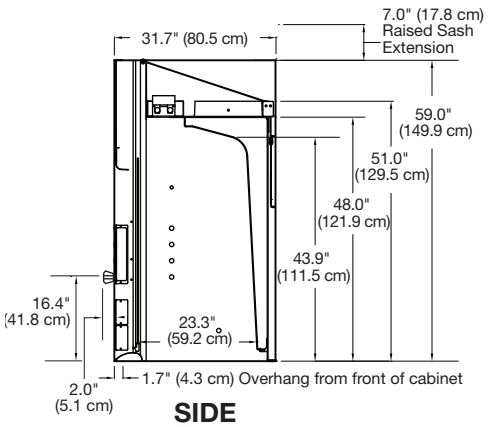
**Protector Premier Laboratory Hoods** Hood interior is molded, one-piece, fire-retardant polyester resin. Hood exterior is powder-coated cold-rolled steel. These hoods include a clear, counterbalanced vertical-rising sash, air foil, two GFCI electrical duplexes, vapor-proof LED lights, and light and blower switches. Hood has modified automatic air by-pass system and **requires a remote blower for operation** (see Blowers, pages 15 and 16). Color is glacier white. Hood is delivered fully assembled.

| Description | Dimensions (w x d x h) | Exhaust | Shipping Weight | VWR Cat. No. |
|---|---|---|---|---|
| 4' Hood | 48.0" x 31.7" x 59.0" | 12.8" Exhaust Connection | 325 lbs. | **89260-050** |
| 5' Hood | 60.0" x 31.7" x 59.0" | 12.8" Exhaust Connection | 410 lbs. | **89260-052** |
| 6' Hood | 72.0" x 31.7" x 59.0" | 12.8" Exhaust Connection | 485 lbs. | **89260-054** |
| 8' Hood | 96.0" x 31.7" x 59.0" | Two 12.8" Exhaust Connections | 650 lbs. | **89260-056** |

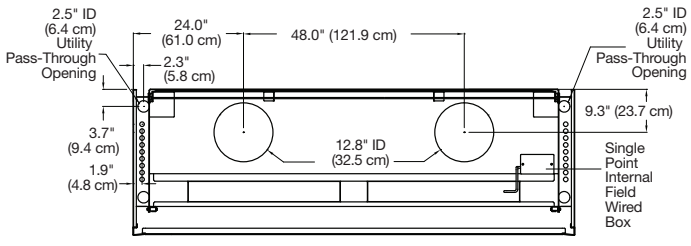
See supporting Base Cabinets on pages 26 and 27.



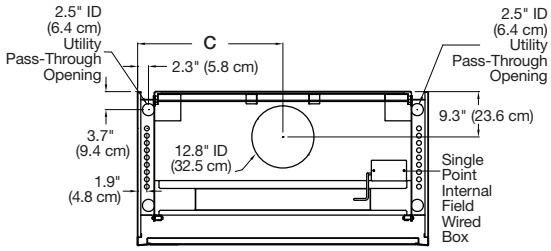

**FRONT**




**SIDE**




**TOP**
**(8' Models)**




**TOP**
**(4', 5' & 6' Models)**

| Description | A | B | C |
|---|---|---|---|
| 4' Hood | 48.0" (121.9 cm) | 38.1" (96 8 cm) | 24.0" (61.0 cm) |
| 5' Hood | 60.0" (152.4 cm) | 50.1" (127.3 cm) | 30.0" (76.2 cm) |
| 6' Hood | 72.0" (182.9 cm) | 62.1" (157 7 cm) | 36.0" (91.4 cm) |
| 8' Hood | 96.0" (243.8 cm) | 86.1" (218.7 cm) | — |

# Protector® Premier® Laboratory Hoods

## Airflow Data & Work Surfaces

ASHRAE 110 tests show a 0.00 ppm average leak rate when tested at 4.0 lpm with OSHA-approved 60, 80 and 100 fpm face velocities and sash positions of 18" and 28". To ensure performance at 60 fpm, Labconco engineers challenged the Protector Premier Hood at less than ideal conditions such as modified ASHRAE test procedures with chest testing at 60 fpm and average face velocities of 50 fpm (not recommended for operation). Contact Labconco for specific ASHRAE test data.

### Total Exhaust CFM and Static Pressure @ 18" Sash Opening (62.5% Open)

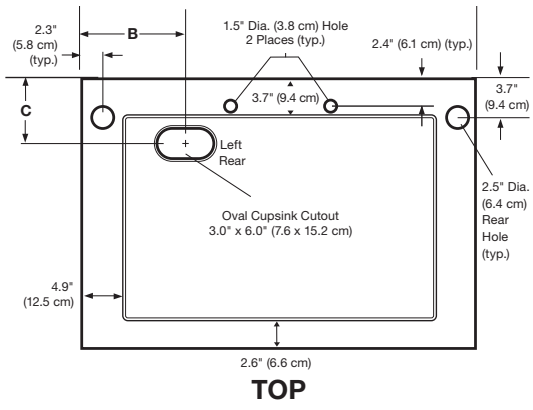
| Nominal Width | 100 fpm | SP | 80 fpm | SP | 60 fpm | SP |
|---|---|---|---|---|---|---|
| 4 Feet | 450 | 0.09" | 365 | 0.06" | 270 | 0.03" |
| 5 Feet | 595 | 0.12" | 480 | 0.08" | 360 | 0.04" |
| 6 Feet | 735 | 0.16" | 590 | 0.10" | 440 | 0.06" |
| 8 Feet | 1025 | 0.11" | 820 | 0.07" | 615 | 0.04" |

### Total Exhaust CFM and Static Pressure @ 28" Sash Opening (100% Open)

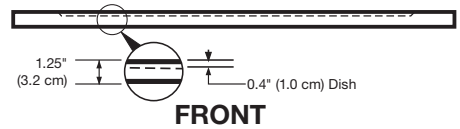
| Nominal Width | 100 fpm | SP | 80 fpm | SP | 60 fpm | SP |
|---|---|---|---|---|---|---|
| 4 Feet | 725 | 0.22" | 580 | 0.14" | 435 | 0.08" |
| 5 Feet | 955 | 0.31" | 765 | 0.20" | 575 | 0.11" |
| 6 Feet | 1180 | 0.41" | 945 | 0.26" | 710 | 0.15" |
| 8 Feet | 1640 | 0.28" | 1310 | 0.18" | 985 | 0.10" |

**SpillStopper™ Work Surfaces.** One-piece work surface molded of a special formulation of epoxy resins that has excellent chemical corrosion resistance. Dished and contoured to conform to the interior liner of the Protector Premier Laboratory Hood to contain spills. Radiused front edge enhances containment. Includes a 6" x 3" oval cupsink cutout in the left rear corner, cupsink (**requires installation**) and cupsink cover. Fit VWR Contour or Labconco base cabinets.

| Description | Dimensions (w x d x h) | Shipping Weight | VWR Cat. No. |
|---|---|---|---|
| 4' Work Surface | 48.0" x 30.0" x 1.25" | 110 lbs. | **89260-066** |
| 5' Work Surface | 60.0" x 30.0" x 1.25" | 150 lbs. | **89260-068** |
| 6' Work Surface | 72.0" x 30.0" x 1.25" | 205 lbs. | **89260-070** |
| 8' Work Surface | 96.0" x 30.0" x 1.25" | 240 lbs. | **89260-072** |




**TOP**




**FRONT**


**SIDE**

| Hood Model | Work Surface Depth | B | C |
|---|---|---|---|
| Premier | 30.0" (76.2 cm) | 9.5" (24.1 cm) | 4.6" (11.7 cm) |
| XStream | 36.0" (91.4 cm) | 12.5" (31.8 cm) | 10.3" (26.2 cm) |

Contact VWR at 1-888-624-2432 for technical information.

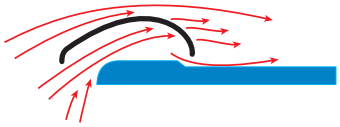
# Protector® XStream® Laboratory Hoods

## Introduction

With its unsurpassed containment and substantial energy savings potential, the patented* **Protector XStream Fume Hood** delivers high performance that is unmatched in the industry. Features such as the upper dilution air supply, containment-enhancing sash handle, rear downflow dual baffle system and Eco-Foil™ work together to decrease turbulence and enhance containment. In fact, XStream Fume Hoods *exceed* the SEFA 1 definition of a high performance hood. When operated at OSHA-approved 60 fpm face velocity, Protector XStream Laboratory Hoods provide an excellent economic payback when compared to traditional hoods running at 80 or 100 fpm.

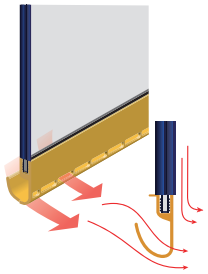
### Eco-Foil™ air foil

Reduces energy consumption by 7-10% compared to flat air foils. Its aerodynamic curve allows air to sweep the work surface for maximum containment.
Clean-Sweep™ openings pull inflow air from under the air foil forcing air into non-turbulent air streams.

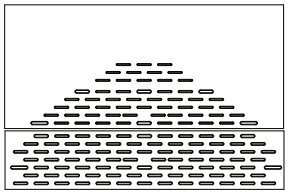


### Clean-Sweep™ sash handle

Sash handle includes Clean-Sweep slots to bleed air into the hood chamber and direct chemical fume concentrations away from the user's breathing zone. Slim-line radiused sash handle sweeps airflow into the hood with minimal turbulence.



### Opti-Zone™ baffle



Decreases the typical face velocity variations found with other baffles. Unique slot pattern and sizes increase velocities in the middle and at the work surface of the hood where it is needed while slowing velocities at the corners.

