

AIR SCIENCE® PURAIR®-LF SERIES LAMINAR FLOW CABINETS



—VLF-48

USER & SERVICE MANUAL

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Specifications subject to change without notice.



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SAFETY WARNINGS

- This cabinet offers no operator protection (only product protection)
- This cabinet is capable of achieving ISO Class 3 air cleanliness within work zone as per ISO 14644.1 (equivalent to Class 1 as per US Federal Standard 209E)
- Read all instructions before proceeding and observe the installation procedure and environmental/electrical requirements
- NEVER OPERATE UV LAMP WITHOUT EYE AND SKIN PROTECTION
- Anyone working with, on or around this equipment should read this manual. Failure to read, understand and follow the instructions given in this documentation may result in damage to the unit, injury to operating personnel, and / or poor equipment performance.
- Any internal adjustment, modification or maintenance to this equipment must be undertaken by qualified service personnel.
- The use of any hazardous material in the cabinet must be monitored by an industrial hygienist, safety officer or some other suitably qualified individual.
- Explosive or inflammable substances should never be used in the cabinet unless a qualified safety professional has evaluated the risk involved.
- If chemical, radiological or other non-microbiological hazards are being used in the cabinet, additional protective measures should be taken. Besides that, the operation should be monitored by a suitably trained individual.
- Before you proceed, you should thoroughly understand the installation procedures and take note of the environmental/electrical requirements of the cabinet.
- In this manual, important safety related points will be marked with this symbol.



- If the equipment is used in a manner not specified by this manual, the protection provided by this equipment may be impaired.

LIMITATION OF LIABILITY

The disposal and / or emission of substances used in connection with this cabinet may be governed by various local regulations. Familiarization and compliance with any such regulation are the sole responsibility of the users of the cabinet. Air Sciences' liability is limited with respect to user compliance with such regulations.

EUROPEAN UNION DIRECTIVE ON WEEE AND RoHS

The European Union has issued two directives:

- **Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE)**

The objective of the WEEE directive is to promote "...the reuse, recycling and other forms of recovery of such wastes (WEEE) so as to reduce the disposal of waste besides improving the environmental performance of all operators involved in the life cycle of electrical and electronic equipment, e.g. producers, distributors and consumers..." and hence this directive refers to the disposal of this cabinet within the EU. A "wheelie bin" sticker (*shown alongside*) has to be pasted on all products covered by this directive, indicating that at the time of disposing of the product, it should not be grouped together with general unsorted municipal waste. Instead, distributors of electrical and electronic equipment should be responsible for the collection and scrapping of the products they have sold Please note that this cabinet has been classified as



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“fixed industrial equipment” and hence the WEEE directive is not applicable to its disposal.

• **Directive 2002/95/EC on Restriction on the use of Hazardous Substances (RoHS)**

With respect to the directive on RoHS, please note that this cabinet falls under category 9 (*monitoring and control instruments*) and is therefore exempted from requirement to comply with the provisions of this directive.

SYMBOLS



Warning of hazardous area or situation



Warning of dangerous electric voltage



Earth (ground) protective conductor

Local government may require proper lamp disposal



FREIGHT CLAIM INFORMATION

Air Science inspects each product for defects before shipment. Air Science products are then carefully packed in compliance with carrier regulations and thoroughly inspected before leaving our plant. Responsibility for their safe delivery is assumed by the carrier upon acceptance of the shipment. Occasionally damage occurs in transit. Claims for loss or damage sustained in transit must be made upon the carrier.

Please remember that you are responsible for all freight claims and the cost of all replacement pieces for each shipment you accept. Inspect each shipment very carefully before acceptance. Carefully inspect each pallet or crate upon arrival. If a shipment is found to be damaged upon delivery, be sure to have the driver/carrier note all damage details on the delivery receipt.

This is essential or your claim may be denied. Also if pallets are stacked, please note "Stacked Pallets" on the delivery receipt (pallets are not stacked when shipped, unless otherwise stated for certain products). Air Science is not responsible for pallets stacked at carrier terminal. Any unloading difficulties or damages due to stacked materials are carrier's responsibility.

If freight damage is discovered, please refer to the following guidelines in order to process and effective freight claim:

ACCEPTED FREIGHT WITH NOTED/VISIBLE LOSS OR DAMAGE

- Any external evidence of loss or damage must be noted on the freight bill or delivery receipt and signed by the courier's agent or delivery driver

NOTE: Failure to properly describe evidence of loss or damage may result in the carrier refusing to honor a claim

- Contact delivering terminal to arrange for a claim form and inspection report to be faxed or mailed to you
- Notify Air Science regarding which items need replacement
- Keep all damaged items and packing material until claim is resolved between you and the carrier

ACCEPTED FREIGHT WITH CONCEALED LOSS OR DAMAGE

When a damage or loss is discovered during unpacking:

- Contact the carrier immediately upon discovery of damage and request for inspection by the carrier's agent.
- Carrier will determine inspection needs based on value and time elapsed
- Notify Air Science regarding which items require replacement
- Air Science will fax to you an order acknowledgment that includes value of items for claim (less freight amount)
- Air Science will invoice you for replacement materials
- Air Science standard payment terms will apply

UNACCEPTED FREIGHT

- If substantial damage is noted upon inspection you have the right to refuse part or all of a shipment. Do not unpack pallets or crates with damaged materials. Individual items cannot be refused. You must refuse the entire pallet or accept the freight with noted damage (see above)
- Air Science will handle all freight claim procedures and process a replacement order for your company for the damaged pieces at no charge. (if the original order was shipped under CIF terms i.e. Air Science had covered the insurance)

NOTE: Any correspondence with Air Science regarding loss or damage must be accompanied by a copy of the shipping carrier's report. Air Science will not accept returns that have not been authorized.

