



User's Manual

Protector® Stainless Steel Radioisotope Laboratory Fume Hoods

Models

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*Protecting your
laboratory environment*

LABCONCO®

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Please read the User's Manual before operating the equipment.

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- Blood Drawing Chairs carry a ten year warranty.
- Carts carry a lifetime warranty.
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Contacting Labconco Corporation

If you have questions that are not addressed in this manual, or if you need technical assistance, contact Labconco's Customer Service Department or Labconco's Product Service Department at 1-800-821-5525 or 1-816-333-8811, between the hours of 7:00 a.m. and 6:00 p.m., Central Standard Time.

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CHAPTER 1

INTRODUCTION

Congratulations on your purchase of a Labconco Protector® Stainless Steel Radioisotope Laboratory Fume Hood. The Protector® Radioisotope Laboratory Fume Hood is designed to efficiently ventilate procedures using radiochemicals. It is the result of Labconco's more than 50 years experience in manufacturing fume hoods, and users like you suggested many of its features to us.

The Labconco Protector Stainless Steel Radioisotope Fume Hood has been engineered to provide maximum safety in a laboratory while using low level Alpha and lower level Beta particles, and effectively contain toxic, noxious, or other harmful materials when properly installed. The Protector Radioisotope Hood offers many unique features to enhance safety, performance, and visibility. To take full advantage of them, please acquaint yourself with this manual and keep it handy for future reference. If you are unfamiliar with how fume hoods operate, please review *Chapter 4: Performance Features and Safety Precautions* before you begin working in the fume hood. Even if you are an experienced fume hood user, please review *Chapter 5: Using Your Fume Hood*, which describes your Protector Radioisotope Hood's features so that you can use the hood efficiently.

About This Manual

This manual is designed to help you learn how to install, use, and maintain your laboratory fume hood. Instructions for installing optional equipment on your hood are also included.

Chapter 1: Introduction provides a brief overview of the laboratory fume hood, explains the organization of the manual, and defines the typographical conventions used in the manual.

Chapter 2: Prerequisites explains what you need to do to prepare your site before you install your laboratory fume hood. Electrical and service requirements are discussed.

Chapter 3: Getting Started contains the information you need to properly unpack, inspect, install, and certify your laboratory fume hood.

Chapter 4: Performance Features and Safety Precautions explains how the Protector Radioisotope Hood operates and the appropriate precautions you should take when using the fume hood.

Chapter 5: Using Your Protector Radioisotope Hood discusses the basic operation of your fume hood.

Chapter 6: Maintaining Your Protector Radioisotope Hood explains how to perform routine maintenance on your fume hood.

Chapter 7: Modifying Your Protector Radioisotope Hood explains how to modify the fume hood or add accessories.

Chapter 8: Troubleshooting contains a table of problems you may encounter while using your laboratory fume hood including the probable causes of the problems and suggested corrective actions.

Appendix A: Protector Radioisotope Hood Components contains labeled diagrams of all of the components of the fume hoods.

Appendix B: Protector Radioisotope Hood Dimensions contains comprehensive diagrams showing all of the dimensions for the laboratory fume hoods.

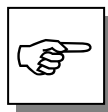
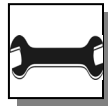
Appendix C: Protector Radioisotope Hood Specifications contains the electrical requirements for laboratory fume hood. Wiring diagrams are also included.

Appendix D: References lists the various resources available that deal with laboratory fume hoods.

Typographical Conventions

Recognizing the following typographical conventions will help you understand and use this manual:

- Book, chapter, and section titles are shown in italic type (e.g., *Chapter 3: Getting Started*).
- Steps required to perform a task are presented in a numbered format.
- Comments located in the margins provide suggestions, reminders, and references.



- Critical information is presented in boldface type in paragraphs that are preceded by the exclamation icon. Failure to comply with the information following an exclamation icon may result in injury to the user or permanent damage to fume hood.
- Critical information is presented in boldface type in paragraphs that are preceded by the wrench icon. These operations should only be performed by a trained certifier or contractor. Failure to comply with the information following a wrench icon may result in injury to the user or permanent damage to your hood.
- Important information is presented in capitalized type in paragraphs that are preceded by the pointer icon. It is imperative that the information contained in these paragraphs be thoroughly read and understood by the user.
- A number icon precedes information that is specific to a particular model of laboratory fume hood. The 4' icon indicates the text is specific to the 4-foot wide model. The 5' icon indicates the text is specific to the 5-foot model, etc.
- The S icon indicates the text is specific to the standard model.
- The A icon indicates the text is specific to the A-Style Combination Sash Model.

Your Next Step

If your Fume Hood needs to be installed, proceed to *Chapter 2: Prerequisites* to ensure your installation site meets all of the requirements. Then, go to *Chapter 3: Getting Started* for instructions on how to install your laboratory fume hood and make all of the necessary connections.

If you would like to review how laboratory fume hoods operate, go to *Chapter 4: Performance Features and Safety Precautions*.

For information on the operational characteristics of your laboratory fume hood, go to *Chapter 5: Using Your Protector Radioisotope Hood*.

If your laboratory fume hood is installed and you need to perform routine maintenance proceed to *Chapter 6: Maintaining Your Protector Radioisotope Hood*.

For information on making modifications to the configuration of your fume hood, go to *Chapter 7: Modifying Your Laboratory Fume Hood*.

Refer to *Chapter 8: Troubleshooting* if you are experiencing problems with your fume hood.

CHAPTER 2

PREREQUISITES

Before you install your laboratory fume hood, you need to prepare your site for installation. Carefully examine the location where you intend to install your hood. You must be certain that the area is level and of solid construction. In addition, a dedicated source of electrical power must be located near the installation site.

Carefully read this chapter to learn the requirements for your installation site:

- The location requirements.
- The support requirements.
- The exhaust requirements.
- The optional filter pack requirements.
- The electrical power requirements.
- The service line requirements.
- The space requirements.

Refer to *Appendix B: Protector Radioisotope Hood Dimensions* for complete fume hood dimensions.

Refer to *Appendix C: Protector Radioisotope Hood Specifications* for complete laboratory fume hood electrical and environmental conditions, specifications and requirements.

Location Requirements



The fume hood should be located away from traffic patterns, doors, windows, fans, ventilation registers, and any other air-handling device that could disrupt its airflow patterns. All windows in the room should be closed.

Support Requirements



DO NOT install the fume hood on a cart, dolly, or mobile bench. **ALL Protector Radioisotope Hood installations must be permanent and stationary.** The supporting structure usually consists of a base cabinet and supporting work surface.

Exhaust Requirements

The exhaust duct connection has been designed for 11" nominal duct (11.00" OD) to allow for minimum static pressure loss while operating at 100 fpm face velocities. The 11" diameter exhaust duct also allows for proper transport velocities away from the hood in the 1000 fpm to 2500 fpm range. The proper exhaust volume and static pressure loss are listed next for each hood model:

Hood Size	Standard Model Description	Full Open 28" Sash Opening		
		Face Velocity	Exhaust Volume	Static Pressure Loss
4'	48" Protector Radioisotope Hood	100 fpm	730 CFM	0.20" H ₂ O
5'	60" Protector Radioisotope Hood	100 fpm	960 CFM	0.30" H ₂ O
6'	72" Protector Radioisotope Hood	100 fpm	1180 CFM	0.50" H ₂ O
8'	96" Protector Radioisotope Hood	100 fpm	1660 CFM	0.26" H ₂ O

Proper blower selection can be determined from these exhaust requirements and the total system static pressure loss. Contact Labconco Customer Service for assistance in sizing a remote blower system.

Filter Pack Requirements

Contact your local EPA or NRC office to determine if exhaust filtration is required. If required, these filter packs should be located as close as possible to the hood to expose as little of the ductwork system as possible to the radiochemicals being filtered. Consult your Safety Officer directly for specific filter ratings on radiochemicals being used.

Electrical Requirements

The Protector Radioisotope Hood models feature internal wiring for the fluorescent light assembly and light switch. All internal wiring is terminated at the single point wiring junction box for hook-up by a qualified electrician. The blower switch, and light switch wires are also terminated at the single point wiring junction box for hook-up by a qualified electrician. Refer to *Chapter 3: Getting Started* and *Appendix C: Protector Radioisotope Specifications* for the wiring diagram for proper electrical installation.

Service Line Requirements

All service lines to the laboratory fume hood should be $\frac{1}{4}$ inch outside diameter, copper (brass for natural gas), and equipped with an easily accessible shut-off valve, should disconnection be required. If the service line pressure exceeds 40 PSI, it must be equipped with a pressure regulator to reduce the line pressure.

Space Requirements

The dimensions for the different models are shown in *Appendix B: Protector Radioisotope Hood Dimensions*.

Your Next Step

After you have determined that the location you have selected accommodates the installation and operational requirements of your fume hood, you are ready to begin installation. Proceed to *Chapter 3: Getting Started*.

CHAPTER 3

GETTING STARTED

Now that the site for your laboratory fume hood is properly prepared, you are ready to unpack, inspect, install, and certify your unit. Read this chapter to learn how to:

- Unpack and move your Protector Radioisotope Hood.
- Set up the fume hood with the supporting structure and work surface.
- Connect to an exhaust system.
- Connect the optional filter packs to the exhaust system (not sold through Labconco).
- Connect the electrical supply source.
- Connect the service lines.
- Seal the Protector Radioisotope Hood to the hardboard support (included).
- Arrange certification of your Protector Radioisotope Hood.