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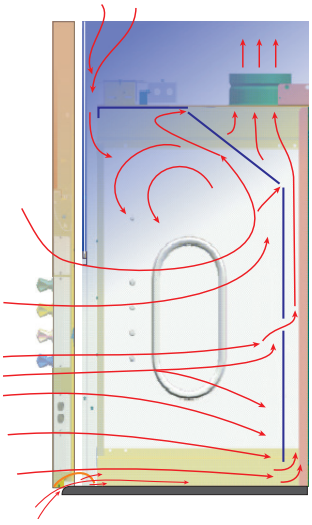
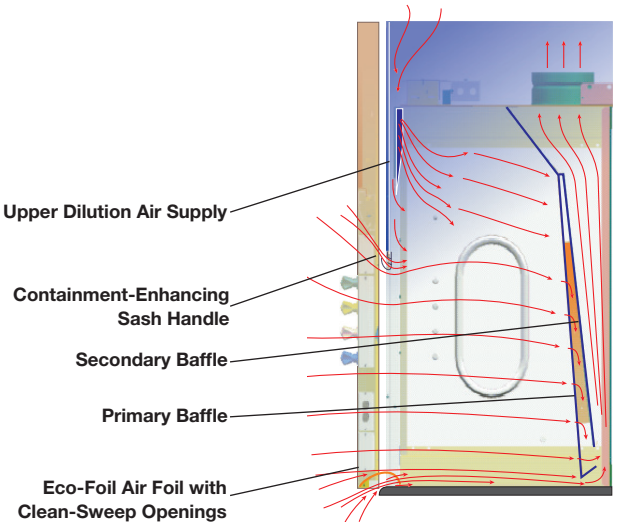
### Traditional By-Pass Hood Design

Smoke tests on traditional hoods show the tendency for contaminants generated in the interior to roll forward producing high concentrations of contaminants behind the sash in close proximity to the user's breathing zone.



### Protector XStream Hood Design

In contrast, smoke tests on Protector XStream Hoods show contaminants removed in a single pass and a remarkable lack of turbulence. Horizontal air flowing toward the baffle forces contaminants to the rear interior, away from the user. Upper dilution air supply prevents contaminants from concentrating behind the sash.




*U.S. Patent No. 6,461,233

# Protector® XStream® Laboratory Hoods

## Features & Benefits

Protector XStream Laboratory Hoods offer unsurpassed safety. Testing confirms the Protector XStream exceeds the SEFA 1 standard of a high performance fume hood and may be operated as low as 60 fpm. Dished work surfaces with a left rear corner cutout and oval cupsink with cover fit VWR Contour or Labconco base cabinets and are sold separately. Fiberglass and Coated Steel Blowers in sizes matched to most installation requirements are also available. See Blower Selection Guide on page 14. For 115V operation.

**To place an order, call VWR at 1-888-624-2432 or visit vwr.com.**

**Front and side panels** may be easily removed for lamp replacement and access to electrical supply connections.

**LED lighting illuminates the interior** Pre-wired LED lighting with vapor-proof design is rated for 50,000 hours.

**Factory-prepared** to accept external vacuum breaker.

**Durable and attractive exterior** is glacier white powder-coated steel.

**Vertical-rising tempered safety glass sash** is anti-racking for smooth operation.

**Chemical-resistant fiberglass-reinforced composite panel liner** surpasses all national codes for fire retarding abilities and has a bright white surface for excellent light reflectivity. Flame spread less than 25 per ASTM E84.


**Service access panels** allow accessibility to plumbing from the front and inside of the hood. Panels are factory prepared for up to 4 service fixtures per side (sold separately).

**High 37.5" sightline** from the work surface to the header panel.

**By-pass design** restricts airflow allowing the hood to operate as a constant air volume system or a variable air volume (CAV) system with no modifications.

**Performance tested to ASHRAE Standard 110**

**Pre-wired electrical components** LED lights and switches are factory-wired to the hood's single point field wired box.

❇ **Ergonomic Eco-Foil™ air foil, with Cord-Keeper™ slots on each side, has patented* Clean-Sweep™ airflow openings** that pull inflow air from under the air foil so that clean air continually flows into the hood.

**Sash stop located at 18" working height** maximizes energy conservation by preventing the sash from being raised higher unless manually released.

**Two 115V, 20A duplex GFCI electrical receptacles, one on each side** factory-wired to hood junction box. Hood accommodates up to four duplexes. Additional receptacles need to be wired to hood junction box.

**ETL-listed**
Hoods carry the ETL mark signifying that they are certified to UL Standard 61010-1, UL-1805 and CAN/CSA C22.2 No. 61010-1.

Intertek

**Upper right fixture panel** is factory-prepared to accommodate a Guardian™ Airflow Monitor. Monitor checks the hood's face velocity and alerts the operator to airflow that drops below a preset level. Sold separately. See page 17 for ordering information.

**Requires work surface, base cabinet, blower and ductwork** (sold separately). See pages 12, 15, 16, 26 and 27.

Contact VWR at 1-888-624-2432 for technical information.

❇ Labconco exclusive feature

*U.S. Patent No. 6,461,233

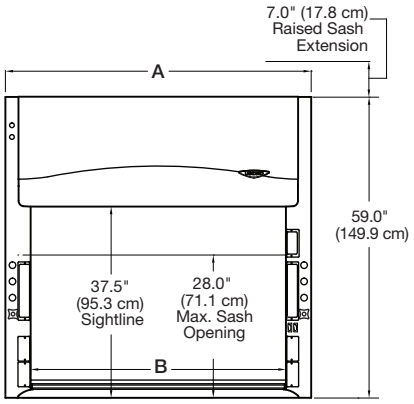
# Protector® XStream® Laboratory Hoods

## Ordering Information & Dimensional Data

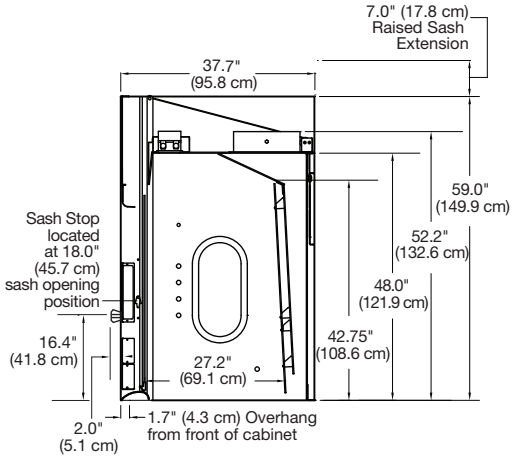
**Protector XStream Laboratory Hoods.** Hood interior is chemical-resistant, fiberglass-reinforced composite panels. Hood exterior is powder-coated steel. Include a clear, counterbalanced vertical-rising sash, air foil, two GFCI electrical duplexes, two vapor-proof LED lights, and light and blower switches. Hood has upper dilution air supply and **requires a remote blower for operation** (see Blowers, pages 15 and 16). Color is glacier white. Hood is delivered fully assembled.

| Description | Dimensions (w x d x h) | Exhaust | Shipping Weight | VWR Cat. No. |
|---|---|---|---|---|
| 4' Hood | 48.0" x 37.7" x 59.0" | 12.8" Exhaust Connection | 440 lbs. | **89260-058** |
| 5' Hood | 60.0" x 37.7" x 59.0" | 12.8" Exhaust Connection | 525 lbs. | **89260-060** |
| 6' Hood | 72.0" x 37.7" x 59.0" | 12.8 Exhaust Connection | 600 lbs. | **89260-062** |
| 8' Hood | 96.0" x 37.7" x 59.0" | Two 12 8" Exhaust Connections | 770 lbs. | **89260-064** |

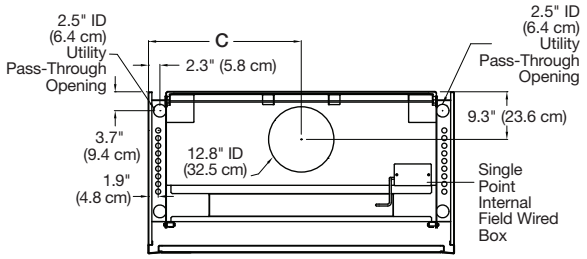
See supporting Base Cabinets on pages 26 and 27.




**FRONT**

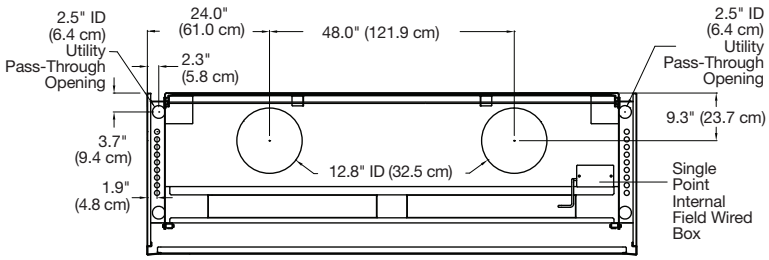



**SIDE**




**TOP**
**(4', 5' & 6' Models)**

| Description | A | B | C |
|---|---|---|---|
| 4' Hood | 48.0" (121.9 cm) | 38.1" (96.8 cm) | 24.0" (61.0 cm) |
| 5' Hood | 60.0" (152.4 cm) | 50.1" (127.3 cm) | 30.0" (76.2 cm) |
| 6' Hood | 72.0" (182.9 cm) | 62.1" (157.7 cm) | 36.0" (91.4 cm) |
| 8' Hood | 96.0" (243.8 cm) | 86.1" (218.7 cm) | — |




**TOP**
**(8' Models)**

# Protector® XStream® Laboratory Hoods

## Airflow Data & Work Surfaces

ASHRAE 110 tests show a 0.00 ppm average leak rate when tested at 4.0 lpm with OSHA-approved 60, 80 and 100 fpm face velocities and sash positions of 18" and 28". To ensure performance at 60 fpm, Labconco engineers challenged the Protector XStream Hood at less than ideal conditions such as 50 fpm cross drafts, chest testing at 50 fpm, modified ASHRAE and National Institutes of Health (NIH) test procedures and average face velocities of 40 fpm. Contact Labconco for specific ASHRAE test data.