In the event of accepted freight with damage or loss, notification of loss or damage must be sent to the carrier within 10 days of receiving the freight. Notification outside the 10-day time frame may result in shipping damage claim being denied.



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WARRANTY TERMS AND CONDITIONS

Our laminar flow cabinets have been designed to provide operator safety with an easy to use cabinet. You can rest assured that with proper maintenance, these hoods will reward you with years of trouble free service and protection.

Air Science value your business, so your satisfaction is important to us, so please complete and return our customer satisfaction survey at the end of this manual.

Should you be unfortunate to receive product that appears to be damaged or defective or does not appear to be working satisfactorily, then please contact our experienced technicians for assistance at the address shown at the foot of this page.

The Air Science range of cabinets has been carefully designed to produce a system that will provide product safety in an easy to use system. However, basic safety precautions should always be followed when:

- Using an electrical product; and
- Handling hazardous substances.

Air Science products come with a 2-year limited warranty beginning on the date of shipment from the Air Science. Air Science's limited warranty covers defects in materials and workmanship. Air Science's liability under this limited warranty shall be, at our option, to repair or replace any defective parts of the equipment, provided if proven to the satisfaction of Air Science that these parts were defective at the time of being sold.

This limited warranty does not cover:

- Installation (inside delivery handling) damage.
- Products with missing or defaced serial numbers
- Consumables such as filters (HEPA, ULPA, carbon, pre-filters) and fluorescent / UV bulbs
- Problems that result from:
 - External causes such as accident, abuse, misuse, problems with electrical power, improper operating environmental conditions
 - Servicing that is not carried out by Air Science personnel or their appointed agents, or in the case of electrical work by a qualified electrician
 - Usage that is not in accordance with these product instructions
 - Failure to follow these product instructions
 - Failure to perform preventive maintenance
 - Problems caused by using accessories, parts, or components not supplied or approved by Air Science
 - Damage by fire, floods, or acts of God
 - Customer modifications to the product

ALL EXPRESS AND IMPLIED WARRANTIES FOR THE PRODUCT, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES AND CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN TIME TO THE TERM OF THIS LIMITED WARRANTY. NO WARRANTIES, WHETHER EXPRESS OR IMPLIED, WILL APPLY AFTER THE LIMITED WARRANTY PERIOD HAS EXPIRED. AIR SCIENCE DOES NOT ACCEPT LIABILITY BEYOND THE REMEDIES PROVIDED FOR IN THIS LIMITED WARRANTY OR FOR SPECIAL, INDIRECT, CONSEQUENTIAL OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY LIABILITY FOR THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES, FOR PRODUCTS NOT BEING AVAILABLE FOR USE, OR FOR LOST WORK. AIR SCIENCE LIABILITY WILL BE NO MORE THAN THE AMOUNT YOU PAID FOR THE PRODUCT THAT IS THE SUBJECT OF A CLAIM. THIS IS THE MAXIMUM AMOUNT FOR WHICH AIR SCIENCE IS RESPONSIBLE. FLORIDA LAW GOVERNS THIS WARRANTY



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USER SECTION



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CHAPTER I

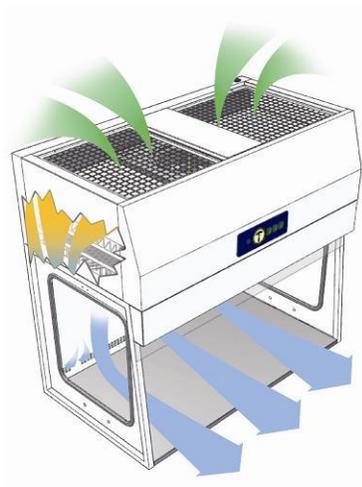
BASIC PRODUCT INFORMATION

Laminar flow cabinets offers proven protection for your sample and processes where operator protection is not required. They are suitable for application which requires ISO Class 3 air cleanliness within work zone as per ISO 14644-1 (equivalent to Class 1 per US Federal Standard 209E)

AIRFLOW PATTERN INSIDE THE CABINET

Room air is taken in from the top of the cabinet through a disposable pre-filter with 85% air resistance; this serves to trap larger particles and increase the life of the main filter. Air is forced evenly across an H14 HEPA/ULPA-filtered laminar flow air stream within the cabinet; the result is a stream of clean laminar air within the work zone of the cabinet; this dilutes and flushes all airborne contaminants from the interior. A nominal filter face velocity of 0.45 m/s or 90fpm ensures that there is sufficient number of air changes within the enclosed area of the cabinet in order to maintain cleanliness. The purified air travels across the internal work zone of the cabinet in a vertical or horizontal, unidirectional stream and leaves the main work chamber across the entire open front of the cabinet.

Vertical Airflow Pattern



Horizontal Airflow Pattern



CHAPTER II

UNPACKING YOUR CABINET

This chapter aims to provide relevant information on how to handle the cabinet properly upon receipt. Failure to follow the following instructions may damage the cabinet. We strongly advise you to read this chapter carefully before proceeding further.

2.1 STEP-BY-STEP PROCEDURE

1. Inspecting the crate

Upon receipt of your new cabinet, inspect the crate. If there is any visible damage to the exterior of the crate please refer to freight claim information.