Depending upon which model you are installing, you may need common plumbing and electrical installation tools in addition to 5/16", 3/8", 7/16", and 1/2" wrenches, ratchets, sockets, a nut driver set, a flat-blade screwdriver, a Phillips screwdriver, and a carpenter level to complete the instructions in the chapter.



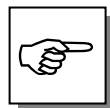
The Protector Radioisotope Hood models weigh between 500 to 700 lbs. (227-318 kg). The shipping skid allows for lifting with a mechanical lift

truck or floor jack. If you must lift the fume hood manually, follow safe-lifting guidelines. Normally, the fume hood can be slid off a hydraulic lift table and be placed into position on top of the hardboard support. Do not lift by the front air foil.

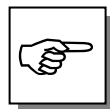
Unpacking Your Laboratory Fume Hood

The United States Interstate Commerce Commission rules require that claims be filed with the delivery carrier within fifteen (15) days of delivery.

Carefully remove the shrink-wrap or carton on your fume hood and inspect it for damage that may have occurred in transit. If your unit is damaged, notify the delivery carrier immediately and retain the entire shipment intact for inspection by the carrier.



DO NOT RETURN GOODS WITHOUT THE PRIOR AUTHORIZATION OF LABCONCO. UNAUTHORIZED RETURNS WILL NOT BE ACCEPTED.



IF YOUR HOOD WAS DAMAGED IN TRANSIT, YOU MUST FILE A CLAIM DIRECTLY WITH THE FREIGHT CARRIER. LABCONCO CORPORATION AND ITS DEALERS ARE NOT RESPONSIBLE FOR SHIPPING DAMAGES.

Do not discard the shipping skid or packing material for your fume hood until you have checked all of the components and installed and tested the unit.

Do not remove the fume hood from its shipping skid until it is ready to be placed into its final location. Move the unit by placing a flat, low dolly under the shipping skid, or by using a floor jack.



Do not move the hood by tilting it onto a hand truck.

Removing the Shipping Skid



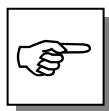
LEAVE THE FUME HOOD ATTACHED TO ITS SHIPPING SKID UNTIL IT IS AS CLOSE TO ITS FINAL LOCATION AS POSSIBLE. MOVE THE HOOD BY USING A SUITABLE FLOOR JACK, OR BY PLACING A FURNITURE DOLLY UNDERNEATH THE SKID. DO NOT MOVE THE HOOD BY TILTING IT ONTO A HAND TRUCK.

After you verify the fume hood components, move your hood to the location where you want to install it. Then, follow the steps listed next to remove the shipping skid from your unit.

1. Remove the side panels by unscrewing the Phillips screws.
2. Find the hardware (bolts, washers, nuts) that attach the fume hood to the skid and remove the hardware. Some hardware is on the sides and some is on the back.

Sash Weight Release

To protect the fume hood from damage in shipment, the sash weight has been secured to the back of the fume hood with four (4) screws. Simply remove the screws and make sure the sash cables are on the pulleys before operating the sash. On models with more than one sash, the sash weights have been secured to the shipping skid with lag screws. Remove the weights from the skid and attach them to the respective sash cables using the hooks provided.



NOTE: THE SASH WEIGHT SIZED WAS FOR THIS SPECIFIC HOOD AND SHOULD NOT BE EXCHANGED ON ANY OTHER HOOD.

Install the Protector Radioisotope Hood on a Supporting Structure and Hardboard Support



The Protector Radioisotope Hood is heavy! Use caution when lifting or moving the unit.

When installing the Protector Radioisotope Fume Hood onto the hardboard support or benchtop, ensure that the structure can safely support the combined weight of the fume hood and any related equipment. The support should be at least as wide as the hood to properly support it. **The support is mounted flush with the back of the fume hood; this will provide the correct spacing under the air foil for proper bypass airflow.**



WARNING: It is important to support the rear of the work surface and fume hood. The cross support provides support for the bottom of the work surface. Install the cross support after the base cabinets and work surface are leveled and before installing the hood.

The following are instructions for mounting a cross support, and installing the hardboard support:

1. Level the base cabinets and the hardboard support surface. Hardboard surface should be placed flush with the back of the fume hood as shown in Figure 3-2.
2. Scribe a line on the wall or back of the base cabinet to locate the cross support under the hardboard surface.
3. Mount the support by attaching it to the wall or base cabinet.

4. Anchor cabinet(s) with seismic restraints if required by the local code in your area.

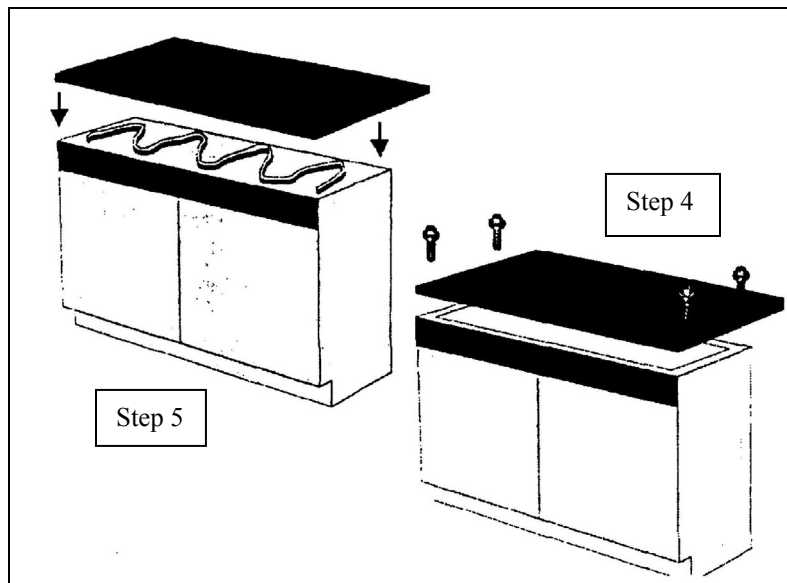


Figure 3-1

5. Secure the hardboard to the top of the base cabinet(s) using adhesives with the Solvent Storage Cabinets(s) or mechanical fasteners with the Acid Storage Cabinet(s). Figure 3-1
6. After completing step 5, apply a sufficient quantity of adhesive to the top surface of the hardboard.
7. Place the hood on top of the work surface and cross support.
8. First wrap the weights to protect the hood's hardboard surface. Place heavy weights on the inside of the fume hood for approximately 24 hours. This provides a proper bond of the adhesive.

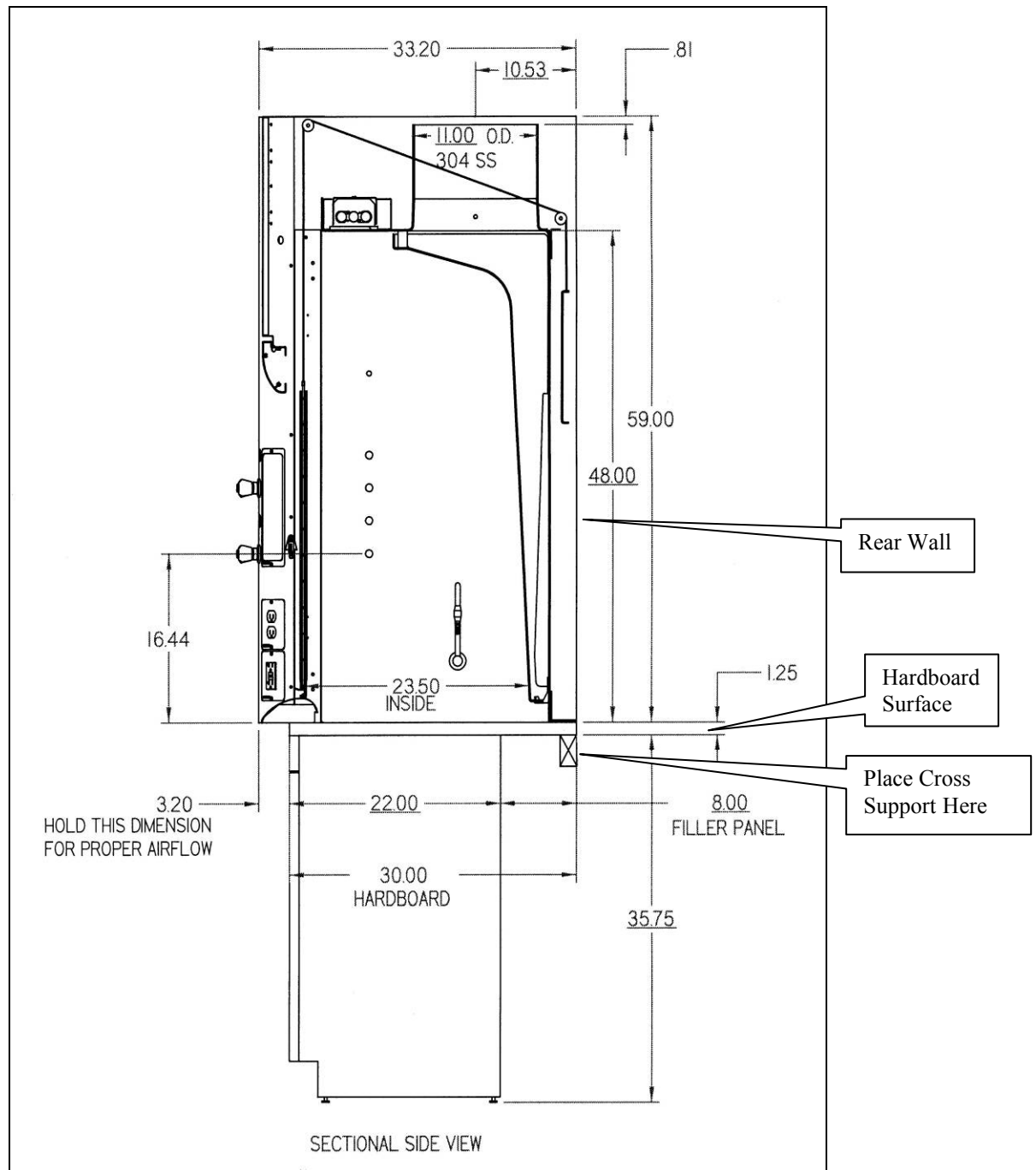


Figure 3-2

Connecting the Protector Radioisotope Hood Exhaust System



WARNING: The weight of the stainless steel exhaust ductwork system must be supported independently of the hood superstructure. Do not allow this weight to be supported by the hood structure as damage to the hood may occur.