### Total Exhaust CFM and Static Pressure @ 18" Sash Opening (62.5% Open)

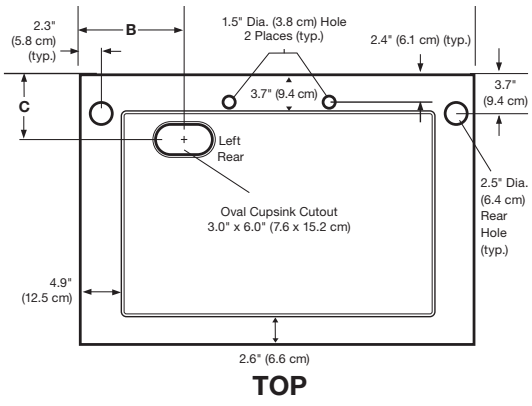
| Nominal Width | 100 fpm | SP | 80 fpm | SP | 60 fpm | SP | CFM Savings at 60 fpm vs. a typical hood at 100 fpm | Total Average Annual Dollar Savings at 60 fpm vs. 100 fpm* |
|---|---|---|---|---|---|---|---|---|
| 4 Feet | 440 | 0.10" | 350 | 0.06" | 265 | 0.04" | 220 | $1540 |
| 5 Feet | 580 | 0.12" | 465 | 0.08" | 350 | 0.05" | 310 | $2170 |
| 6 Feet | 720 | 0.16" | 575 | 0.10" | 430 | 0.06" | 355 | $2485 |
| 8 Feet | 1000 | 0.11" | 800 | 0.07" | 600 | 0.04" | 480 | $3360 |

### Total Exhaust CFM and Static Pressure @ 28" Sash Opening (100% Open)

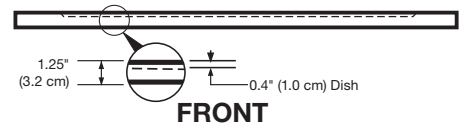
| Nominal Width | 100 fpm | SP | 80 fpm | SP | 60 fpm | SP | CFM Savings at 60 fpm vs. a typical hood at 100 fpm | Total Average Annual Dollar Savings at 60 fpm vs. 100 fpm* |
|---|---|---|---|---|---|---|---|---|
| 4 Feet | 705 | 0.26" | 565 | 0.17" | 425 | 0.09" | 335 | $2345 |
| 5 Feet | 930 | 0.32" | 745 | 0.20" | 560 | 0.12" | 440 | $3080 |
| 6 Feet | 1150 | 0.41" | 920 | 0.26" | 690 | 0.15" | 560 | $3920 |
| 8 Feet | 1600 | 0.29" | 1280 | 0.19" | 960 | 0.10" | 750 | $5250 |

**SpillStopper™ Work Surfaces.** One-piece work surface is molded of a special formulation of epoxy resins that withstand chemicals. Dished and contoured to conform to the interior liner of the Protector XStream Laboratory Hood to contain spills. Radiused front edge enhances containment. Include a 6" x 3" oval cupsink cutout in the left rear corner, cupsink (**requires installation**) and cupsink cover. Fit VWR Contour or Labconco base cabinets.

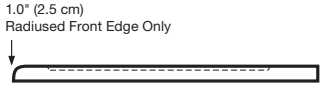
| Description | Dimensions (w x d x h) | Shipping Weight | VWR Cat. No. |
|---|---|---|---|
| 4' Work Surface | 48.0" x 36.0" x 1.25" | 120 lbs. | **89260-074** |
| 5' Work Surface | 60.0" x 36.0" x 1.25" | 160 lbs. | **89260-076** |
| 6' Work Surface | 72.0" x 36.0" x 1.25" | 220 lbs. | **89260-078** |
| 8' Work Surface | 96.0" x 36.0" x 1.25" | 250 lbs. | **89260-080** |




**TOP**




**FRONT**




**SIDE**

| Hood Model | Work Surface Depth | B | C |
|---|---|---|---|
| Premier | 30.0" (76.2 cm) | 9.5" (24.1 cm) | 4.6" (11.7 cm) |
| XStream | 36.0" (91.4 cm) | 12.5" (31.8 cm) | 10.3" (26.2 cm) |

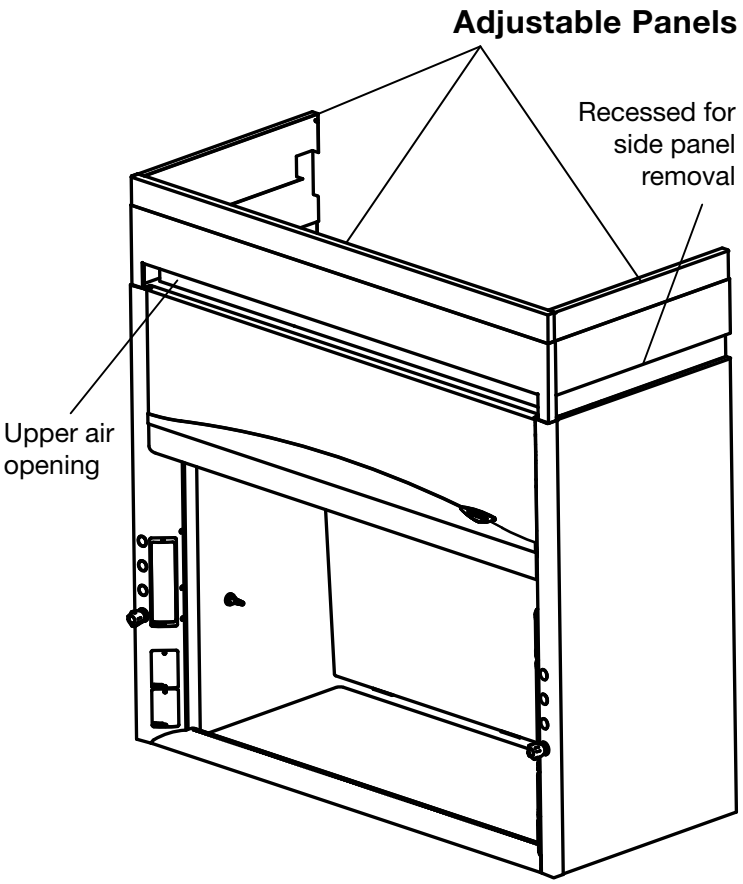
*Based on average annual dollars per CFM usage of $7.00; fume hood operating 24 hours a day and 5 days per week (6240 hours per year).

# Protector® Premier® & XStream® Laboratory Hoods

## Ceiling Enclosure Kits

**3-Sided Ceiling Enclosure Kits.** Panels extend above the top of the hood to the ceiling to hide exposed ductwork, plumbing and wiring. Each kit includes three glacier white powder-coated steel panels. Adjustable panels allow for a height range of 18.6" to 24.4". The height range should match the height between the top of the hood and building ceiling. Upper air opening allows air into the upper portion of the hood.

| Description | Exterior Depth | For Use With | Shipping Weight | VWR Cat. No. |
|---|---|---|---|---|
| 6' Ceiling Enclosure | 31.7" | Protector Premier Laboratory Hoods | 185 lbs. | **89370-028** |
| 6' Ceiling Enclosure | 37.7" | Protector XStream Laboratory Hoods | 205 lbs. | **89370-034** |



# Protector® Premier® & XStream® Laboratory Hoods

## Blowers

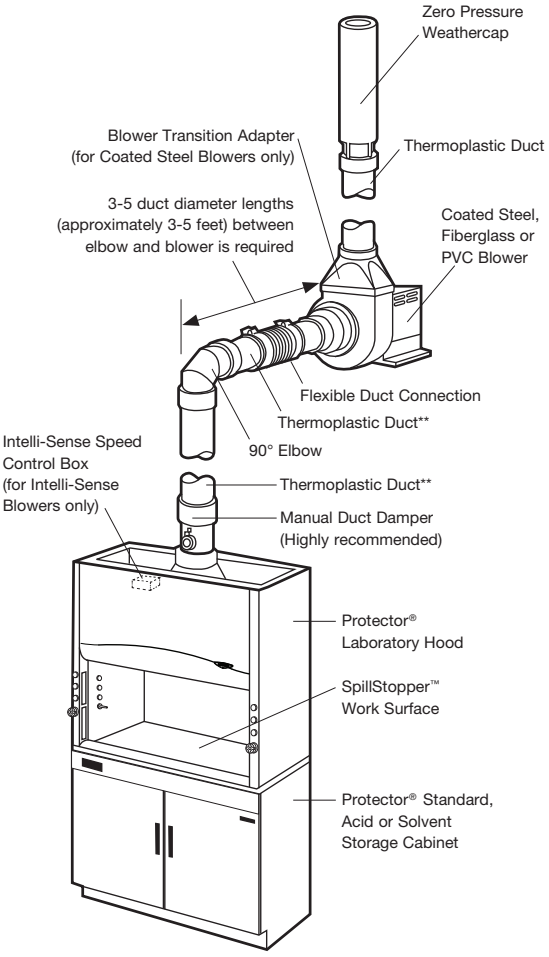
### Blower Selection Guide

The following chart lists Coated Steel and Fiberglass Blowers for 4', 5', 6' and 8' Protector Premier and Protector XStream Hoods. Calculations are for equivalent duct runs up to a maximum of 100 feet. Equivalent resistance in feet of straight duct includes all factors such as elbows and transitions. Contact your VWR Sales Representative for blower recommendations and sizing assistance.

| Hood Model VWR Cat. No. | Hood Size | Sash Opening | Face Velocity | Airflow Volume | Coated Steel Blower VWR Cat. No. | Fiberglass Blower VWR Cat. No. | Intelli-Sense® Fiberglass Blower VWR Cat. No. |
|---|---|---|---|---|---|---|---|
| Premier **89260-050** | 4' | 100% | 100 fpm | 725 cfm | **82006-748** | **82006-786** | **76311-766/768*** |
| XStream **89260-058** | 4' | 100% | 60 fpm | 425 cfm | **82006-740** | **97019-806** | **76311-766/768*** |
| XStream **89260-058** | 4' | 62.5% | 60 fpm | 265 cfm | **82006-740** | **97019-806** | **76311-766/768*** |
| Premier **89260-052** | 5' | 100% | 100 fpm | 955 cfm | **82006-750** | **82006-788** | **76311-766/768*** |
| XStream **89260-060** | 5' | 100% | 60 fpm | 560 cfm | **82006-748** | **82006-784** | **76311-766/768*** |
| XStream **89260-060** | 5' | 62.5% | 60 fpm | 350 cfm | **82006-740** | **97019-806** | **76311-766/768*** |
| Premier **89260-054** | 6' | 100% | 100 fpm | 1180 cfm | **82006-750/752*** | **82006-790** | **76311-768** |
| XStream **89260-062** | 6' | 100% | 60 fpm | 690 cfm | **82006-748** | **82006-786** | **76311-766/768*** |
| XStream **89260-062** | 6' | 62.5% | 60 fpm | 430 cfm | **82006-748** | **82006-784** | **76311-766/768*** |
| Premier **89260-056** | 8' | 100% | 100 fpm | 1640 cfm | **82006-752/754*** | **82006-792** | **—** |
| XStream **89260-064** | 8' | 100% | 60 fpm | 960 cfm | **82006-748/750*** | **82006-788** | **76311-766/768*** |
| XStream **89260-064** | 8' | 62.5% | 60 fpm | 600 cfm | **82006-748** | **82006-784** | **76311-766/768*** |

### Typical Fume Removal System

This diagram details the many components that are needed to complete a typical fume removal system.