NB: Some cabinets may be packed with corrugated carton instead of a wood crate, in which some of the following instructions would not apply.

2. Moving the crate

- The crate is designed to protect our cabinet from any foreseeable circumstances. However, excessive impact onto the crate may also damage the cabinet. Prevent any direct impact or hitting to the crate when moving.
- b. When lifting the crate, please always ensure that the floor jack or mechanical lift truck has always entered fully under the crate in order to achieve stability. Failure to do so will increase the risk of the crate falling off the floor jack or mechanical lift truck during handling. Please use a suitable extension bar when the situation arises.

3. Opening the crate

- Use a hammer or crowbar to open the top panel carefully. Be aware of exposed nails.
- Remove the front panel, followed by the two side panels, and finally the back panel.
- All the retrofit kits are packed separately. These items are listed on the packing checklist. Please check the packing checklist carefully to make sure that all items have been included
- If you did not receive one or more of the parts listed on the packing checklist, or if any of the items are damaged, please contact your distributor or Air Science immediately for further instructions.

4. Removing the packaging material

- The cabinet is protected by Styrofoam and shrink-wrap.
- The cabinet is secured with straps to the pallet.
- c. Remove the Styrofoam and shrink-wrap but leave the strap securing the cabinet to the pallet intact.
- d. If you find any damage during this stage of unpacking please refer to freight claim information.
- e. It is the best practice to leave the cabinet secured with straps to the pallet until the cabinet is located in its approximate final position to facilitate ease and safety in handling.

Choosing the best location for your cabinet in order to achieve optimum operating performance of your cabinet is determined by a number of factors. Please refer to the next chapter for some guidelines.

5. Moving the cabinet

- When lifting the pallet with the cabinet secured to it, please always ensure that the floor jack or mechanical lift truck has always entered fully under the pallet. This is to increase the stability of the cabinet and reduce the risk of the cabinet falling down. Please use extension bar when necessary. During the moving of the cabinet, please ensure there is enough distance between the supports of pallet and the ground. Dragging the pallet against the ground (at one side or otherwise) will damage the pallet and possibly your new cabinet.



6. Removing the strapping

- Remove the strapping by cutting it at a safe position to prevent any scratch on the surface of your new cabinet.
- b. Do not discard the packaging material for your cabinet until you have checked all of the components, installed and tested the unit.

7. Lifting the cabinet

- The cabinet is not designed to support its own weight at the center portion for extended periods. However, lifting the cabinet by mechanical lift truck in the center is allowable. If you must lift the cabinet manually, use at least 4 persons.
- Always lift up the cabinet with enough distance in between the fork of the mechanical lift truck and the center of the cabinet. Suggested distance: 50 cm for 3 ft and 90 cm for 4ft and above. Install the cabinet on the existing work surface or Air Science support stand.

NOTE:

- *When installing the cabinet onto an existing work surface, ensure that the structure can safely support the combined weight of the cabinet and any related equipment. Some modifications to the work surface may be necessary.*
- *The work surface should be smooth and nonporous and resistant to the disinfectants and chemicals used in conjunction with the cabinet.*

2.2 PACKAGING CONTENTS

The following items are included together with your manual:

- Test certificate
- Test report

In case this manual and/or test report is lost or misplaced, Air Science retains a copy in our files. A replacement copy can be obtained by contacting Air Science and stating the cabinet model, serial number and a brief description of the information desired.



CHAPTER III INSTALLING YOUR CABINET

3.1 CHOOSING A SUITABLE LOCATION

Location impacts the nature and extent of external airflow disturbances, which may affect performance of the clean bench when it is exposed to these disturbances.

When installing the clean bench, it should be located as far away as possible from sources of airflow disturbance and in an orientation which optimally shields the clean bench's airflow from all external airflow disturbances. Please note that the clean bench should not be placed close to another clean bench.

Please follow these guidelines when choosing a suitable location for your cabinet:

- The location must be far away from :
 - a. personnel traffic flows
 - b. air vents (in and out)
 - c. door and window
 - d. any other sources of disruptive air currents or air drafts

If drafts or other disruptive air currents exceed the face velocity of the filter, the potential exists for contaminated air to enter the work zone of the cabinet.

- A minimum distance of 50 cm to the top of the ceiling is recommended for blower changing purpose.
- A clearance of 183 cm (6ft) in front of cabinet is strongly advised in order to maintain proper airflow.
- Please permit adequate space for cleaning behind the cabinet.

3.2 ENVIRONMENTAL/ELECTRICAL CONDITIONS

This cabinet is designed to be used under the following conditions:

1. Indoor use.
2. Altitudes up to 2000 meters or 6600 ft.
3. 20% - 60% relative humidity.
4. Temperature range from 20 deg C to 30 deg C (68 deg F to 86 deg F). It is recommended that the temperature in the laboratory be maintained within +/-2 deg C under all conditions.
5. Main supply voltage fluctuations not to exceed +/- 10% of the nominal voltage. It is recommended that the voltage fluctuation doesn't exceed +/- 2% of the nominal voltage at all times.
6. Installation Category: 2.0
Installation category (over voltage category) defines the level of transient over voltage which the instrument is designed to withstand safely. It depends on the nature of the electricity supply and its over voltage protection means. For example, in CAT II, which is the category used for instruments in installations supplied from a supply comparable to public mains such as hospital and research laboratories and most industrial laboratories, the expected transient over voltage is 2500 V for a 230 V supply and 1500 V for a 120 V supply.
7. Pollution Degree: 2.0
Pollution degree describes the amount of conductive pollution present in the operating environment. Pollution degree 2 assumes that normally only non-conductive pollution such as dust occurs with the exception of occasional conductivity caused by condensation.
8. Power Cord: 1) For units intended to be operated at 120 volts (North America): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts. 2) For units intended to be operated at 230 volts. Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.