The stainless steel exhaust connection should be installed by a qualified HVAC contractor.

The exhaust connection on your hood has been designed for 11" nominal pipe (11.00" OD) to allow for minimum static pressure loss with proper transport velocities away from the hood. Consult Labconco Customer Service should you require help sizing your blower for the exhaust volume and total system static pressure loss.



The selected exhaust duct material must be fabricated out of type 304 stainless steel, or type 1 unplasticized polyvinyl chloride (PVC) material. The duct should be fully welded in the case of the stainless steel material or solvent bonded in the case of (PVC) so that it does not feature any cracks or holes to allow for the collection of radiochemicals.

Connecting to the Optional Filter Packs

Both HEPA (High Efficiency Particulate Air) and activated carbon filter pack assemblies are available for use with the Protector Radioisotope Hood. Please contact your local EPA or NRC office for

manufacturers of exhaust filters appropriate for use with radio-chemicals. The HEPA filter assembly can be used to remove most particulate forms of radio-chemicals being used today. The activated carbon filter is used in the removal of gaseous form radiochemicals and can be used in conjunction with the HEPA filter, depending on the materials being used inside the fume hood. The filters themselves should be located as close as possible to the hood to expose as little of the ductwork system as possible to the radiochemicals being used. Consult your company Safety Officer directly for specific filter ratings on radiochemicals being used.



IMPORTANT WARNING: Used filters contain hazardous material. Observe all federal, state and local EPA regulations for their handling and disposal.

Connecting the Electrical Supply Source to the Protector Radioisotope Fume Hood

Prior to connecting any electrical wiring to the fume hood structure, refer to the hood identification plate for the proper electrical requirements of your specific model.



WARNING: The building electrical supply system for Protector Radioisotope Hoods should include overload protection. A switch or circuit breaker should be in close proximity to the equipment and within easy reach of the operator. The switch or circuit breaker is to be marked as the disconnecting device for the equipment. Consult the NEC-2002 for proper installation.

The identification plate, model number, serial number, and electrical connection boxes are accessible from the front of the fume hood by removing the front panel. An additional I.D. label is located on the sash.

The Protector Radioisotope Hood is wired for 115 Volt, 60 Hz, 20 Amp or 230 Volt, 50 Hz, 10 Amp electrical service. Check the I.D. plate behind the front panel for voltage verification. The number of circuits varies depending on the model. All of the electrical connections are terminated at the single point internal junction box for connection by a qualified electrician. See Figure 3-3. The single point internal junction box is used for the connection of the lights, blower, and duplex outlets. Refer to the wiring diagram for your Protector Radioisotope in *Appendix C: Protector Radioisotope Fume Hood Specifications*.

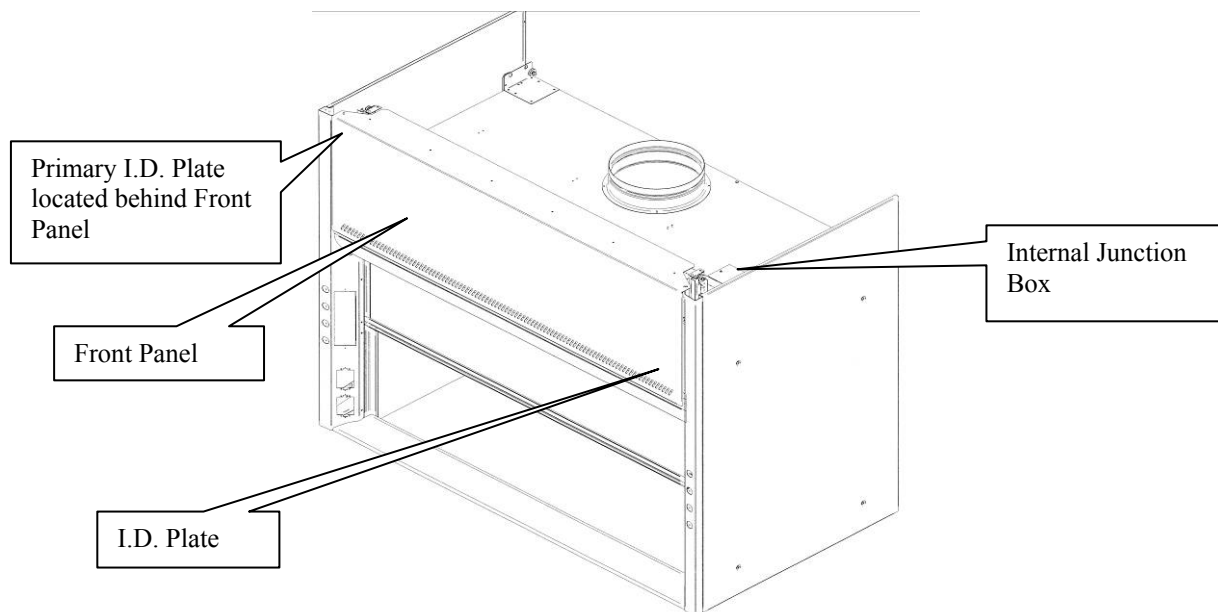


Figure 3-3



All wiring for the fume hood SHOULD be performed by a licensed electrician and conform to all local codes. In most cases, the hood will require the use of shielded conduit to protect the wiring into the hood. The grounding connection shall not be made to the terminal box cover.

The fluorescent light has been mounted outside the top liner panel and is sealed from vapors inside the hood structure. To change the fluorescent light bulbs in your hood, you must first remove the front panel from the hood. Next remove knock out plugs holding the light fixture in place. Lift fixture up and replace any defective bulbs. Reverse order to reassemble.

Connecting the Service Lines to the Protector Radioisotope Fume Hood

The hoods with service fixtures have been plumbed from the valve to the hose connector or gooseneck for your installation convenience. Supply tubing shall be provided by the qualified installer. Tubing can enter the hood from above, through the back, or through the work surface to make these connections to the service fixtures.



NOTE: Inspect all fittings for leakage. Tighten the fittings slightly if needed.



CAUTION: Do not use oxygen with any standard service fixture. Contact Labconco Customer Service for oxygen fixture information.

Should access to the hood plumbing fixture bodies be required, remove the service access plate on the hood front corner posts by loosening their individual screws. (See item 11 Figure A-1, page 50 and page 51). The valve body will now be fully exposed for any service work that may be necessary. The service fixtures supplied on your laboratory hood are designed for use with the following services:

- Air
- Cold Water
- Hot Water
- Natural Gas – See Caution Below
- Vacuum



WARNING: Contact Labconco Customer Service before using any service other than those listed above in these valves to assure full compatibility.



CAUTION: Natural gas should be used only in the service fixture that has been pre-plumbed with brass tubing. Sulfur content of the gas could cause deterioration of standard copper supply lines.

Certifying the Protector Radioisotope Fume Hood

The combination of your laboratory hood, exhaust ductwork, and exhaust blower gives you the flexibility to change the airflow at the sash opening of your hood. To determine the actual face velocity at the sash opening, airflow velocity readings will need to be taken. This should be done across the sash opening of the hood in accordance with the *Industrial Ventilation Manual* section on laboratory hoods. (See Appendix D – Reference) Labconco recommends an average face velocity at the sash opening of 80 to 100 feet per minute. Consult Labconco Customer Service for proper airflows for your particular model.

Your Protector Radioisotope Fume Hood has been tested at the factory per ASHRAE 110-1995. All hoods achieve an “as manufactured rating” of less than 0.10 part per million (ppm) at 4 liters per minute (lpm); AM <0.10 (Consult Labconco for individual fume hood ratings.) For “field use” ASHRAE testing contact the Labconco Ventilation Ventures Team or Customer Service for the name of a certified on-site contractor.



NOTE: Face velocity profiles and smoke testing should be done periodically to ensure safe performance.

Your Next Step

After your fume hood has been installed and certified, you are ready to proceed to *Chapter 4: Performance Features and Safety Precautions*.

CHAPTER 4

PERFORMANCE

FEATURES AND

SAFETY PRECAUTIONS

Performance Features:

The Protector Radioisotope Laboratory Hood has been engineered to provide you the maximum in work area and personal safety. The by-pass air configuration on the Radioisotope Fume Hood is totally dependent on air being supplied to the hood from its surrounding environment for proper operation.