*Smaller blower for 25 foot duct runs; larger blower for 50-100 foot duct runs.
**Minimum of 5 to 15 feet of duct in both locations is recommended for noise reduction.

# Protector® Premier® & XStream® Laboratory Hoods

## Blowers

### Blowers for Protector Premier and XStream Laboratory Hoods

Fiberglass blowers are designed for fume hood exhaust systems in moderate to highly corrosive conditions. Housing is made from molded fiberglass reinforced polyester for durability and long life. Coated steel blowers are recommended for low to moderately corrosive applications. Impeller and housing are phenolic coated. Both blowers feature adjustable sheaves for performance adjustments and a powder-coated base and weather cover for protection in extreme weather.

Fiberglass Blower

Coated Steel Blower

| | HP | Electrical Requirements | CFM Range @ Static Pressure | Inlet | Outlet | Shipping Weight | VWR Cat. No. |
|---|---|---|---|---|---|---|---|
| | 1/6 | 115V, 60 Hz, 1Ø | 325 @ .12" to 305 @ .38" | 10.4" OD | 10.75" ID | 92 lbs. | **97019-806** |
| | 1/4 | 115V, 60 Hz, 1Ø | 520 @ .25" to 350 to .50" | 10.4" OD | 10.75" ID | 100 lbs. | **82006-778** |
| | 1/6 | 115V, 60 Hz, 1Ø | 370 @ .12" to 450 @ .25" | 12.4" OD | 12.75" ID | 96 lbs. | **82006-784** |
| **Fiberglass** | 1/4 | 115V, 60 Hz, 1Ø | 720 @ .12" to 550 @ .38" | 12.4" OD | 12.75" ID | 96 lbs. | **82006-786** |
| | 1/2 | 115V, 60 Hz, 1Ø | 900 @ .25" to 710 @ .62" | 12.4" OD | 12.75" ID | 100 lbs. | **82006-788** |
| | 3/4 | 115/230V, 60 Hz, 1Ø | 1200 @ .25" to 1000 @ 1.25" | 12.4" OD | 12.75" ID | 100 lbs. | **82006-790** |
| | 1.5 | 115/230V, 60 Hz, 1Ø | 1640 @ .38" to 1100 @ 1.25" | 12.4" OD | 12.75" ID | 114 lbs. | **82006-792** |
| | 1/6 | 115V, 60 Hz, 1Ø | 370 @ .12" to 308 @ .38" | 10.9" ID | 5.5 x 10" OD | 92 lbs. | **82006-740** |
| | 1/4 | 115V, 60 Hz, 1Ø | 540 @ .25" to 430 @ .75" | 10.9" ID | 5.5 x 10" OD | 92 lbs. | **82006-742** |
| | 1/3 | 115V, 60 Hz, 1Ø | 760 @ .38" to 500 @ 1.00" | 10.9" ID | 5.5 x 10" OD | 86 lbs. | **82006-744** |
| | 1/2 | 115V, 60 Hz, 1Ø | 825 @ .50" to 555 @ 1.25" | 10.9" ID | 5.5 x 10" OD | 88 lbs. | **82006-746** |
| **Coated Steel** | 1/3 | 115V, 60 Hz, 1Ø | 540 @ .12" to 550 @ .38" | 12.25" OD | 7 x 13.5" OD | 90 lbs. | **82006-748** |
| | 1/2 | 115/230V, 60 Hz, 1Ø | 900 @ .25" to 710 @ .62" | 12.25" OD | 7 x 13.5" OD | 96 lbs. | **82006-750** |
| | 3/4 | 115/230V, 60 Hz, 1Ø | 1305 @ .38" to 830 @ .88" | 12.25" OD | 7 x 13.5" OD | 96 lbs. | **82006-752** |
| | 1.0 | 115/230V, 60 Hz, 1Ø | 1680 @ .50" to 1000 @ 1.25" | 12.25" OD | 7 x 13.5" OD | 100 lbs. | **82006-754** |
| | 1.5 | 115/230V, 60 Hz, 1Ø | 1840 @ .75" to 1100 @ 1.50" | 12.25" OD | 7 x 13.5" OD | 114 lbs. | **82006-756** |

If purchasing a Coated Steel Blower, a **Blower Transition Adapter is required.** Powder-coated steel adapter connects to the rectangular exhaust outlet on the blower. Nominal size PVC duct fits inside the adapter opening. To discharge air away from the building, a Zero Pressure Weathercap is also recommended. These products are not in REDISHIP inventory but are available through VWR with short lead times.

| Description | Shipping Weight | VWR Cat. No. |
|---|---|---|
| Blower Transition Adapter for use with 10" duct | 92 lbs. | **82006-958** |
| Blower Transition Adapter for use with 12" duct | 100 lbs. | **30186-002** |
| Zero Pressure Weathercap 56" high, 12" diameter | 96 lbs. | **30185-000** |
| Zero Pressure Weathercap 48" high, 10" diameter | 96 lbs. | **26674-520** |

# Protector® Premier® & XStream® Laboratory Hoods

## Intelli-Sense® Blowers

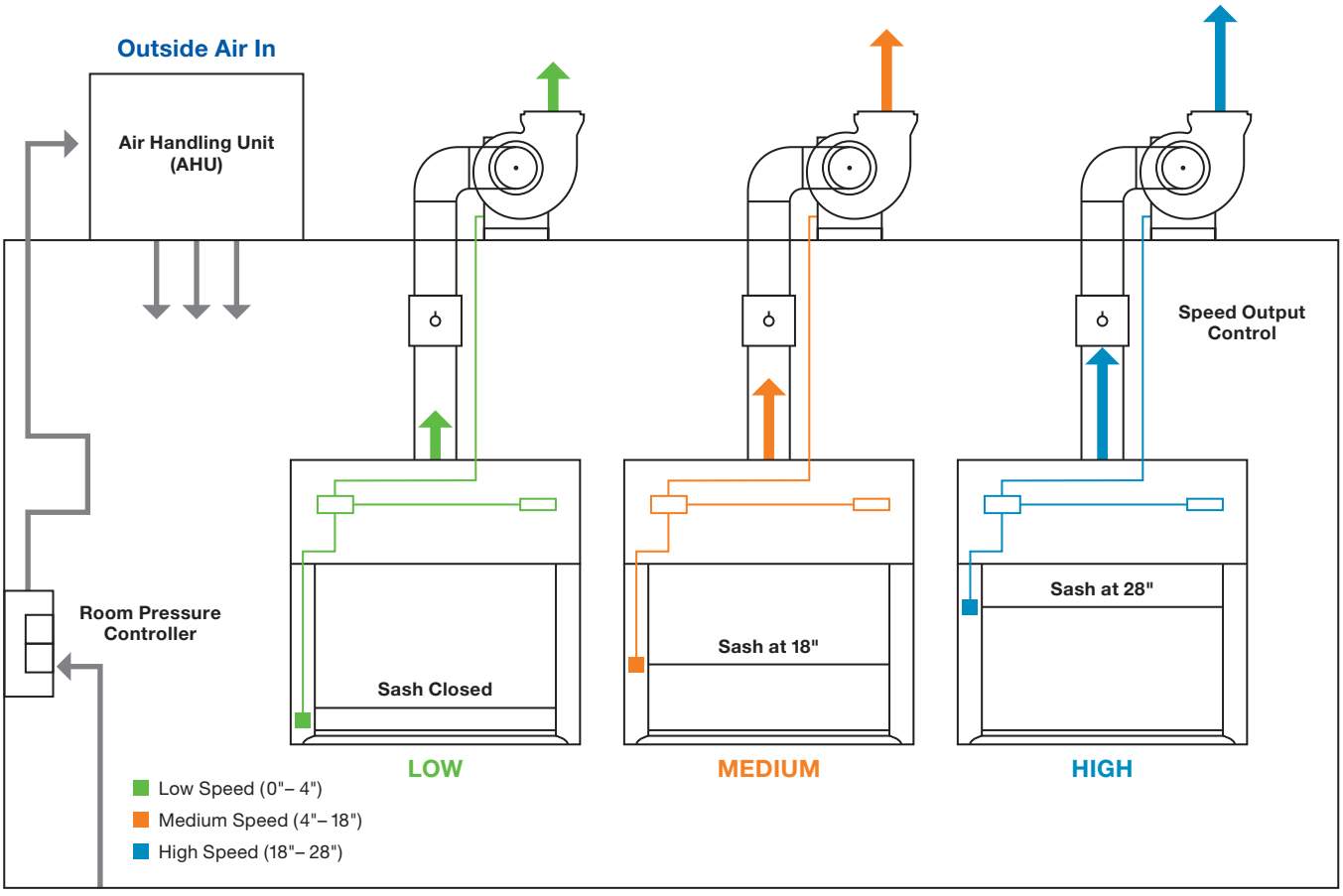
### Intelli-Sense Multi-Speed Fiberglass Blowers

Intelli-Sense Multi-Speed Blowers are weatherized, direct drive, non-explosion-proof blowers controlled by a three position switch. Each blower has a reliable electronically commutated motor (ECM), which consumes one third less energy and is easier and less expensive to maintain than belt-drive motors.

These fiberglass blowers are ideal for fume hood exhaust systems in moderate to highly corrosive conditions. Housing is made from molded fiberglass reinforced polyester for durability and long life. Balanced, forward-curved impellers made of injection-molded polypropylene resist corrosive atmospheres, operate quietly and provide optimum air delivery. A powder-coated base and weather cover provide long life in extreme weather.