3.3 INSTALLING YOUR CABINET

1. Please refer to the unpacking your cabinet on the previous chapter section on lifting the cabinet
2. Inspect your cabinet carefully, should you find any defect please refer to the freight claim information and our warranty terms and conditions
3. Wipe down the interior and exterior of the cabinet with water or a mild household detergent
4. Connect cabinet to the main power supply and turn on the blower. Please leave the cabinet on for 3 minutes in order to purge airborne contamination from the work area. Each cabinet requires its own dedicated 13A (230V) or 15A (115V) power outlet which should not be shared with other appliances. For some cabinets which required 2 power sources, 2 separate and dedicated power outlets are needed.



NOTE:

DO NOT MOVE THE CABINET WITHOUT OBSERVING THE FOLLOWING PRECAUTIONS:

1. Observe the necessary precautions when relocating the cabinet as it is heavy

3.4 PERFORMANCE VALIDATION/CERTIFICATION

After installation and prior to use, cabinet performance must be validated and certified to factory standards.

The following tests should be performed:

- Airflow velocity
- Filter leak test (filter media leak test and filter gasket leak test)
- Site installation assessment test
- Noise level test
- Optional tests:
 - a. Electrical safety
 - b. Light intensity test
 - c. UV intensity test

The testing methods are specified on the test report. It is recommended that these tests be performed only by a qualified technician who is familiar with the methods and procedures for certifying laminar flow cabinets.

Note: Besides the noise level test described in the test report. The following noise level test is recommended; A-weighted sound pressure level measurements be made at both the operators position in normal use and at several points which are 1 meter from the enclosure (in order to determine the highest sound pressure level at 1 meter. Many authorities regard sound pressure level of 80dBA above a reference sound pressure of 20uPa as the threshold at which a hazard may be caused. Therefore, if the recorded sound pressure level readings exceed this value, then it is recommended that the user consider the use of noise-reducing baffles. The use of ear pieces can make a higher level non-hazardous to an operator.

3.4.1 THE IMPORTANCE OF PERFORMANCE VALIDATION/CERTIFICATION

1. Airflow velocity value that falls below the value specified inside the test report will not provide adequate product protection.
2. Possible product contamination when the filter is leaking.

3.4.2 RECERTIFICATION

After the initial certification, the cabinet shall be recertified at the following situations:

1. Relocation of cabinet
2. When the performance is suspected
3. Major maintenance or service (filter changing, blower changing, etc.)
4. At least annually

3.4.3 DISCLAIMER

The performance of the cabinet, while rigorously evaluated at the factory, cannot be guaranteed once after transit and installation. Therefore the on-site testing is always recommended.



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CHAPTER IV OPERATING YOUR CABINET

4.1 LAMINAR FLOW CONTROL SYSTEM



Fan Button

To turn on and turn off the fan

Outlet Button

Controls power to electrical outlets in the workzone

Light Button

To turn on the light.

Pressure Gauge

To indicate the pressure drop across filter, to maintain nominal airflow velocity as specified inside the test report.

UV Key Switch (optional)



Allows UV to be activated. NOTE: Switch Fan to off position. Wait 2 minutes. Install front cover. Switch Light to on position. Turn key switch. UV lamp will activate. Factory default time is 15 minutes once UV is activated. **Eyes and skin should not be exposed to direct ultraviolet light. ALWAYS Install Front Cover before activating to prevent risk of UV exposure.**

4.2 CABINET START-UP PROCEDURE

1. Adjust the seating position so that the user's face is above the front opening. Adjustable stool is recommended.
2. Turn on the fan. Please leave the cabinet on for 5 minutes before start working in order to purge airborne contamination from the work area.
3. Prepare a written checklist of materials/apparatus necessary for immediate usage and surface decontaminate them before loading them into the work zone. This is to prevent overloading and minimize the number of arm movement that might disrupt the airflow.
 - Never use the cabinet to store supplies or laboratory equipment
 - Keep the back air grilles unobstructed by arms or objects
 - Always surface-decontaminate everything before inserting them into the work zone
4. Load and arrange the materials/apparatus to minimize the movement of contaminated items over clean items by segregating the contaminated items from the clean items.
5. A clean long-sleeves laboratory coat may be used to protect personal clothing.
6. Wash hands thoroughly using germicidal soap. Wear gloves for hand protection. Gloves should be pulled over the knitted wrists of the gown rather than worn inside.
7. Thoroughly surface-decontaminate the work surface, inner back walls and interior surface of the window using 70% ethanol or other disinfectant depending on the user's requirement.
 - Do not use any disinfectant containing chlorine-based substance as this will cause corrosion to steel and stainless steel resulting in irreparable damage to the cabinet structure.



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8. Minimize room activity (personnel movements, closing and opening of doors, etc.).