The hood itself is designed to handle radiochemical operations of all types. The hood liner should be decontaminated manually by the operator. Water washdown or flooding the surface with water is standard practice and results in about 50% reduction of contamination on the 304 stainless steel liner material. A secondary means of surface decontamination involves the use of organic solvents that can result in reduction a of contamination of up to 75%.

Even though the stainless steel seams are smooth to the touch, there are microscopic voids within the surface in which radioactive particles can lodge and are not easily removed by the above mentioned surface decontamination procedures. Abrasion decontamination, which consists of sanding and/or scouring may be required to dislodge these particles from your hood liner.

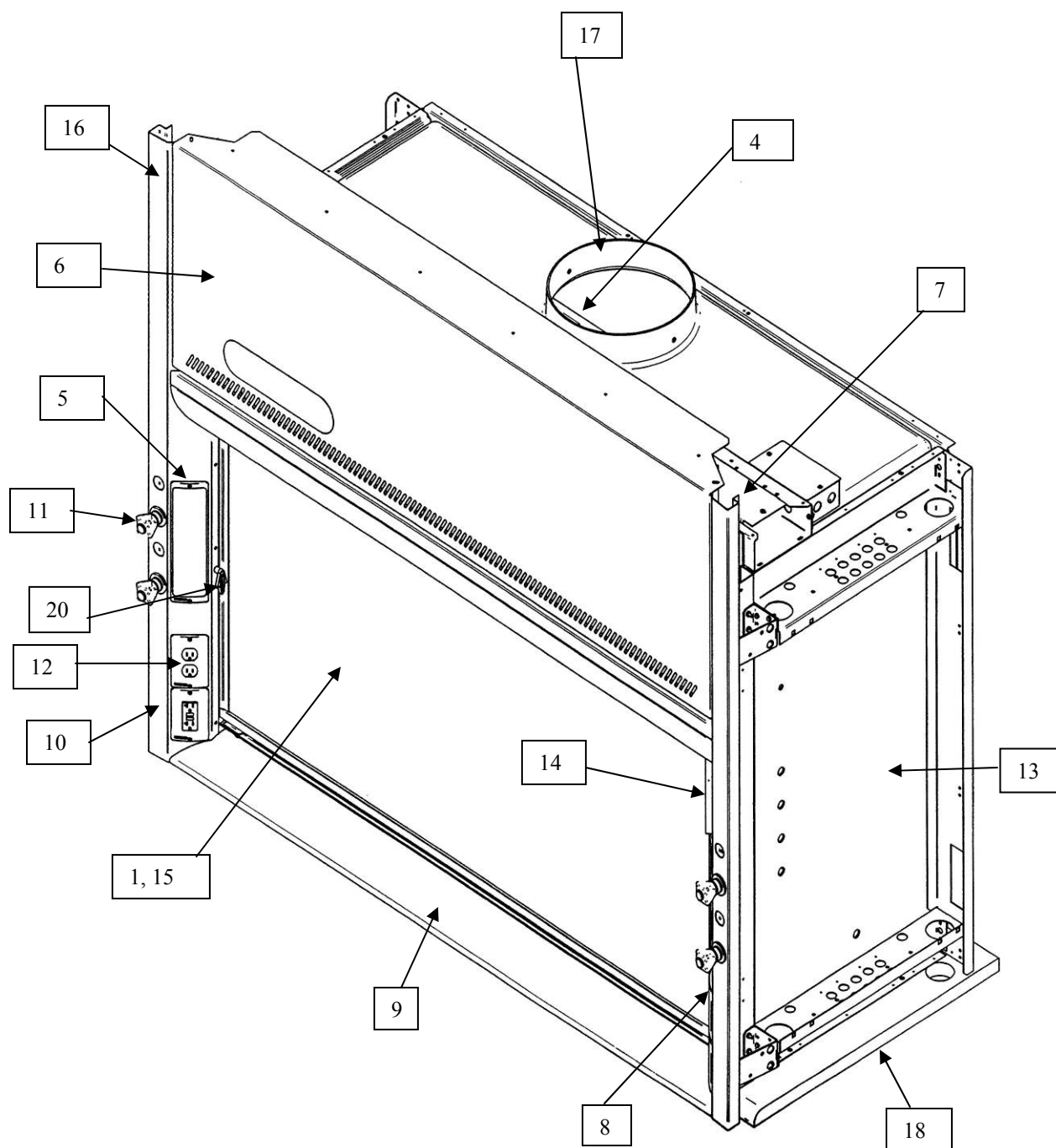
Radioisotope materials are, in essence, high-energy particles with different levels of intensity. These levels are, alpha, beta, and gamma. Radioactive particles do not just simply strike a barrier and bounce off, but rather are absorbed by the barrier and physical decomposition on the molecular level can occur. In the case of the alpha and some lower level beta radiation particles, human skin can act as an effective barrier to this radiation without damage to the underlying tissues.

However, in the case of inhalation, low-level emitters can attack inner organ tissues posing a health hazard. Therefore, it is very important in cases even where these low level type emitters are being used that effective sources of ventilation be provided.

The radioisotope hood's stainless steel liner material is intended for use with alpha particles, which are least hazardous, and for most beta type particles, which have a slightly higher mass and consequently feature a higher velocity requiring more shielding than the alpha particles. The gamma emitter particles have no mass but an extremely high velocity. Therefore, they are not easily absorbed and are not normally used within this hood enclosure unless it has been properly lined with lead blocks and a lead glass sash assembly. Consult with your company safety officer for additional safety procedures dealing with your specific materials, before operating this hood.

1. **Unique sash provides maximum visibility of 32.15" high while conserving energy by limiting sash travel to 28"**. Vertical-rising sash may be raised from a closed to 28" operating height. Exhaust volume and blower sizing is based on the 28" height. Optional sash stops are available to limit sash height and reduce energy usage.
2. **By-pass airflow design** ensures relatively stable face velocities.
3. **Large usable interior work depth and interior height of 48"** provides ample working space.
4. **Baffle** directs airflow to the rear of the interior to provide efficient airflow. The baffle may be removed for cleaning purposes only.
5. **Exterior access cover plates** are removable for easy access to plumbing valves when access through the sides is not available.
6. **Lift-Away™ front panel** provides easy access to electrical wiring, sash weights, and lighting fixtures.
7. **Energy efficient fluorescent lighting** is located behind a laminated safety glass shield mounted to the top of the hood. The factory wired light is serviceable from outside the hood cavity.
8. **Low mounted, factory wired light and blower switches** are ADA compliant.
9. **Clean-Sweep™ Air Foil** allows air to sweep the work surface for maximum containment.
10. **Streamlined corner posts** provide maximum visibility and the flexibility to add services; services are most easily added at the factory, because of the stainless steel liner.
11. **All hoods are factory prepared for up to 8 service fixtures**. Additional fixtures are available only as a factory special. Hole drilling is required to add another fixture in the field.
12. **One duplex electrical receptacle** is mounted on the right corner post. Receptacles are factory

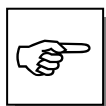
- wired to hood single point junction box.
Additional electrical receptacles are available as factory or field installed.
13. **Type 304 stainless steel interior liner** is one-piece stainless, non-reactive type 304 stainless steel with coved interior corners and integral work surface bottom.
 14. **Accessory Guardian™ Digital Airflow Monitor** or **Guardian Jr. Monitor** continuously monitors face velocity. An audio/visual alarm alerts the user to low airflow conditions. The right corner post is factory prepared to accommodate the Guardian Monitor (sold separately).
 15. **Optional energy reducing A-Style combination sash models.** These combination sashes allow the operator to use the hood with sashes either half open vertically or horizontally to conserve energy. Optional sash stops prevent raising the vertical sash above the half-open and fully closed positions unless manually defeated by the operator.
 16. **Outside frame of epoxy coated steel and galvanized steel** is durable and corrosion resistant.
 17. **Exhaust connection.** The hood features 11" (11.0" OD pipe) 304 stainless steel exhaust connections sized to allow for a minimum static pressure loss through the hood structure while providing a good transport velocity through the exhaust system.
 18. **Solid hardboard support** provided to support the integral stainless steel work surface bottom.
 19. **Optional ceiling enclosure kits** are available for a decorative facade between the hood and the ceiling.
 20. **Optional sash stops** provide a means of controlling the operating height of the sash.



Safety Precautions



Although the laboratory hood has been engineered to maintain optimum operator safety, caution should always be used while working in the hood. Prior to using the hood, check to make sure that the exhaust blower is operating and that air is entering the hood at its specified face velocity.



USE GOOD HOUSEKEEPING IN THE HOOD AT ALL TIMES. CLEAN UP SPILLS IMMEDIATELY WITH A MILD DETERGENT. PERIODICALLY CLEAN HOOD INTERIOR, INCLUDING FLUORESCENT LIGHT GLASS PANEL. REPLACE BURNED OUT LIGHT BULBS TO MAINTAIN MAXIMUM ILLUMINATION.