These fiberglass blowers are not recommended for use with perchloric acid. Please refer to PVC Blowers for perchloric acid use. Contact your VWR Sales Representative for blower recommendations and sizing assistance.

| | HP | Electrical Requirements | CFM Range @ Static Pressure | Inlet | Outlet | Shipping Weight | VWR Cat. No. |
|---|---|---|---|---|---|---|---|
| **Fiberglass** | 1.0 | 115V, 50/60 Hz, 1Ø | 175 @ .06" to 1025 @ 1.6" | 10.4" OD | 10.75" ID | 80 lbs. | **76311-766** |
| **Fiberglass** | 1.0 | 115V, 50/60 Hz, 1Ø | 200 @ .08" to 1150 @ 1.4" | 12.4" OD | 12.75" ID | 85 lbs. | **76311-768** |

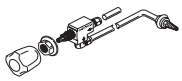


# Protector® Premier® & XStream® Laboratory Hoods

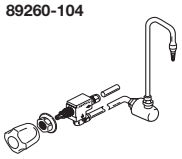
## Accessories

Service Fixture Kits, Electrical Receptacle Kits and Guardian Airflow Monitor Kits are available in REDISHIP inventory for your convenience in customizing a hood to fit your specific needs.

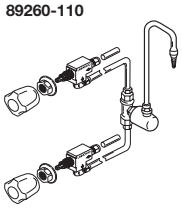
### Service Fixture Kits for Protector Premier and XStream Laboratory Hoods



**89260-086** through **89260-104**



**89260-106, 89260-112, 89260-110**



**89260-108**

| Description | Knob Color | Valve | Tubing | Shipping Weight | VWR Cat. No. |
|---|---|---|---|---|---|
| Cold Water Service Fixture Kit (CW) | Green | 1/4" Brass | Copper | 4.0 lbs. | **89260-086** |
| Vacuum Service Fixture Kit (VAC) | Yellow | 1/4" Brass | Copper | 4.0 lbs. | **89260-090** |
| Air Service Fixture Kit (AIR) | Orange | 1/4" Brass | Copper | 4.0 lbs. | **89260-088** |
| Nitrogen Service Fixture Kit (NIT) | Brown | 1/4" Brass | Copper | 4.0 lbs. | **89260-102** |
| Steam Service Fixture Kit (STM) | Black | 1/4" Brass | Copper | 4.0 lbs. | **89260-100** |
| Hot Water Service Fixture Kit (HW) | Red | 1/4" Brass | Copper | 4.0 lbs. | **89260-096** |
| Argon Service Fixture Kit (ARG) | Gray | 1/4" Brass | Copper | 4.0 lbs. | **89260-094** |
| Gas Service Fixture Kit (GAS) | Blue | 1/4" Brass | Brass | 4.0 lbs. | **89260-092** |
| Deionized/Distilled Water Service Fixture Kit (DW) | White | 1/4" Stainless | Stainless | 4.0 lbs. | **89260-098** |
| Oxygen Service Fixture Kit (OXY) | Light Green | 1/4" Brass | Copper | 4.0 lbs. | **89260-104** |
| Cold Water Gooseneck Faucet Kit with green powder-coated brass rigid/swivel gooseneck (CW) | Green | 3/8" Brass | Copper | 10 lbs. | **89260-106** |
| Cold Water Gooseneck Faucet Kit with gray PVC rigid gooseneck (CW) | Green | 3/8" Brass | Copper | 10 lbs. | **89260-112** |
| Deionized/Distilled Water Faucet Kit with gray PVC rigid gooseneck (DW) | White | 1/4" Stainless | Stainless | 10 lbs. | **89260-110** |
| Hot/Cold Mixing Gooseneck Faucet Kit with white powder-coated brass rigid/swivel gooseneck | Red/Green | 2 each, 1/4" Brass | Copper | 11 lbs. | **89260-108** |

### Electrical Receptacle Kits for Protector Premier and XStream Laboratory Hoods

**89260-114**

**89260-116**

**89260-118**

| Description | Volts | Hz | Amps | Shipping Weight | VWR Cat. No. |
|---|---|---|---|---|---|
| Duplex Receptacle Kit (includes wires) | 115 | 60 | 20 | 4.0 lbs. | **89260-114** |
| GFCI Duplex Receptacle Kit (includes wires) | 115 | 60 | 20 | 4.0 lbs. | **89260-116** |
| Duplex Receptacle Kit (includes wires) | 230 | 60 | 20 | 4.0 lbs. | **89260-118** |

### Guardian™ Airflow Monitor Kits for Protector Premier and XStream Laboratory Hoods

Airflow monitors include face plate with circuit board, electrical power pack, probe, vinyl tubing and wiring connections. For 115V, 50/60 Hz operation. **Installation is required.**

**89260-082**

**89260-084**

| Description | Shipping Weight | VWR Cat. No. |
|---|---|---|
| **Guardian Airflow Monitor Kit**, monitors and alerts operator to low airflow conditions | 6.0 lbs. | **89260-082** |
| **Guardian Digital Airflow Monitor Kit**, provides digital display of face velocity, audible alarm | 6.0 lbs. | **89260-084** |

NOTE: Airflow monitors for Protector XVS Stations are also available. See page 25.

### Supporting Base Cabinets for Protector Premier and XStream Laboratory Hoods

See information about Protector Acid, Solvent and Standard Storage Cabinets on pages 26 and 27.

# Protector® XVS™ Ventilation Stations

## Features & Benefits

Use this ventilated work enclosure as a light duty fume hood, science student work station, solvent cleaning work bay, or pathology/cytology enclosure. Its patented* design protects the operator and contains hazardous or noxious fumes, vapors and fine powders.

**To place an order, call VWR at 1-888-624-2432 or visit vwr.com.**

**Tempered safety glass front sash, sides and top** offer excellent visibility and protection, making it well-suited for teaching demonstrations. Glass provides better fire, scratch and corrosion resistance than acrylic.

**Lower static pressures** allow smaller blower and quieter operation. **Remote blower is required and sold separately** (see page 19).

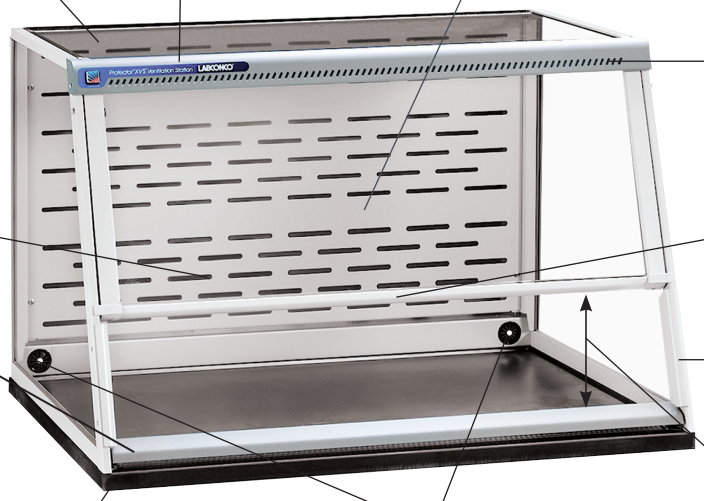
**Low profile design**, 22.75" high, requires less space than most ventilated enclosures.

❇ **Patented* rear baffle with zones of perforations** promotes horizontal laminar airflow to maximize containment.

❇ **Patented* Clean-Sweep™ air foil** allows air to sweep the work surface for maximum containment. Airflow openings pull inflow air from under the air foil so that clean air continually flows through the air foil, creating a constant barrier of protection from contaminants. Its ergonomic design provides a comfortable position for the operator's forearms.

**Sturdy glacier white and gray, powder-coated aluminum frame and steel rear plenum and baffle** dissipate static charge and provide durability and better chemical resistance compared to acrylic models. No unreliable plastic-to-plastic bonding is used.

**Ergonomic 20° angled sash** allows a closer view, reduces glare and provides a more comfortable operating position than vertical sashes. The hinged sash pivots upward and locks to a loading height of 20".



❇ **Upper dilution air supply** introduces room air at the top of the sash to dilute contaminants in the upper chamber and bathes the back of the sash with clean air.

❇ **Upper containment sash foil** bleeds air into the enclosure to direct concentrations of contaminants away from the operator's breathing zone.

**Side-entry air foils** allow air to sweep across the interior glass surfaces to enhance containment.

**8" sash opening** limits exhaust demand so the enclosure conserves costly tempered air and utilizes a smaller blower than most fume hoods.

**Optional chemical-resistant solid epoxy work surface** is contoured to fit the enclosure's dimensions and dished to contain spills (see page 19, sold separately).

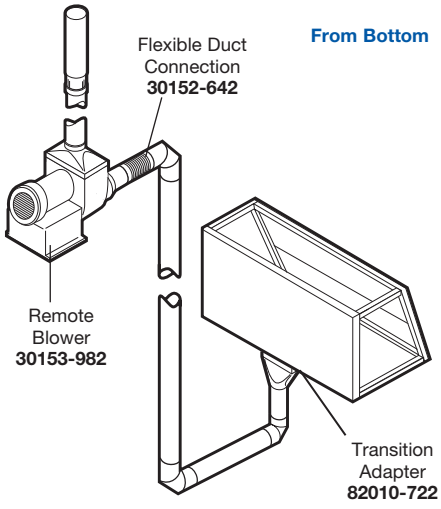
**Two utility ports** allow passage of tubing, electrical cords and interface cables from inside to back exterior for connection to services.

**Flexible exhaust options**
2" x 10" rectangular exhaust openings on the top and bottom allow connection to ductwork. Using the bottom exhaust opening keeps ductwork hidden, maximizing room visibility. **Requires ductwork and blower (not included).**

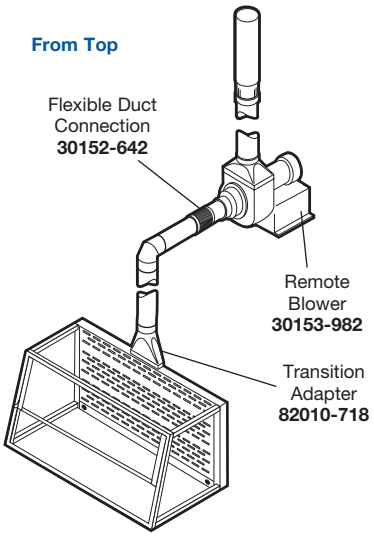
**Versatile exhaust openings** allow connection to remote blower from top or bottom. **Exhaust transition adapters, remote blower and ductwork are sold separately.**

Not for use with radioisotopes, perchloric acid or corrosive acids.
Contact VWR at 1-888-624-2432 for additional sizes and models.