4.3 WORKING IN THE CABINET

1. Work from clean to dirty by following the segregation of clean and dirty materials/apparatus as described in the start-up procedure on top
2. Particularly critical objects may be arranged such that air flows directly against them and keep the back air grilles unobstructed by arms or objects.
3. Do not use a gas flame whenever possible as it interferes with airflow
 - Do not use writing materials inside the work area as they generate aerosols
 - Do not change the cabinet original blower speed unless the change is required by a decrease in measured air velocity. Adjustment should be made only by a qualified technician. Do not operate the cabinet if fan fails to run
 - Do not cough or sneeze into the work zone
4. Minimize arm movement. Move arms in and out of the cabinet slowly to avoid disrupting cabinet airflow
Be sure to surface-decontaminate first when inserting arms into the cabinet
5. Use absorbent pads on the work surface where appropriate to minimize splatter and aerosol generation in case of spillage.
6. Clean materials should be at least 150 mm away from aerosol generating objects to minimize the chance for cross contamination.
7. Hold lids/covers above dishes/sample plates in order to prevent air impingement where appropriate.
8. Arrange objects to avoid airflow turbulence
9. Keep your arms as far away as possible from items in the work zone
10. Keep heads (large potential for aerosol generation) out of the work zone
11. It is recommended that the cabinet be operated continuously whenever possible to ensure and cleanliness.

4.4 CABINET SHUTDOWN PROCEDURE

1. Install front cover (optional accessory) and activate UV lamp (optional accessory) when present
 - **Eyes and skin should not be exposed to direct ultraviolet light**
 - **Ultraviolet light should not be relied upon as the sole disinfecting agent**
 - **Check the UV interlock regularly for correct operation**
 - **The use of UV lamp in laminar flow cabinets is explicitly discouraged in all major international standards and recommendations.**
2. Turn off the cabinet, remove laboratory coat and gloves and wash hands using germicidal soap thoroughly.

4.5 ERGONOMICS

During the operation of your cabinets, you will be more likely to do it in the sitting position.

Advantages of sitting position:

1. The physiological energy cost and fatigue are reduced
2. It provides the body with a stable support

However, sitting position also has some drawbacks:

1. Limited working area
2. Possible risk of being constrained in a fix posture for a long time
3. One of the most stressful position for the back

Fortunately, it is possible to create a more comfortable and healthier working condition by following these simple steps:

1. Ensure there is enough space for your leg and feet
2. Keep the lower back comfortably supported by your chair. Adjust the chair or use a pillow behind your back when necessary



3. Position your feet flat on the floor or a footrest. Don't dangle your feet and compress your thighs
4. Vary your sitting position throughout the day. Don't sit in one fixed posture all day
5. Eyes , some guidelines:
 - a. Give your eyes frequent breaks. Periodically look away from the work area and focus at a distant point.
 - b. Keep your glasses clean
6. Arrange and position your frequently used work materials to minimize the possibility of straining yourself



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CHAPTER V MAINTAINING YOUR CABINET

5.1 MAINTENANCE SCHEDULE

Please kindly follow the suggested maintenance schedule in order to maintain your Air Science cabinet at its optimum performance.

Daily

1. Thoroughly surface-decontaminate the work surface, inner back walls, and interior surface of the window using 70% ethanol or other disinfectant depending on the user's requirement.

Do not use any disinfectant containing chlorine-based substance as this will cause corrosion to steel and stainless steel resulting in irreparable damage to the cabinet structure.

Do surface decontamination as well to the UV lights. When cleaning the interior, the operator should not insert any part of his/her body into the work zone (except hands).

Monthly

1. Using a damp cloth, clean the exterior surfaces of the cabinet, particularly the front and top of the cabinet, to remove any accumulated dust.
2. Check all the service fixtures (when present) for proper operation.
3. All daily activities

Quarterly

1. Replace pre-filters
2. All monthly activities

Annually

1. *Have the cabinet recertified by a qualified certification technician.*
2. Replace the UV lamp, when present
3. All quarterly activities

Biannually

1. Replace the fluorescent lamps
2. All annual activities

5.2 DISINFECTING AGENTS

1. For stainless steel, all common disinfecting agents except chlorine-based agents are suitable.
2. For powder coated surfaces, all common disinfecting agents are suitable. However, the cabinet has been specifically evaluated for use with the following:

- a. 1N hydrochloric acid
- b. 1N sodium hydroxide
- c. 1% quaternary ammonium compound
- d. 5% formaldehyde
- e. 5,000 ppm hypochlorite
- f. 2% iodophor
- g. 5% phenol
- h. 70% ethyl alcohol



USER MONTHLY MAINTENANCE SCHEDULE

Model:		Year	
Serial Number:		Responsible Person:	

Month	Clean exterior surface	Check all service fixtures	By Who
Jan			
Feb			
Mar			
Apr			
May			
Jun			
Jul			
Aug			
Sep			
Oct			
Nov			
Dec			

Daily

- Surface Decontamination

Quarterly

- Replace Pre-filters

Annually

- Re-certification
- Change UV lamp (if fitted)

Bi-annually

- Replace all lamps
- Replace HEPA/ULPA



SERVICE SECTION



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CHAPTER I MAINTENANCE BY SERVICE PERSONNEL ONLY

1.1 CABINET AIRFLOW BALANCING

After some period of usage, the pressure drop across HEPA/ULPA filters will increase, otherwise known as “filter loading”. By increasing the fan speed, we can compensate this effect. However, there is a limit to this increment in speed which is the maximum supply voltage according to the fan performance curve. If this happens, and the required cabinet performance cannot be achieved, the filters must be changed. (Please refer to the filter changing section below) Please follow the steps described below to adjust the fan speed:

1. Remove Front control panel.
2. Adjust the speed control to achieve the required velocity.
3. Recertify the cabinet after speed is adjusted

1.2 FILTER CHANGING

The HEPA/ULPA filter under normal usage and barring an accident (a puncture), do not need replacement until the airflow velocity cannot be maintained at the specifications required by the test report even though the fan has been set to maximum speed. The filter changing procedure is described in detail at the end of this chapter. The cabinet must undergo recertification after filter changing. Before the new filters are installed, all surfaces should be thoroughly cleaned of silicon and/or adherent gasket material. The new filter should be carefully handled and examined prior to fitting. It is important that the filters and the gaskets be checked for leaks prior to use.