DO NOT OVERLOAD THE WORK SURFACE WITH APPARATUS OR WORK MATERIAL. THE SAFE OPERATION OF THE LABORATORY HOOD IS BASED UPON HAVING PROPER AIRFLOW THROUGH THE STRUCTURE. DO NOT PLACE LARGE, BULKY OBJECTS SUCH AS BLOCK HEATERS, DIRECTLY ON THE HOOD WORK SURFACE. INSTEAD, PLACE THE OBJECT ON BLOCKS UP 2" TO 3" TO ALLOW A FLOW OF AIR UNDER THE OBJECT AND INTO THE LOWER REAR BAFFLE EXHAUST SLOT. ENSURE BLOCKS ARE LEVEL AND SECURED IN PLACE.



Blocking the bottom of the baffle at rear of hood will change the airflow pattern in the hood causing turbulence and possible leakage at the face of the hood. (Don't store containers or supplies against baffles, as this will affect airflow through the hood.)

Never place your head inside hood. Keep hands out of hood as much as possible.

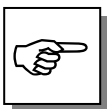
Always work as far back in hood as possible. It is best to keep all chemicals and apparatus 6" inside the front of the hood.

This hood does not feature explosion-proof electrical components, unless ordered separately. Therefore, use of flammable or explosive materials in quantities above the explosive limit are not recommended.

Do not work with chemicals in this hood without the exhaust system running. Do not store chemicals in a fume hood.

Perchloric acid use in this hood is not recommended.

High-level radioisotope materials are not recommended for use in this hood. Only use low-level alpha and lower level beta radiochemical particles.



AVOID CROSS DRAFTS AND LIMIT TRAFFIC IN FRONT OF THE HOOD. AIR DISTURBANCES CREATED

MAY DRAW FUMES OUT OF THE HOOD.



The use of heat generating equipment in this hood without the exhaust system operating properly can cause damage to the hood.



The Protector Radioisotope Laboratory Hood should be certified by a qualified certification technician and safety officer before it is initially used. The hood should be re-certified whenever it is relocated, serviced or at least annually thereafter.

Ensure that the unit is connected to electrical service in accordance with local and national electrical codes. Failure to do so may create a fire or electrical hazard. Do not remove or service any electrical components without first disconnecting the hood from electrical service.

Proper operation of the fume hood depends largely upon the hood's location, the hood's installation, and the operator's work habits. Consult the *Reference Manual in Appendix D*.

Your Next Step

After you understand the theory of operation and safety precautions, you are ready to proceed to *Chapter 5: Using Your Protector Radioisotope Fume Hood*.

CHAPTER 5

USING YOUR

PROTECTOR

RADIOISOTOPE

FUME HOOD

Operating the Vertical-Rising Sash

A small square box with a thick border containing the letter 'S' in a bold, sans-serif font.

Because of the Protector Radioisotope Hood's counterbalanced sash mechanism, it will take only a few pounds of force to move the sash up or down, and you can operate the sash smoothly with one or two hands positioned along the handle. The vertical-rising sash may be raised to a maximum 28" operating height. The airflow requirements should be sized for the 28" operating height; if using sash stops then the airflow requirements can be reduced by approximately 40% at 18" or approximately 50% at 15".

A

Operating the A-Style Combination Sash

Optional hood models have additional energy saving sashes called A-style combination sashes in place of vertical-rising sashes. These combination sashes allow the operator to use the hood with sashes either half open horizontally or vertically to conserve energy. The horizontal sashes are used in normal operating mode. Optional sets of sash stops can be installed to prevent raising the vertical sash above the half-open and fully closed positions unless manually defeated by the operator. The airflow requirements are sized for the 50% open sash condition.

S

A

Operating the Blower

Your Protector Radioisotope Fume Hood utilizes a remote style blower, which can be activated by turning the blower switch to “ON.” You can validate the hood performance by watching smoke drawn into the hood face opening.

S

A

Operating the Lights

Your Protector Radioisotope Fume Hood utilizes a factory-wired fluorescent light to illuminate the hood interior. Simply turn the light switch to “ON” to operate.

Working in your Protector Radioisotope Fume Hood

Planning

- Thoroughly understand procedures and equipment required before beginning work.
- Arrange for minimal disruptions, such as room traffic or entry into the room while the hood is in use.

Start-up

- Turn on fluorescent light and hood blower.
- Slowly raise the sash.
- Check the baffle air slots for obstructions.
- Allow the hood to operate unobstructed for 5 minutes.
- Wear a long sleeved lab coat and rubber gloves. Use protective eyewear. Wear a protective mask if appropriate.

Loading Materials and Equipment

- Only load the materials required for the procedure. Do not overload the hood.
- High-level radioisotope materials (gamma particles) are not recommended for use in this Radioisotope Hood. Only use low-level alpha, lower level beta radioactive particles, and gaseous radioisotopes. Consult your Safety Officer should you have any questions.
- Do not obstruct the front air foil, or rear baffle slots.
- Large objects should not be placed close together and spaced above the work surface bottom to permit airflow to sweep under the equipment.
- After loading the hood, wait one minute to purge airborne contaminants from the work area.

Work Techniques

- Keep all materials at least 6 inches inside of the sash, and perform all contaminated operations as far to the rear of the work area as possible. Segregate all clean and contaminated materials in the work area.
- Avoid using techniques or procedures that disrupt the airflow patterns of the hood.

Final Purging

- Upon completion of work, the hood should be allowed to operate for two to three minutes undisturbed, to purge airborne contaminants from the work area before shutting down blower.

Unloading Materials and Equipment

- Objects in contact with contaminated material should be surface decontaminated before removal from the hood.
- All open trays or containers should be covered before being removed from the hood.

Final Decontamination

- Water washdown or flooding the surfaces with water is standard practice and results in about 50% reduction of contamination on the 304 stainless steel liner material due to radiochemicals.
- A secondary means of surface decontamination involves the use of organic solvents that can result in up to 75% reduction of contamination due to radiochemicals.
- Even though 304 stainless steel seams are smooth to the touch, there are microscopic voids within the surface in which radioactive particles can lodge and are not easily removed except by abrasion decontamination. Abrasion decontamination consists of sanding and/or scouring operations to dislodge radioactive particles from the stainless steel hood liner.

Shutdown

- Only turn off the fluorescent light and hood blower if final decontamination is complete, and then close the sash.

Your Next Step

After you understand how to operate and work in the fume hood, you are ready to proceed to *Chapter 6: Maintaining Your Protector Radioisotope Fume Hood*.

CHAPTER 6

MAINTAINING YOUR PROTECTOR RADIOISOTOPE FUME HOOD

Now that you have an understanding of how to work in the fume hood, we will review the suggested maintenance schedule and the common service operations necessary to maintain your fume hood for peak performance.



Only trained and experienced certification technicians should perform some of the service operations after the fume hood has been properly decontaminated. DO NOT attempt to perform these operations if you are not properly trained. The wrench icon precedes the service operations that require qualified technicians.

Routine Maintenance Schedule

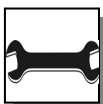
Weekly

- Using ordinary dish soap to clean the surface inside of the fume hood, and the work surface.
- Using an appropriate glass cleaner, clean the sash and all glass surfaces.
- Operate the fume hood blower, noting the airflow velocity through the hood using a source of visible smoke.
- Decontaminate 304 stainless steel surfaces (if used daily) from radiochemicals as outlined in Chapter 5 Final Decontamination.



Monthly (or more often as required)

- Determine the actual face velocity through the sash opening of the hood where the average reading should be at the specified velocity. (Use calibrated thermal anemometer or other approved apparatus).
- Using a damp cloth, clean the exterior surfaces of the hood, particularly the front of the hood, to remove any accumulated dust.
- Check all service valves, if so equipped, for proper operation.
- The hood baffle should be checked for blockages behind it to ensure that the hood is maintaining proper airflow.
- All weekly activities.



Annually

- Replace the fluorescent lamps.
- Have the fume hood recertified by a qualified certification technician. See *Certifying the Protector Radioisotope Fume Hood* in Chapter 3.
- All monthly activities.

Biannually

- The sash assembly should be checked to ensure proper operation and to make sure there are no signs of abnormal wear on the sash pulleys, cables and clamps.

Routine Service Operations

Front Panel Removal:

1. Simply lift the front panel up and then away from the hood to provide access to the top.

Changing the Fluorescent Lamp:

1. Turn light switch to “OFF.”
2. Remove the front panel as noted earlier.
3. Reach over the front header of the hood and remove the knock out plugs at both ends of fixture. Lift fixture up.
4. Remove the fluorescent lamp by pushing it out of the spring-loaded lamp socket and swinging it out of the other lamp socket.
5. Install the new lamp by reversing the removal procedure.



Your Next Step

After you understand the maintenance procedures, you are ready to proceed to *Chapter 7: Modifying Your Protector Radioisotope Fume Hood*.

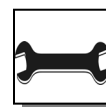
CHAPTER 7

MODIFYING THE PROTECTOR RADIOISOTOPE FUME HOOD

There are several ways to modify the fume hood for your individual requirements. These include the addition of service fixtures, air monitor, distillation grids, electrical duplex outlets, ceiling enclosures, and rear panels.

Installing Hardboard Support

Your Protector Radioisotope Fume Hood includes a hardboard support for the support of the one-piece stainless steel liner. The hardboard support is shipped and included with the Radioisotope Fume Hood. Be sure to secure the hardboard support per the instructions on pages 14 and 15 in Chapter 3.





Installing Ceiling Enclosures above the Fume Hood

The Protector Radioisotope Fume Hood has mounting holes to accept a ceiling enclosure to close off the area between the top of the hood and the ceiling. Contact Labconco Customer Service for ordering information.