**From Bottom**




**From Top**



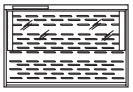
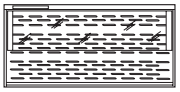

❇ Labconco exclusive feature

*U.S. Patent No. 6,461,233

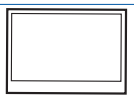
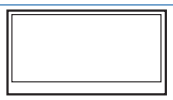
# Protector® XVS™ Ventilation Stations

## Ordering Information & Accessories

**Protector XVS Ventilation Stations.** Enclosure has sturdy glacier white and gray powder-coated aluminum frame with steel baffle, plenum and air foil, with 3/16" thick tempered safety glass top and side walls. Twenty-degree angled, hinged 1/4" thick tempered safety glass sash swings up for loading and cleaning. Two utility ports allow pass-through of cords and tubing. Top and bottom have 2" x 10" rectangular exhaust collars. Interior depth 23"; height 22". **Requires exhaust transition adapter, remote blower and ductwork for operation (sold separately).**

| Description | Dimensions (w x d x h) | Static Pressure Loss | Shipping Weight | VWR Cat. No. |
|---|---|---|---|---|
|  2' Ventilation Station | 24.0" x 28.8" x 22.75" | Does not exceed .03" $H_2O$ at 95 CFM (80 fpm) | 105 lbs. | **82010-736** |
|  3' Ventilation Station | 36.0" x 28.8" x 22.75" | Does not exceed .06" $H_2O$ at 145 CFM (80 fpm) | 135 lbs. | **82010-738** |
|  4' Ventilation Station | 48.0" x 28.8" x 22.75" | Does not exceed .10" $H_2O$ at 200 CFM (80 fpm) | 160 lbs. | **82010-740** |

**Work Surfaces.** One-piece surface molded of a special formulation of epoxy resins that withstand chemicals. Dished and contoured to conform to the interior liner of the Protector XVS Ventilation Station to contain spills. Radiused front edge enhances containment.

| Description | Dimensions (w x d x h) | Shipping Weight | VWR Cat. No. |
|---|---|---|---|
|  2' Work Surface | 24.0" x 26.7" x 1.0" | 48 lbs. | **82010-690** |
|  3' Work Surface | 36.0" x 26.7" x 1.0" | 72 lbs. | **82010-692** |
|  4' Work Surface | 48.0" x 26.7" x 1.0" | 96 lbs. | **82010-694** |

### Ducting Accessories and Remote Blower for Protector XVS Ventilation Stations

Exhaust Transition Adapters of glacier white powder-coated steel provide easy connection of Protector XVS Ventilation Station to standard 6" diameter duct. Connect from the top or bottom of the enclosure.

Direct drive blower has a 1/4 hp totally enclosed fan cooled (TEFC) standard motor capable of overcoming external static pressure loss of .75" $H_2O$ at 360 CFM. Housing and wheel are corrosion-resistant phenolic-coated steel. Blower inlet is 6" ID. Outlet dimensions are 4.25" x 7.4" OD. Overall dimensions are 15" h x 14" w x 11" d. For operation on 115V, 60 Hz AC electrical service. **Applications involving high concentrations of solvents may require an explosion-proof blower. Contact VWR at 1-888-624-2432 for technical information.**

Flexible Duct Connection can be used to reduce vibration on either side of blower. These accessory items are not in REDISHIP inventory, but are available through VWR with short lead times.

| Description | Shipping Weight | VWR Cat. No. |
|---|---|---|
| **Upper Exhaust Transition Adapter, 6"** | 5.0 lbs. | **82010-718** |
| **Lower Exhaust Transition Adapter, 6"** | 5.0 lbs. | **82010-722** |
| **Remote Blower**, 1/4 hp, 115V, 60 Hz | 35 lbs. | **30153-982** |
| **Flexible Duct Connection** for 6" diameter round duct | 8.0 lbs. | **30152-642** |
| **Exhaust Damper**, powder-coated steel | 1.0 lb. | **82010-724** |
| **Blower Transition Adapter** | 1.0 lb. | **30152-644** |

See supporting Base Cabinets on pages 26 and 27.

# **XPert**® Filtered Balance Systems

## Features & Benefits

XPert Filtered Balance Systems incorporate an exhaust HEPA filter and built-in blower to provide user protection from powders and particulates during weighing procedures. The built-in blower and exhaust HEPA filter mounted in the upper plenum conserve space. Isolation supports minimize blower vibration. Since HEPA filtered air is returned to the laboratory, these enclosures have the added benefits of low installation costs, portability and no required outside ducting. Interior dimensions accommodate large micro and analytical balances.

**To place an order, call VWR at 1-888-624-2432 or visit vwr.com.**

❇ **Upper dilution air supply** introduces room air at the top of the sash to dilute contaminants in the upper chamber and bathes the back of the sash with clean air.

**Front-mounted Minihelic*** **pressure gauge** monitors pressure differential across the HEPA filter to help determine filter loading.

**Vibration isolation system** eliminates disturbance for sensitive microbalances.

**Glare-free fluorescent lighting**


**Two utility ports** allow passage of tubing, electrical cords and interface cables from inside to back exterior for connection to services.

**Tempered safety glass front sash and sides** offer excellent visibility and protection. Glass provides better fire, scratch and chemical resistance than acrylic and dissipates static charge.

**Modified ASHRAE 110 tested**

❇ **True bag-in/bag-out filter disposal system** allows the HEPA filter to be safely removed and replaced by a certified technician. The HEPA filter and bag are easily accessed by removing the front panel.

**9.4" high sash opening**

❇ **Deep 23" interior** easily accommodates large micro and analytical balances.

**Upper diffuser screen** located above the work area provides protection for the HEPA filter.

**Sturdy glacier white and gray, powder-coated aluminum frame and steel rear plenum and baffle** dissipate static charge and provide durability and better chemical resistance compared to acrylic models. Unreliable plastic-to-plastic bonding is not used.

**Built-in exhaust HEPA filter,** 99.99% efficient on particles 0.3 micron in size, can be easily verified by a certified technician.

**Built-in Guardian™ Airflow Monitor** alerts the user to face velocities outside of preset range.

**Front-mounted light and blower switches**

❇ **Patented** rear baffle with zones of perforations** promotes horizontal laminar airflow to maximize containment. Easily tilts for cleaning.

**Ergonomic 10° angled sash** allows a closer view, reduces glare and provides a more comfortable operating position than vertical sashes. The hinged sash pivots upward and locks to a loading height of 20". A wiping seal helps to keep contaminants contained.

❇ **Upper containment sash foil** bleeds air into the enclosure to direct concentrations of contaminants away from the operator's breathing zone.

**Side-entry air foils** allow air to sweep across the interior glass surfaces to enhance containment.

❇ **Patented** Clean-Sweep™ air foil** allows air to sweep the work surface for maximum containment. Airflow openings pull inflow air from under the air foil so that clean air continually flows through the air foil, creating a constant barrier of protection from contaminants. Its ergonomic design provides a comfortable position for the operator's forearms.

Intertek

❇ Labconco exclusive feature

*Minihelic® is a registered trademark of Dwyer Instruments, Inc.
**U.S. Patent 6,461,233

Contact VWR at 1-888-624-2432 for additional sizes and models.

# **XPert**® Filtered Balance Systems

## Specifications & Ordering Information

XPert Filtered Balance System **82018-116** is shown with Black Solid Epoxy Work Surface **82018-190** and Protector Standard Storage Cabinet **46610-470**.

### All models feature:

- ❇ Deep 23.4" interior
- ❇ Ergonomic air foil with aerodynamic Clean-Sweep* airflow openings
- ❇ Upper dilution air supply
- ❇ Upper containment sash foil
- ❇ Zone-perforated, pivoting rear baffle*
- ❇ Side-entry air foils
- Exhaust HEPA filter, 99.99% efficient on particles 0.3 micron in size
- ❇ Top accessible HEPA filter for leak scanning of entire surface
- ❇ True bag-in/bag-out filter disposal system (requires certified technician)
- Built-in blower with dynamically-balanced, vibration-isolated motorized impeller and speed control. Blower has a 40% reserve so that the speed may be adjusted as needed by a certified technician as the filter loads
- Pressure gauge
- ❇ Intrinsically safe, negative pressure design
- Space saving design. Impeller and HEPA filter are contained within the enclosure's upper plenum for a smaller overall footprint
- Upper diffuser screen
- Quiet operation
- Glacier white and gray, powder-coated aluminum frame and steel rear plenum and baffle. No unreliable plastic-to-plastic bonding is used
- Pre-wired fluorescent lamp and switches for blower and light
- 1/4" thick tempered safety glass front sash and sides
- Ergonomic angled and hinged, pivoting sash with wiping seal
- 16.5" sash locking height and 19.0" maximum loading height
- Two 1.5" utility ports for pass-through of electrical cords
- Guardian Airflow Monitor that continuously monitors airflow with a green LED that glows when airflow is within set point range and a red LED that glows and an audible alarm that sounds when airflow is outside set point range
- 8' cord included
- Particulate containment independently verified by SafeBridge Consultants, Inc.
- Validation package available containing Test Reports, Installation Qualification/Operation Qualification (IQ/OQ) Protocols and Maintenance Log

### All models conform to the following regulations and standards:

- Modified ASHRAE 110 tested
- ANSI Z9.5
- UL 61010-1
- CAN/CSA C22.2 No. 1010.1

### All models require (not included):

- Work surface. See page 25
- Supporting base. See pages 26 and 27

| Description | Overall Dimensions (w x d x h) | Interior Dimensions (w x d x h) | Shipping Weight | VWR Cat. No. |
|---|---|---|---|---|
| 3' XPert Filtered Balance System | 36.0" x 29.0" x 37.1" | 33.6" x 23.4" x 22.7" | 230 lbs. | **82018-116** |
| 4' XPert Filtered Balance System | 48.0" x 29.0" x 37.1" | 45.6" x 23.4" x 22.7" | 280 lbs. | **82018-124** |

Contact VWR at 1-888-624-2432 for additional sizes and models.

❇ Labconco exclusive feature

*U.S. Patent 6,461,233

# XPert® Balance Enclosures

## Features & Benefits

Patented* XPert Balance Enclosures feature flexible ducting options with collars on top and bottom to provide user protection by keeping powders, particulates and fumes contained during weighing operations. XPert Balance Enclosures require venting. They may be connected to a remote blower and exhausted to the outside. When connected to the XPert Balance Enclosure, FilterMate Portable Exhausters provide an alternative to outside ducting. With a HEPA and/or carbon filter installed, the FilterMate rids the work area of hazardous particulates and/or fumes and vapors. With their low profile, these enclosures exhaust less tempered room air than traditional fume hoods, conserving energy. They have no switches, wiring or service fixtures that can add significant costs.