Vertical Cabinet Filter Change out:

1. Remove the perspex cover, which are held in position by screws in front and thumb screws at the back.
2. Remove the filter clamps by releasing the bolts.
3. Take off the supply filter carefully. Replace new filter by reversing the above steps.

Horizontal Cabinet Filter Change out:

1. Remove the back cover, which is held in position by screws.
2. Remove the nuts located on the 2 sides (*top and bottom*) of the vertical clamps. Remove all the vertical clamps along with the u-plates, then carefully remove the supply filter.
3. Replace new filter by reversing the above steps.

Note: *The following applies for both Horizontal and Vertical Laminar Flow Clean Benches.*

The bolts that are used to clamp the filter have to be tightened until 50% compressed with alternating pattern after the new filter is installed. The nuts must be equally tightened to give uniform compression. This is to prevent over compression on one side of the filter that can cause filter leakage

Pre-filters (all units) - Remove pre-filter from top of cabinet and replace.

1.3 BLOWER REPLACEMENT

Blower Replacement Instruction for a horizontal cabinet

1. Pre-filter and mesh must be removed first before proceeding to the blower replacement instruction. Disconnect electrical connections as necessary to free blower.
2. Remove the nuts, which clamp the blower. Pull out and lift up the blower carefully.
3. Replace new blower by reversing the above steps.

Blower Replacement Instruction for a vertical cabinet

1. Mesh and mesh separator must be removed first before proceeding to the blower replacement instruction. Disconnect electrical connections as necessary to free blower.
2. Remove the screws as shown and lift up the blower assembly from the supply plenum



3. The blower is secured to the mounting plate, which is held by the 4 aluminum profiles. First remove the mounting plate from the 4 profiles, and then remove the blower from the mounting plate. Disconnect electrical connections as necessary to free blower.
4. Re-install blower by reversing the above steps.

1.4 RECERTIFICATION

The following tests should be performed:

1. Airflow velocity
2. Filter leak test (filter media leak test and filter gasket leak test)
3. Site installation assessment test

Optional tests:

- a. Electrical safety
- b. Light intensity test
- c. Noise level test
- d. UV intensity test

The testing methods and equipment required are specified in details on the test report. It is recommended that these tests be performed only by a qualified technician who is familiar with the methods and procedures for certifying laminar flow cabinets