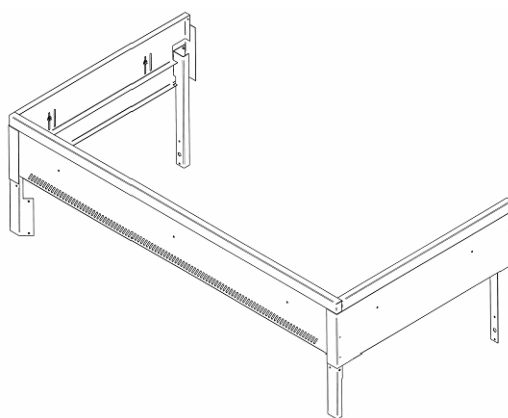
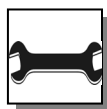


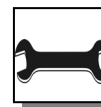
Figure 7-1



Installing Rear Panels Behind the Fume Hood

The Protector Radioisotope Fume Hood can be modified to add a rear panel behind the fume hood when the fume hood is placed on an island. Contact Labconco Customer Service for ordering information.

Installing Additional Service Fixtures



Additional service fixtures can be installed. The fume hood is factory set to accept up to four valves per side, but the liner is not drilled for extra fixtures. Contact Labconco Customer Service for information.



Figure 7-2 - Knob

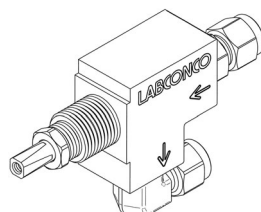


Figure 7-3 - Valve

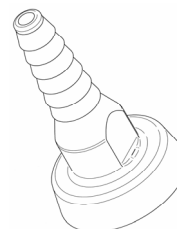
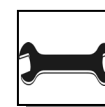


Figure 7-4 – Stainless Connectors

Installing Guardian™ Digital Airflow Monitor or Guardian™ Jr. Airflow Monitor



The Guardian Digital Airflow Monitor P/N 9743211 continuously monitors face velocity through the fume hood opening. The Guardian Jr. Airflow Monitor P/N 9743202 continuously monitors airflow through the exhaust. The fume hood right corner post is factory prepared to mount either monitor. Contact Labconco Customer Service to order.

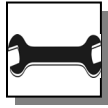


Figure 7-5



Figure 7-6

Sash Stop Kit – Field Installation



The Sash Stop P/N 9724500 restricts how far a vertical-rising sash may be opened. This small plastic device may be easily field installed on the fixture corner post of any fume hood. The metal bracket is simply mounted to the sash handle.

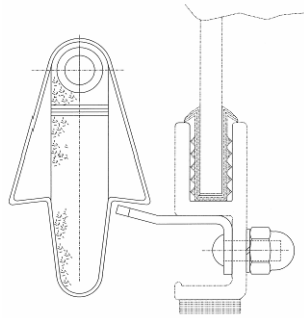


Figure 7-7

Installing an Electrical Duplex Outlet



Your Protector Radioisotope Fume Hood can be ordered with duplex outlets, however, if you ordered a model without an electrical duplex outlet you can have one installed in the field by a qualified electrician. Contact Labconco Customer Service for ordering information. (Not acceptable on explosion-proof hoods).

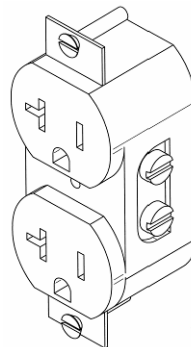


Figure 7-8

Your Next Step

After you understand the modifying procedures, you are ready to proceed to *Chapter 8: Troubleshooting*.

CHAPTER 8

TROUBLESHOOTING

Refer to the following table if the fume hood fails to operate properly. If the suggested corrective actions do not solve your problem, contact Labconco for additional assistance.

PROBLEM	CAUSE	CORRECTIVE ACTION
Remote blower and lights won't operate	Wires not connected at junction boxes or switches.	Check connection of switches.
		Check connection to control box on top of hood.
	Circuit breakers tripped in building electrical supply.	Reset circuit breakers.
Remote blower won't operate, but lights work	Blower wiring is disconnected.	Inspect blower wiring and switch.
	Belt broken.	Replace belt.
	Blower motor is defective.	Replace blower motor.
Fume hood blower operates but lights will not operate	Lamp not installed correctly.	Inspect lamp installation.
	Lamp is defective.	Replace lamp.
	Lamp circuit breaker in building is tripped.	Reset the lamp circuit breaker.

PROBLEM	CAUSE	CORRECTIVE ACTION
Fume hood blower operates but lights don't work (cont.)	Lamp wiring is disconnected.	Inspect lamp wiring.
	Defective lamp ballasts.	Replace lamp ballasts.
Contaminants escape outside of fume hood	Improper user techniques for the fume hood.	See "Certifying the Hood" Chapter 3 and "Safety Precautions" Chapter 4 sections in the manual. (Ref. Appendix D)
	Restriction of the baffle air slots or blockage of the exhaust outlet.	Remove baffles to ensure that all air slots and the exhaust outlet are unobstructed.
	External factors are disrupting the fume hood airflow patterns or acting as a source of contamination.	See "Location Requirements" Chapter 2, "Certifying the Hood" Chapter 3, and "Safety Precautions" Chapter 4 sections of this manual. (Ref. Appendix D)
	Fume hood has improper face velocity.	Have fume hood re-certified and check remote blower exhaust system. Hood should have average face velocity of 80-100 fpm.
Vertical sash no longer operates smoothly	Cable is frayed or plastic protection is damaged.	Inspect cable and replace cable if worn or damaged immediately; otherwise injury could result.
	Pulley bearing is damaged.	Replace pulley, bearing or add grease.
	Cable has slipped off the pulleys.	Re-install; cable must be replaced immediately if damaged.
	Weight has broken pulleys.	Replace weight pulleys.
Combination A-Style sash no longer operates smoothly	Horizontal glass panels have come off the tracks.	Re-install horizontal glass on tracks.

PROBLEM	CAUSE	CORRECTIVE ACTION
Electrical duplex outlets no longer have power	Vertical-rising sash frame is distorted.	Place horizontal sliding glass symmetrically and pull sash down to air foil. Straighten damaged frame.
	Cable is frayed or has slipped off the pulleys.	Re-install, cable must be replaced immediately if damaged.
	Wires not connected or faulty duplex.	Check wire connection or replace duplex.
Service valves no longer operate	Circuit breakers tripped in building electrical supply.	Reset circuit breakers.
	Faulty building supply.	Inspect building supply shut off valves and appropriate pressures below 40 PSI.
	Valve no longer operates.	Replace valve and check for leaks.
	Supply line or outlet line has leaks.	Inspect line for leaks and fix any leaking plumbing connections.

APPENDIX A

PROTECTOR

RADIOISOTOPE

HOOD COMPONENTS

Illustration A-1 indicates the location of the following service parts:

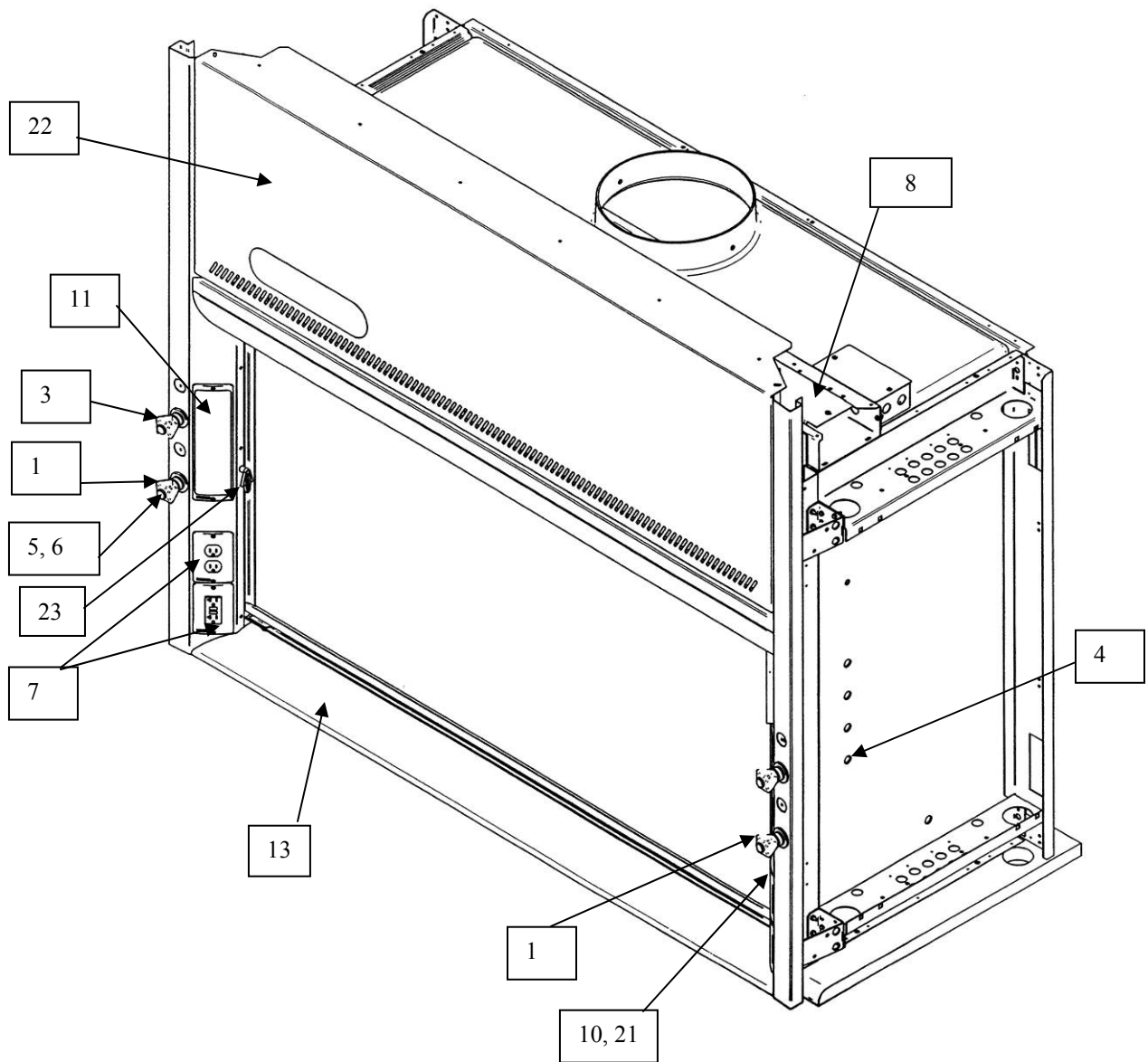
Protector Radioisotope Hood Replacement Parts