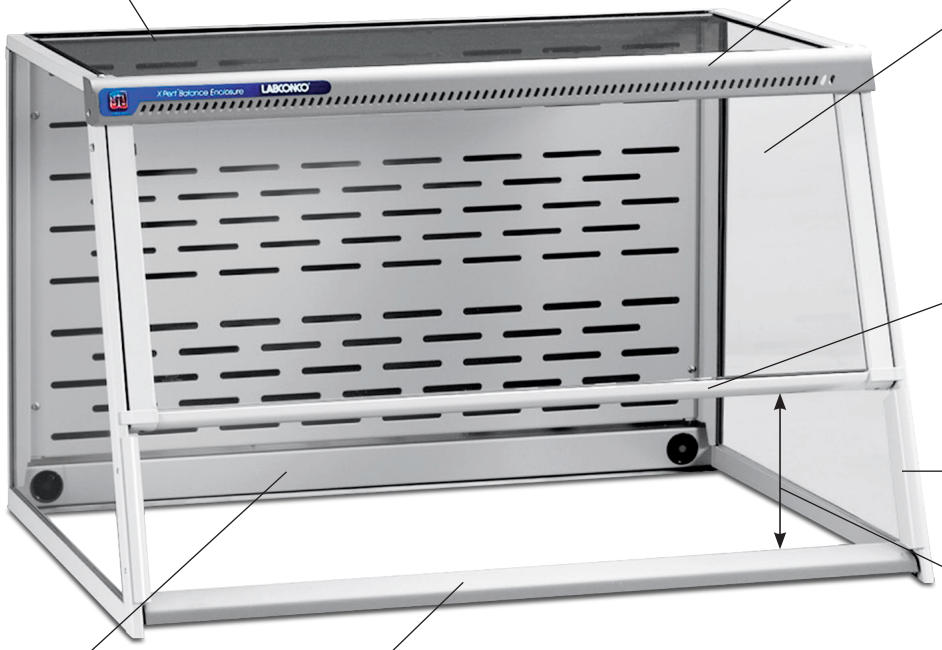
**To place an order, call VWR at 1-888-624-2432 or visit vwr.com.**

❇ **Tempered safety glass front sash, sides and top** offer excellent visibility, ambient light and protection. Glass provides better fire, scratch and chemical resistance than acrylic and dissipates static charge.

❇ **Flexible exhaust options**
Exhaust openings at top and bottom permit connections to ductwork for outside exhausting or to a FilterMate™ Portable Exhauster. Using the bottom exhaust opening keeps ductwork hidden, maximizing room visibility.

❇ **Deep 23.4" interior** easily accommodates large micro and analytical balances.

❇ **Upper dilution air supply** sweeps clean air to the back of sash to keep contaminants away from the operator.




**Ergonomic 20° angled sash** allows a closer view, reduces glare and provides a more comfortable operating position than vertical sashes. The hinged sash pivots upward and locks to a loading height of 19.0". A wiping seal helps to keep contaminants contained.

❇ **Upper containment sash foil** bleeds air into the enclosure to direct concentrations of contaminants away from the operator's breathing zone.

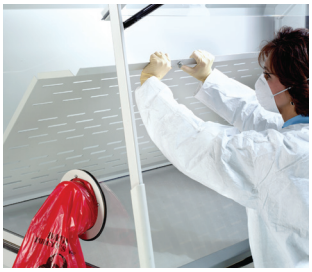
❇ **Side-entry air foils** allow air to sweep across the interior surfaces to enhance containment.

**8.0" high sash opening** limits exhaust demand, conserves costly tempered room air and requires a smaller remote blower than most fume hoods.

❇ **Glacier white and gray powder-coated aluminum frame and steel rear plenum and baffle** dissipate static charge and provide durability and better chemical resistance compared to acrylic models. No unreliable plastic-to-plastic bonding is used.

❇ **Patented** Clean-Sweep™ air foil** allows air to sweep the work surface to maximize containment. Airflow openings pull inflow air from under the air foil so that clean air continually flows through the air foil, creating a constant barrier of protection from contaminants. Its ergonomic design provides a comfortable position for the operator's forearms.

❇ **Patented** rear baffle with zones of perforations** promotes horizontal laminar airflow for maximum containment. The baffle pivots down for cleaning.



**Optional left-side mounted waste chute** isolates contaminated waste in a sealable bag.

Intertek

❇ Labconco exclusive feature

*U.S. Design Patent D567,389
**U.S. Patent 6,461,233

Contact VWR at 1-888-624-2432 for additional sizes and models.

# XPert® Balance Enclosures

## Specifications & Ordering Information

XPert Balance Enclosure **89004-462** is shown with Guardian 1000 Digital Airflow Monitor **82010-706**, FilterMate Portable Exhauster **82010-632**, Black Solid Epoxy Work Surface **82010-692** and Protector Standard Storage Cabinet **46610-470**.

### All models feature:

- ❇ Deep 23.4" interior
- ❇ Ergonomic air foil with aerodynamic Clean-Sweep* airflow openings
- ❇ Upper dilution air supply
- ❇ Upper containment sash foil
- ❇ Zone-perforated, pivoting rear baffle*
- ❇ Side-entry air foils
- ❇ Glacier white and gray, powder-coated aluminum frame and steel rear plenum. No unreliable plastic-to-plastic bonding is used
- ❇ 1/4" thick tempered safety glass front sash, sides and top
- Ergonomic 20° angled and hinged, pivoting sash with wiping seal
- 16.5" sash locking height and 19.0" maximum loading height
- Space saving design to fit easily on existing counters
- Two 1.5" utility ports for pass-through of electrical cords
- ❇ 2" x 10" rectangular exhaust openings at the top and bottom. Cover provided for unused opening
- Particulate containment independently verified by SafeBridge Consultants, Inc.
- Validating package available containing Test Reports, Installation Qualification/Operation Qualification (IQ/OQ) Protocol and Maintenance Log

### All models conform to the following regulations and standards:

- Modified ASHRAE 110 tested
- ANSI Z9.5

### All models require (not included):

- FilterMate Portable Exhauster or remote blower. See page 24
- Work surface. See page 25
- Supporting base. See pages 26 and 27
- Ductwork

### Optional accessories for on-site installation include:

- Fluorescent Lights
- Utility Shelves, Bottle Holder and Tissue Holder
- Transition Adapters
- Waste Chute Bags

| Description | Overall Dimensions (w x d x h) | Interior Dimensions (w x d x h) | Shipping Weight | VWR Cat. No. |
|---|---|---|---|---|
| 2' XPert Balance Enclosure | 24.0" x 29.0" x 22.8" | 22.8" x 23.4" x 22.3" | 105 lbs. | **89004-458** |
| 3' XPert Balance Enclosure | 36.0" x 29.0" x 22.8" | 34.8" x 23.4" x 22.3" | 135 lbs. | **89004-462** |
| 4' XPert Balance Enclosure | 48.0" x 29.0" x 22.8" | 46.8" x 23.4" x 22.3" | 160 lbs. | **89004-466** |

Contact VWR at 1-888-624-2432 for additional sizes and models.

❇ Labconco exclusive feature

*U.S. Patent 6,461,233

# FilterMate™ Portable Exhausters

## Specifications & Ordering Information

An accessory for the XPert Balance Enclosure, the FilterMate uses a HEPA filter, carbon filter or a combination of both filters to remove hazardous powders, particulates or vapors from the exhaust air stream, returning filtered air to the environment.

**To place an order, call 1-888-624-2432 or visit vwr.com.**


### All REDISHIP models feature:

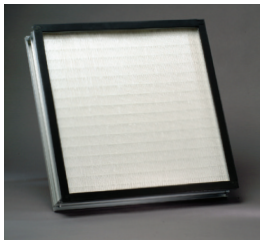
- Compact, corrosion-resistant housing of glacier white and light gray, powder-coated steel with rubber feet
- Variable-speed, non-sparking motorized impeller
- ❇ Quiet operation. Oversized HEPA filter, efficient impeller and perforated exhaust cover work together to provide lower system exhaust velocity and noise pressure levels
- ❇ Inherently safe design. A negative pressure plenum surrounds the positive pressure impeller so that if a leak occurs, the unfiltered air is captured and refiltered
- ❇ Capable of up to 250 CFM for single HEPA/carbon filtration (60-100 fpm depending on enclosure model)
- HEPA filter, 99.99% efficient on particulates 0.3 micron in size is included
- ❇ True bag-in/bag-out filter disposal system for safely removing and replacing the filter without detaching the hose. HEPA filter may be easily accessed by removing the exhaust cover for field leak testing by a certified technician
- Front-mounted rocker switch to control power to the blower
- ❇ Rear-mounted, auxiliary electrical outlet that may be connected to an airflow monitor or other user-supplied accessories
- ❇ Only one FilterMate is required for 2', 3' and 4' wide enclosures
- Includes 8 feet of 5" ID flexible gray polypropylene hose, two clamps and a 4.9" OD Upper Transition Adapter for connection to the top of the XPert Balance Enclosure
- 6' IEC 3-wire electrical cord with plug

| Exhaust CFM | Noise Pressure dB(A) |
|---|---|
| 100 | 45-47 |
| 150 | 51-54 |
| 200 | 56-61 |
| 250 | 63-65 |

### All models conform to the following regulations and standards:

- UL 61010-1
- CAN/CSA C22.2 No. 61010.1

| Description | Overall Dimensions (w x d x h) | Electrical Requirements | Airflow Potential | Exhaust Connection | Shipping Weight | VWR Cat. No. |
|---|---|---|---|---|---|---|
| FilterMate with HEPA Filter Included | 14.0" x 23.0" x 22.7" | 100-115V, 50/60 Hz | 250 CFM (60-100 fpm) | None. Room exhaust. | 50 lbs. | **82010-632** |



**82010-686*—Replacement HEPA Filter.** 99.99% efficient on particles 0.3 micron in size. Not suitable for use with biohazardous materials or volatile organic material. For use with FilterMate Portable Exhausters. Shipping weight 35 lbs.

Contact VWR at 1-888-624-2432 for additional sizes and models.