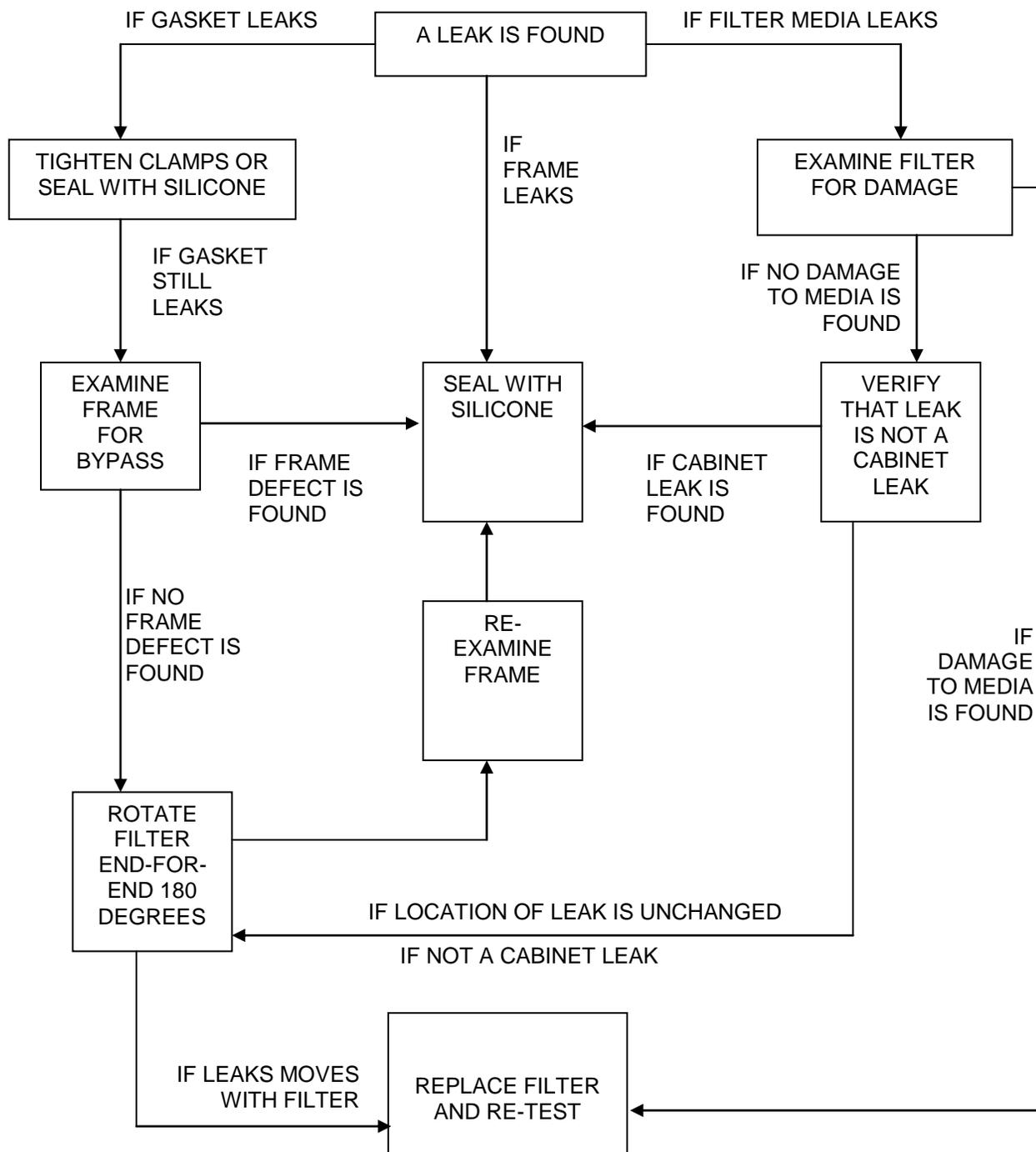
1.5 UV TIMER ADJUSTMENT



The UV timer is located behind the front control panel. Disconnect unit from power. Remove screws to access on the control panel and on top on the prefilter retainer grid.



1.6 LEAK TESTING OF HEPA FILTERS



Air Science™

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CHAPTER II PRODUCT SPECIFICATION

2.1 ENGINEERING DETAILS

PLEASE KINDLY REFER TO THE BROCHURE

2.2 OPTIONAL ACCESSORIES

1. Support Stand (**WARNING:** Minimum 2 persons are required to assembly the support stand as it is heavy) . To enable mobility of the cabinet within the laboratory and for users without bench space
Types available:

- a. Standard (with castors)
- b. With leveling feet

2. IV Bar with 6 hooks For IV bags filling applications

3. Service Fixtures (both European and American style fixtures available) - To provide supplies of gas, vacuum, water and compressed air to the cabinet

For vacuum fixture, please install a filter between the work zone and the fixture.

4. Germicidal UV Lamp - For germicidal decontamination

5. Electrical outlets (total 6A rating for all outlets in cabinet)

To allow users to use electrical devices, such as ultra-sonic bath, hotplate and electronic weighing scale inside the work-zone.

6. Front cover (also known as Night Doors in some countries) - To protect operator from harmful UV rays and also to keep work zone free from dust

2.3 TECHNICAL SPECIFICATION

PLEASE KINDLY REFER TO THE BROCHURE



**CHAPTER III
TROUBLESHOOTING OF COMMON PROBLEMS**



Problem	Potential Cause	Corrective Action
Cabinet does not start / no power	Wrong electrical connection	<ul style="list-style-type: none"> ▪ Check electrical cord is connected properly ▪ That wall socket works. ▪ Reset circuit breaker on top of the unit
Motor Silent	Circuit Breaker Trip Faulty Relay Faulty Speed Control Auto-thermal cut-off engaged Faulty Fan Capacitor Motor Failure	<ul style="list-style-type: none"> ▪ Switch off the cabinet and check ▪ Switch off the cabinet and check ▪ Short out control by placing jumper wire directly across the connections to the two speeds control leads. ▪ If the fan operates, the speed control is defective. ▪ If the fan does not run, the speed control is not the problem ▪ Blower was overheated ▪ Shut off, wait 30 minutes, and try to restart. ▪ Replace the fan capacitor ▪ Disconnect two motor leads at the motor. Connect a proper AC voltage source directly to the motor. ▪ If the motor starts to run, the problem is in the wiring connection. Refer to blown fuse or faulty relay section ▪ If the motor does not run, the motor is defective. Replace motor
Inoperative Switches	Connection Problem	<ul style="list-style-type: none"> ▪ Check whether the cable from electrical panel has been connected properly to the switch
Low airflow / high airflow	Adjust speed control setting Faulty Fan Capacitor (low air flow) Faulty Speed control	<ul style="list-style-type: none"> ▪ Adjust the speed control as needed. ▪ Replace the fan capacitor ▪ Short out control by placing jumper wire directly across the connections to the two speeds control leads. ▪ If the fan operates, the speed control is defective. ▪ If the fan does not run, the speed control is not the problem
Excessive Fan noise	Loose Motor or blower wheel mount	<ul style="list-style-type: none"> ▪ Check the tightness of the set screw holding the blower wheel. ▪ Check the tightness of all blower and motor mounting bolts
Light Always Off	Faulty Bulb Faulty Relay	<ul style="list-style-type: none"> ▪ Tighten bulb to ensure proper fit ▪ Replace bulb ▪ Switch off the cabinet and check
UV lamp always off	Faulty Bulb Faulty Relay	<ul style="list-style-type: none"> ▪ Make sure fan and light buttons in off position ▪ Tighten bulb to ensure proper fit, rotate bulb ▪ Replace bulb ▪ Switch off the cabinet and check
Contaminated samples	Filter Leaking Low airflow	<ul style="list-style-type: none"> ▪ Repair or replace filters ▪ Readjust airflow setting

CHAPTER IV COMPACT FLORESCENT LAMPS (CFL's)

Why do we use CFL's?