Item	Quantity	Part No.	Description
1A	1	9823700	Valve, Labconco (Water) 1/4" Compression Fitting
1B	1	9823701	Valve, Labconco (Water) 3/8" Compression Fitting
1C	1	9817000	Valve, Labconco 1/4" Compression Fitting (AIR, GAS, VAC, NIT, etc.)
1D	1	9817001	Valve, Labconco 3/8" Compression Fitting (AIR, GAS, VAC, NIT, etc.)
1E	1	9823702	Valve, Labconco Deionized 1/4" Compression Fitting
1F	1	9823703	Valve, Labconco Deionized 3/8" Compression Fitting
1G	1	9818000	Nut, Valve Mounting. (Labconco)
3	1	9818700 thru 08	Knobs (GRAY, GRN, BLU, ORG, YEL, RED, WHT, BLK, BRN)
4A	1	1427300	Connector, Hose 3/8 NPT
4B	1	1911024	Flat Washer, .75" ID, 2" OD Steel
4C	1	1485900	Washer, Rubber, 1.00 OD x .66 ID
4D	1	4890300	Connector, Female Brass 1/4" Compression x 3/8" NPT
5	1	9825500	Label, Knob (contains all the labels)
6	1	9818900	Lens, Knob
7A	1	9947100, 01, 02	115V Duplex Receptacle (GRAY) Right, Left 4' - 6', Left 8' w/ wires
7B	1	9818200	Cover Plate 115V Duplex
7C	1	9947103, 04, 05	115V GFCI Duplex Receptacle (GRAY) Right, 4' - 6', Left 8' w/ wires
7D	1	9818100	Cover Plate, 115V GFCI
7E	1	9818300	Cover Plate, Blank

Appendix A: Protector Radioisotope Hood Components

Item	Quantity	Part No.	Description
8A	1	9721901	Lamp, Fluorescent (T8 x 3') – use on 4' & 8' Hoods
8B	1	9721900	Lamp, Fluorescent (T8 x 4') – use on 5' & 6' Hoods
10A	1	1302300	Switch, Rocker
10B	1	1327500	Switch, Plug (Fills cutout when switch is not used)
11A	1	9818400	Access Cover
11B	1	9825100	Label, Access Cover (includes all three corner labels)
12A	1	9810800	Side Panel, 24" internal deep hoods – NOT SHOWN
12B	1	9810801	Side Panel, 30" internal deep hoods – NOT SHOWN
12C	1	9810802	Side Panel, 36" internal deep hoods – NOT SHOWN
12D	4	1916400	Nut, Retainer #10-24 – NOT SHOWN
12E	4	1885512	Screw, Machine #10-24 x .75 Truss Head Stainless – NOT SHOWN
13A	1	9860000	Air Foil 4'
13B	1	9860001	Air Foil 5'
13C	1	9860002	Air Foil 6'
13D	1	9860003	Air Foil 8'
14	4	1861400	Pulley, Front or Rear, 1-3/16 Dia. – NOT SHOWN
15	2	4949902	Cable, Sash 130" – NOT SHOWN
16	2	9741900	Sheave, (Rear 8') – NOT SHOWN
17	2	1663200	Bumper, Rubber – NOT SHOWN (upper sash bumper)
18	4	9742100	Bronze Bearing, Flanged Rear – NOT SHOWN
19	4	1920100	Clamp, Cable Replacement – NOT SHOWN
20	2	1972100	S-Hook – NOT SHOWN (to attach weight to cable)
21A	1	99463XX	Wiring Harness, Main
22	1	9807600, 01, 02, 03	Front Panel, 4', 5', 6', 8'
23	1	9724500	Sash Stop Kit

Figure A-1



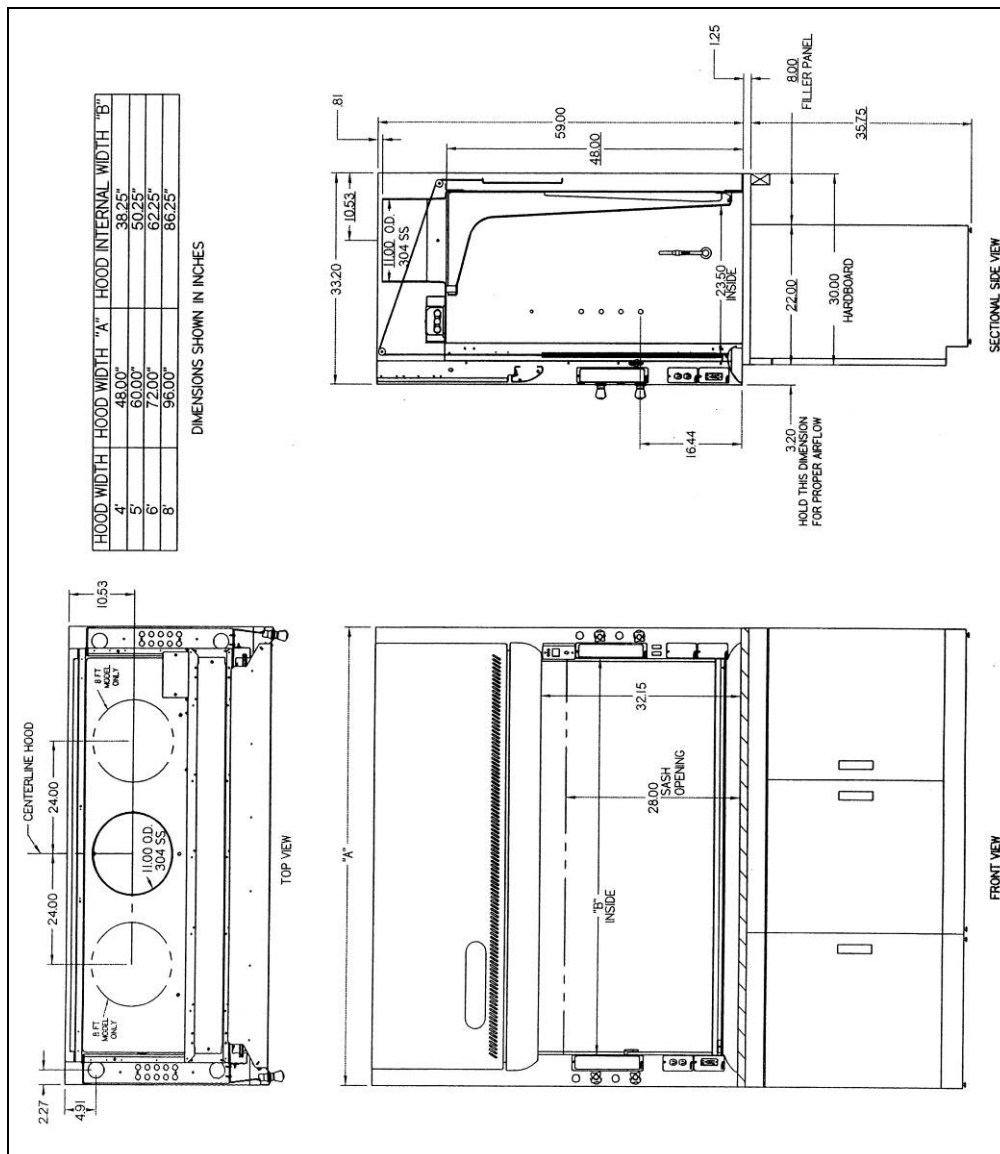
APPENDIX B PROTECTOR RADIOISOTOPE HOOD DIMENSIONS

Protector Stainless Steel Radioisotope Hood Model Widths

	4'	5'	6'	8'
A	48.00	60.00	72.00	96.00
B	38.25	50.25	62.25	86.25

Dimensions in inches. CAD layouts available upon request.