❇ Labconco exclusive feature

*Not in REDISHIP inventory but is available through VWR with short lead time.

# XPert® Balance Enclosures & Protector® XVS™ Stations

## Accessories

**82010-706—Guardian™ 1000 Digital Airflow Monitor.** Mounts atop XPert Balance Enclosures and Protector XVS Ventilation Stations in factory-prepared location. Monitors and alerts the operator to low airflow conditions. Includes face plate with circuit board, electrical power pack, airflow hose, flow hose adapter and glacier white powder-coated steel casing. LCD displays actual airflow in fpm or m/sec from 0 to 999 fpm (0 to 5.0 m/s). Audible/visual alarm alerts user to sustained low velocity condition. Calibration instructions displayed on LCD. LED lights display red for alarm, yellow for caution, green for normal. Includes temperature-compensated sensor, external alarm, RS-232 port, night setback and alarm mute functions. UL* listed. For 115V, 60 Hz operation. Shipping weight 10 lbs.

**Solid Epoxy Work Surfaces.** Black surfaces are contoured to fit the dimensions of XPert Balance Enclosures, XPert Filtered Balance Systems and Protector XVS Ventilation Stations and dished to contain spills. One inch thick molded solid epoxy is chemical resistant and fire proof.

| Description | Dimensions (w x d x h) | For Use With | Shipping Weight | VWR Cat. No. |
|---|---|---|---|---|
| 2' Solid Epoxy Work Surface | 24.0" x 26.7" x 1.0" | 2' XPert Balance Enclosure, 2' Protector XVS Station | 48 lbs. | **82010-690** |
| 3' Solid Epoxy Work Surface | 36.0" x 26.7" x 1.0" | 3' XPert Balance Enclosure, 3' Protector XVS Station | 72 lbs. | **82010-692** |
| 3' Solid Epoxy Work Surface | 36.0" x 29.0" x 1.0" | 3' XPert Filtered Balance System | 75 lbs. | **82018-190**** |
| 4' Solid Epoxy Work Surface | 48.0" x 26.7" x 1.0" | 4' XPert Balance Enclosure, 4' Protector XVS Station | 96 lbs. | **82010-694** |
| 4' Solid Epoxy Work Surface | 48.0" x 29.0" x 1.0" | 4' XPert Filtered Balance System | 100 lbs. | **82018-192**** |

Contact VWR at 1-888-624-2432 for additional sizes and models.

*UL is a registered trademark of UL, LLC.
**Not in REDISHIP inventory but are available through VWR with short lead times.

# **Protector**® Storage Cabinets

## Standard and Acid Cabinet Specifications

Protector Storage Cabinets support laboratory hoods, ventilation stations and balance enclosures. These durable steel cabinets have attractive glacier white exteriors, which complement laboratory casework. All cabinets can support loads up to 800 pounds and include four leveling feet and one 8" filler panel to increase cabinet depth from 22" to 30". Two 30" cabinets are needed for a 5' wide hood, two 36" cabinets are needed for a 6' wide hood and two 48" cabinets are needed for an 8' wide hood. **To place an order, call VWR at 1-888-624-2432 or visit vwr.com.**

Protector Standard Storage Cabinet **46610-478**

**Protector Standard Storage Cabinets.** May be used for storage of small laboratory instruments and supplies. Versatile and support all Labconco benchtop fume hoods. **A work surface is required (not included).**

**All REDISHIP models feature:**

- Durable powder-coated steel construction
- Dual manual-closing, non-locking doors
- Work surface and interior shelf kits are sold separately through VWR

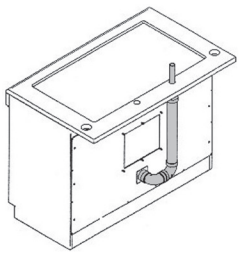
Protector Acid Storage Cabinet **46610-464**

**Protector Acid Storage Cabinets.** Safely store and vent acids and other corrosive liquids. Versatile and support all Labconco benchtop fume hoods. **A work surface is required (not included).**

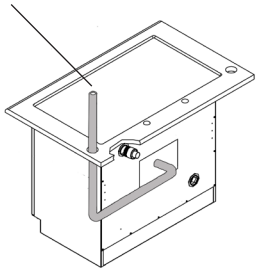
**All REDISHIP models feature:**

- Durable powder-coated steel construction
- Vacuum-formed PVC liner tray
- Two rear vent connection cutouts included for venting the cabinet to a fume hood (Vent Kit 15202-504 sold separately)
- Corrosion-resistant polyethylene-lined interior
- Dual manual-closing, non-locking doors
- Work surface and interior shelf kits are sold separately through VWR

Must connect to negatively pressured duct



Vent Kit for Acid Storage Cabinet **15202-504***



Vent Kit for Solvent Cabinet **89033-090*†**

Contact VWR at 1-888-624-2432 for additional sizes and models.

*Vent Kits are for use with fume hood SpillStopper Work Surfaces only.

†Not available in Canada.

# **Protector**® Storage Cabinets

## Solvent Cabinet Specifications & Ordering Information

Protector Solvent Storage Cabinet **46610-458**

**Protector Solvent Storage Cabinets.** Safely store and vent solvents and other flammable liquids. These cabinets are available with dual manual-closing, non-locking doors or automatic, self-closing doors. Versatile and support all Labconco benchtop fume hoods. **A work surface is required (not included).**

**All REDISHIP models feature:**

- Durable powder-coated steel construction
- Dual-wall construction with 1.5" air gap
- Two rear vent connection cutouts with flame arrestors and closure plugs
- Dual doors
- Key lock included. Doors are manual-closing or self-closing/self-latching with sequencing mechanism. Self-closing doors close automatically in case of fire when temperature reaches 165° F (74° C)
- Work surface is sold separately through VWR

### Protector Storage Cabinets

| Description | Dimensions (w x d x h) | Shipping Weight | VWR Cat. No. |
|---|---|---|---|
| **30" Standard Storage Cabinet** with manual-closing doors | 30.0" x 22.0" x 35.5" to 36.75" | 130 lbs. | **46610-462** |
| **36" Standard Storage Cabinet** with manual-closing doors | 36.0" x 22.0" x 35.5" to 36.75" | 135 lbs. | **46610-470** |
| **48" Standard Storage Cabinet** with manual-closing doors | 48.0" x 22.0" x 35.5" to 36.75" | 150 lbs. | **46610-478** |
| **30" Acid Storage Cabinet** with manual-closing doors | 30.0" x 22.0" x 35.5" to 36.75" | 145 lbs. | **46610-456** |
| **36" Acid Storage Cabinet** with manual-closing doors | 36.0" x 22.0" x 35.5" to 36.75" | 155 lbs. | **46610-464** |
| **48" Acid Storage Cabinet** with manual-closing doors | 48.0" x 22.0" x 35.5" to 36.75" | 170 lbs. | **46610-472** |
| **30" Solvent Storage Cabinet** with manual-closing doors | 30.0" x 22.0" x 35.5" to 36.75" | 195 lbs. | **46610-458*** |
| **36" Solvent Storage Cabinet** with manual-closing doors | 36.0" x 22.0" x 35.5" to 36.75" | 205 lbs. | **46610-466*** |
| **48" Solvent Storage Cabinet** with manual-closing doors | 48.0" x 22.0" x 35.5" to 36.75" | 250 lbs. | **46610-474*** |
| **30" Solvent Storage Cabinet** with self-closing doors | 30.0" x 22.0" x 35.5" to 36.75" | 215 lbs. | **46610-460*** |
| **36" Solvent Storage Cabinet** with self-closing doors | 36.0" x 22.0" x 35.5" to 36.75" | 225 lbs. | **46610-468*** |
| **48" Solvent Storage Cabinet** with self-closing doors | 48.0" x 22.0" x 35.5" to 36.75" | 280 lbs. | **46610-476*** |
| **Vent Kit**, for use with Acid Storage Cabinets | | 5.0 lbs. | **15202-504** |
| **Vent Kit**, for use with Solvent Storage Cabinets | | 5.0 lbs. | **89033-090**** |
| **Filler Panel**, 8" deep | 8.0" d x 35.1" h | 10 lbs. | **89238-200** |
| **Filler Panel**, 14" deep | 14.0" d x 35.1" h | 13 lbs. | **89238-198** |

Contact VWR at 1-888-624-2432 for additional sizes and models.

*Factory Mutual Approved
**Not available in Canada.

# VWR Furniture

**Designed. Delivered. Installed.**

## About VWR Furniture

Building a new lab? Renovating an existing one? The VWR Furniture team can support you before, during and after your installation by offering:

- Comprehensive lab planning assistance
- Complete project supervision from proposal through final installation
- Choice offerings of quality lab furniture and components

Our commitment begins with our team of experienced sales and support staff. This group of professionals is dedicated to supplying original, innovative solutions — on time and within budget.

### VWR Furniture Specialists

Working in coordination with your VWR sales representative, these factory-trained specialists select the most functional and cost-effective solutions for your lab, and oversee the design-to-install process. Call 1-888-624-2432 to identify your VWR Furniture Specialist.

### VWR Furniture Project Estimators

Members of this professionally trained team are available to assist you in identifying your laboratory furniture requirements. Estimators will guide you with value-engineering your project to meet your budget needs. From designed to delivered to installed, they can estimate your cost.

### VWR Furniture Design Specialists

Using the latest Computer Aided Design (CAD) software, VWR's Laboratory Designers create lab plans to your specifications that maximize space usage and comply with all established safety guidelines.

### VWR Furniture Project Coordinators

They will oversee every detail of your job from start to finish. Once your lab is planned, one of the Project Coordinators will manage the ordering, shipping and final installation, handling all project details to your complete satisfaction.

### VWR Furniture Installers

Professional, factory-trained installers deliver quality installations on time. Their thorough knowledge of our furniture components and extensive experience assure a fast, trouble-free finish to your project.

So whether you are renovating an existing lab or planning a new one, the VWR Furniture team can help. Call your VWR Furniture Specialist or the VWR Furniture team (1-888-624-2432) today to get started.

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## VWR Contour Steel Laboratory Furniture is a fresh, clean look for the laboratory.

Aesthetically pleasing and extremely durable, Contour features a full-radius integral pull design on the door and drawer fronts. All the components necessary to build a lab are available through VWR.

avantor™ delivered by VWR™

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