CFL's use less electricity and prevent greenhouse gas emissions that lead to global climate change. CFL's use up to 75 percent less energy (electricity) than other light bulbs and last up to 10 times longer.

Do CFL's contain mercury?

CFL's contain a very small amount of mercury sealed within the glass tubing – an average of 4 milligrams – about the amount that would cover the tip of a ballpoint pen. Mercury is an essential part of CFL's; it allows the bulb to be an efficient light source. No mercury is released when the bulbs are intact (not broken) or in use.

What is mercury?

Mercury is an element (Hg on the periodic table) found naturally in the environment. Mercury emissions in the air can come from both natural and man-made sources. Coal-fired power plants are the largest man-made source because mercury that naturally exists in coal is released into the air when coal is burned to make electricity. Coal-fired power generation accounts for roughly 40 percent of the mercury emissions. The use of CFL's reduces power demand, which helps reduce mercury emissions from power plants.

How do CFL's result in less mercury in the environment compared to traditional light bulbs?

CFL's use less electricity than incandescent lights, meaning CFL's reduce the amount of mercury into the environment and landfill waste (because the bulbs last longer).

What precautions should I take when using CFL's in my Lab?

CFL's are made of glass and can break if dropped or roughly handled. Be careful when removing the bulb from its packaging, installing it, or replacing it. Always screw and unscrew the light bulb by its base (not the glass), and never forcefully twist the CFL into a light socket. If a CFL breaks in your lab, follow the clean-up recommendations below. Used CFL's should be disposed of properly (see below).

What should I do with a CFL when it burns out?

We recommend that you take advantage of available local recycling options for CFL's. Please contact your local municipal solid waste agency directly, or go to www.epa.gov/bulbrecycling or www.earth911.org to identify local recycling options. If your state or local environmental regulatory agency permits you to put used or broken CFL's in the garbage, seal the bulb in two plastic bags and put it into the outside trash, or other protected outside location, for the next normal trash collection. Never send a fluorescent light bulb or any other mercury-containing product to an incinerator.

How should I clean up a broken fluorescent bulb?

Because CFL's contain a small amount of mercury, we recommend the following clean-up and disposal guidelines, but please contact your Safety Manager for instruction before following this guideline:

1. Before Clean-up: Air Out the Room

- Have people leave the room, and don't let anyone walk through the breakage area on their way out.
- If possible, open a window and leave the room for 15 minutes or more.
- If possible shut off the heating/air conditioning system.

2. Clean-Up Steps for Hard Surfaces

- Wear gloves and carefully scoop up glass fragments and powder using stiff paper or cardboard and place them in a glass jar with metal lid (such as a canning jar) or in a sealed plastic bag.
- Use sticky tape, such as duct tape, to pick up any remaining small glass pieces and powder.
- Wipe the area clean with damp paper towels or disposable wet wipes. Place towels in the glass jar or plastic bag also gloves.
- Do not use a vacuum or broom to clean up the broken bulb on hard surfaces.

3. Clean-up Steps for Clothing

- If clothing materials come in direct contact with broken glass or mercury-containing powder from inside the bulb that may stick to the fabric, the clothing should be thrown away. Do not wash such clothing because mercury fragments in the clothing may contaminate the machine and/or pollute sewage.
- You can, however, wash clothing or other materials that have been exposed to the mercury vapor from a broken CFL, such as the clothing you are wearing when you cleaned up the broken CFL, as long as that clothing has not come into direct contact with the materials from the broken bulb.
- If shoes come into direct contact with broken glass or mercury-containing powder from the bulb, wipe them off with damp paper towels or disposable wet wipes. Place the towels or wipes in a glass jar or plastic bag for disposal also gloves.

4. Disposal of Clean-up Materials

- Immediately place all clean-up materials outdoors in a trash container or protected area for the next normal trash pickup.
- Wash your hands after disposing of the jars or plastic bags containing clean-up materials.
- Check with your local or state government about disposal requirements in your specific area. Some local governments/states do not allow such trash disposal. Instead, they require that broken and unbroken mercury-containing bulbs be taken to a local recycling center.



**APPENDIX A
WARRANTY REGISTRATION AND CUSTOMER SATISFACTION SURVEY**

Model		Serial #		Purchase Date	
Contact Person			Position:		
Company & Address					
Telephone			Fax:		
E-Mail					

Air Science values your business, so your satisfaction is important to us. To help us to serve you better, please take a few minutes to complete our Customer Satisfaction Survey. You may return the results by post, fax, or e-mail using the details above.

Please circle the number that best describes your evaluation of Air Science and add your comments, if any, at the bottom (and continue on another sheet if necessary). We are also interested to receive comparison against any competitors if you are able to provide the information:

	<u>Excellent</u>	<u>Very Good</u>	<u>Good</u>	<u>Must Improve</u>	<u>Poor</u>
1. Were our quotations provided to you promptly and courteously?	5	4	3	2	1
2. Was your order correct when you received it?	5	4	3	2	1
3. Did you receive your order on time and without damage?	5	4	3	2	1
4. Do our products operate properly?	5	4	3	2	1
5. Do our products meet your requirements?	5	4	3	2	1
6. What is your overall judgement of Air Science?	5	4	3	2	1

We enjoy using Air Science products because:

How could Air Science improve its products and /or service to you?

How could Air Science improve this survey?

Thank you very much for your time. Your comments are much appreciated.

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