Figure B-1



APPENDIX C

PROTECTOR

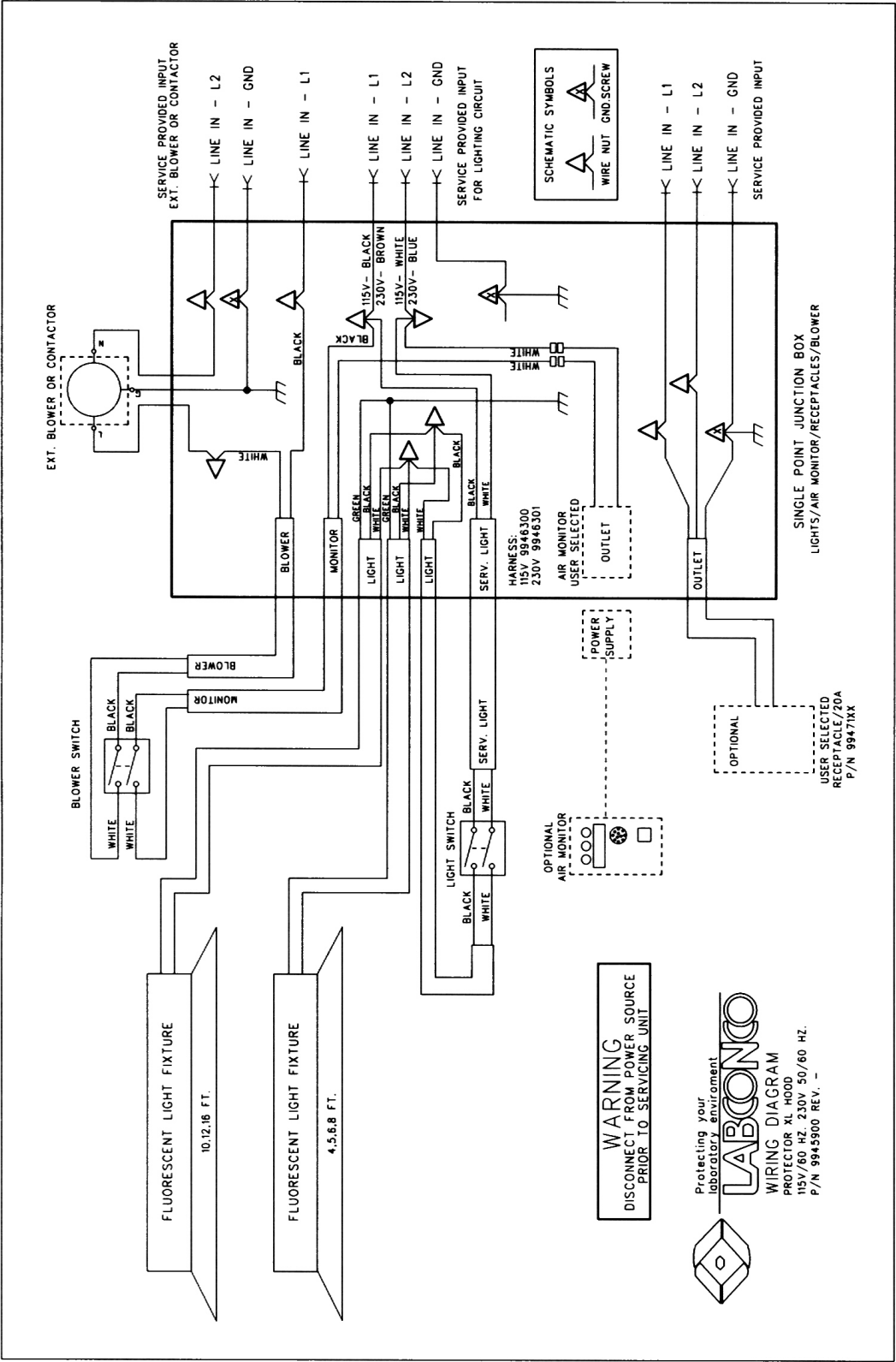
RADIOISOTOPE

FUME HOOD

SPECIFICATIONS

Environmental Conditions

- Indoor use only.
- Maximum altitude: 6562 feet (2000 meters).
- Ambient temperature range: 41° to 104°F (5° to 40°C).
- Maximum relative humidity: 80% for temperatures up to 88°F (31°C), decreasing linearly to 50% relative humidity at 104°F (40°C).
- Main supply voltage fluctuations not to exceed $\pm 10\%$ of the nominal voltage.
- Transient over-voltages according to Installation Categories II (Over-voltage Categories per IEC 1010). Temporary voltage spikes on the AC input line that may be as high as 1500V for 115V models and 2500V for 230V models are allowed.
- Used in an environment of Pollution degrees 2 (i.e., where normally only non-conductive atmospheres are present). Occasionally, however, a temporary conductivity caused by condensation must be expected, in accordance with IEC 664.



APPENDIX D

REFERENCES

Many excellent reference texts and booklets are currently available. The following is a brief listing:

Laboratory Ventilation Standards

Federal Register 29 CFR Part 1910

Non-mandatory recommendations from "Prudent Practices."

- Fume hoods should have a continuous monitoring device
- Face velocities should be between 60-100 linear feet per minute (lfpm)
- Average 2.5 linear feet of hood space per person

Occupational Health and Safety

U.S. Department of Labor

200 Constitution Avenue N.W.

Washington, DC 20210

(202) 523-1452

Industrial Ventilation-ACGIH

- Fume hood face velocities between 60-100 lfpm
- Maximum of 125 lfpm for radioisotope hoods
- Duct velocities of 1000-2000 fpm for vapors, gasses and smoke
- Stack discharge height 1.3-2.0 x building height
- Well designed fume hood containment loss, <0.10 ppm

Industrial Ventilation, A Manual of Recommended Practice.

24th Edition, 2001

American Conference of Governmental Industrial Hygienists

1330 Kemper Meadow drive

Cincinnati, OH 45240-1634

(513) 742-2020

ASHRAE 110-1995 Method of Testing Performance of Fume Hoods

Evaluates fume hood's containment characteristics

- Three part test: Smoke generation, Face velocity profile, Tracer gas release @ 4 liters per minute
- Rated As Manufactured (AM), As Installed (AI) and As Used (AU)

American Society of Heating, Refrigerating, and Air Conditioning Engineers

1791 Tullie Circle N.E.

Atlanta, GA 30329

(404) 636-8400

ANSI Z9.5-1993 Laboratory Standard

Covers entire laboratory ventilation system.

- Vertical stack discharge @ 2000-3000 fpm
- New and remodeled hoods shall have a monitoring device
- Ductless hoods should only be used with non-hazardous materials
- Fume hood face velocities between 80 – 120 fpm

American Industrial Hygiene Association

2700 Prosperity Avenue, Suite 250

Fairfax, VA 22031

(703) 849-8888

SEFA 1-2002

- Fume hood face velocities based on toxicity levels of chemicals
 - Class A – 125 to 150 fpm
 - Class B – 80 to 100 fpm
 - Class C – 75 to 80 fpm
- Test method – face velocity profile and smoke generation

Scientific Equipment & Furniture Association

1028 Duchess Drive

McLean, VA 22102

(703) 538-6007

NFPA 45 – 2002 Fire Protection for Laboratories Using Chemicals

- Laboratory hoods should not be relied on for explosion protection
- Exhaust air from fume hoods should not be recirculated
- Services should be external to the hood
- Canopy hoods only for non-hazardous applications
- Materials of construction should have flame spread of 25 or less
- 80 to 120 fpm to prevent escape

NFPA 30 – 2000 Flammable and Combustible Liquids Code

- Approved cabinets may be metal or wood
- Vent location on cabinets are required
- Venting of cabinets not a requirement

National Fire Protection Association
1 Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101
(800) 344-3555

General References

American Conference of Governmental Industrial Hygienists. *Industrial Ventilation, A Manual of Recommended Practice*, Cincinnati, OH.

ASHRAE Standard Committee. *ASHRAE Standard Atlanta*: ASHRAE Publications Sales Department, 1995

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Department of Labor, Occupational Safety and Health Administration, *29 CFR Part 1910, Occupational Exposures to Hazardous Chemicals in Laboratories, Final Rule*. Vol. 55, No. 21. Washington D.C.:1990

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DECLARATION OF CONFORMITY

Application Council Directive(s): 73/23/EEC, 89/336/EEC, 2002/95/EC (ROHS),
2002/96/EC (WEEE), 2004/108/EC

Standard(s) to which conformity is declared: EN61010-1, EN61326-1, EN55022,
EN61000-3-2/3

Manufacturer's Name: Labconco Corporation

Manufacturer's Address: 8811 Prospect Avenue
Kansas City, MO 64132 USA

Importer's Name: See Shipping/Customs Documents

Importer's Address: See Shipping/Customs Documents for your equipment

Type of Equipment: Laboratory Equipment Protector Radioisotope Fume Hoods

Protector Stainless Steel Radioisotope Hood:

Model No.: 4882200, - 10922 4' Protector Stainless Steel Radioisotope Hood
6082200, - 10922 5' Protector Stainless Steel Radioisotope Hood
7282200, - 10922 6' Protector Stainless Steel Radioisotope Hood
9682200, - 10922 8' Protector Stainless Steel Radioisotope Hood

Serial No.: Various – See Individual Declaration

Year of Manufacture: 2002 and subsequent

I, the undersigned, hereby declare that the equipment specified above conforms to the
above Directive(s) and Standard(s).

See individual Declaration of Conformity which
will be signed by the importer for your country.

Place:

(Signature)

Date:

(Full Name)

(Position)

Labconco P/N 36960-27, Rev. C, ECO E344