# CleanSpace®
## HEALTH & SAFETY

**www.cleanspacetechnology.com**

# USER
# INSTRUCTIONS

## CleanSpace2

## Powered Respirator

USA – English

**www.cleanspacetechnology.com**

**Important! Before use, the wearer must read and understand these user instructions. Keep these user instructions for reference.**

# 1. Contents

Read these instructions in conjunction with the appropriate CleanSpace™ filters and accessories instructions.

⚠️ **WARNING**
**This product is part of a system that helps reduce exposure to certain airborne contaminants. Misuse may result in sickness. For proper use, consult an Occupational Health Specialist, these user instructions or contact CleanSpace Technology Customer Support on sales@cleanspacetechnology.com or the website: cleanspacetechnology.com/welcome/**

# 2. Forward

Read all instructions and warnings before using this device. Keep these user instructions for reference. If you have questions regarding this system contact CleanSpace Customer Service by e-mailing support@cleanspacetechnology.com.

# 3. System Description

CleanSpace2™ is a complete NIOSH approved respiratory protection system ("respirator"). When used in accordance with its NIOSH approval, the respirator helps reduce exposure to certain particulates. CleanSpace2 does not provide protection against vapors or gases and is not an intrinsically safe system. See NIOSH Cautions and Limitations and the Approval Labels for CleanSpace2 for additional information on approvals.

The components of the CleanSpace2 system are shown in Section 9. The blower ("Power Unit") draws ambient air through the high efficiency filter (and filter adaptor if used) and supplies filtered air to the wearer via the mask. CleanSpace2 is a breath responsive respirator which means that it blows harder during inhalation and more softly during exhalation. The device continuously adjusts fan speed to maintain positive pressure in the mask. Should the filter become blocked, an audible alarm will sound and the "Filter" light on the keypad will be illuminated. If the battery voltage falls below the minimum required to sustain the designed flow rate, an audible alarm will sound.

> **WARNING**
>
> **Properly selected, used and maintained respirators help reduce exposure to certain airborne contaminants by reducing concentrations in the wearer's breathing zone. It is essential to follow all instructions and government regulations on the use of this product, including wearing the complete respirator system during all times of exposure, in order for the product to help protect the wearer. Misuse of respirators may result in overexposure to contaminants and lead to sickness. For proper use, consult an Occupational Health Specialist, these user instructions or contact CleanSpace Technology Customer Support on sales@cleanspacetechnology.com or the website: cleanspacetechnology.com/welcome/**

# 4. List of Warnings within these User Instructions

*This product is part of a system that helps reduce exposure to certain airborne contaminants. Misuse may result in sickness. For proper use, consult an Occupational Health Specialist, these user instructions or contact CleanSpace Technology Customer Support on sales@cleanspacetechnology.com or the website: cleanspacetechnology.com/welcome/*

*Properly selected, used and maintained respirators help reduce exposure to certain airborne contaminants by reducing concentrations in the wearer's breathing zone. It is essential to follow all instructions and government regulations on the use of this product, including wearing the complete respirator system during all times of exposure, in order for the product to help protect the wearer. Misuse of respirators may result in overexposure to contaminants and lead to sickness. For proper use, consult an Occupational Health Specialist, these user instructions or contact CleanSpace Technology Customer Support on sales@cleanspacetechnology.com or the website: cleanspacetechnology.com/welcome/*

*No Half Mask or Full Facepiece PAPR can fully protect you if you are not clean shaven. CleanSpace2 is not suitable for users with facial hair.*

*If a satisfactory quantitative fit factor or a passing qualitative test cannot be achieved with any of the masks, CleanSpace2 must not be used. A satisfactory quantitative fit factor for half masks is 1000 for Power On testing and 100 for Power Off testing.*

*Do not use compressed air or a brush to clean the filter! HE filters are very easily damaged by compressed air or by brushing. Misuse by cleaning the filter may result in overexposure to contaminants and lead to sickness.*

*If a satisfactory Seal Check cannot be achieved, do not enter the contaminated zone.*

*Be sure to remove the Seal Check Cap before entering the contaminated area. The Cap blocks the exhalation valve, making it more difficult for your exhaled air to be expelled from the mask. Failure to remove the cap will lead to*

*increased levels of rebreathed Carbon Dioxide, and may result in headache or dizziness. Never leave the Cap in place for more than 2 minutes!*

*Do not remove the respirator until you have vacated the contaminated area unless you have pressing health reasons to do so (for instance you are experiencing dizziness and believe removing the respirator while you leave the contaminated area may help).*

*It is essential that the correct filter type is selected for the chosen application.*

*If the blocked filter alarm is triggered (2 beeps, repeated every second, red LED flashes), leave the contaminated area immediately and replace the filter. Operating the respirator after the blocked filter alarm has sounded can cause the flow to fall below the manufacturer's minimum designed flow, which may result in overexposure to contaminants and lead to sickness.*

*When fitting a new filter the blocked filter alarm shall be tested before the respirator is put back into service. See the heading "Testing the Blocked Filter Alarm" below.*

*Use only NIOSH-approved CleanSpace filters. If used with other filters the CleanSpace2 is not NIOSH approved. Use of other filters may result in overexposure to contaminants and lead to sickness.*

*CleanSpace2 is not intrinsically safe. Do not use in flammable or explosive atmospheres. Doing so may result in injury or death.*

*Always correctly use and maintain the internal lithium ion battery packs. Failure to do so may result in fire or explosion or could adversely affect respirator performance and result in injury, sickness or death. Do not charge the on-board battery with unapproved chargers, in enclosed cabinets without ventilation, near flammable liquids or gases, or near sources of high heat. Do not immerse the device in water. Do not use, charge or store the device outside the recommended temperature limits.*

*If the battery alarm sounds (3 beeps, repeated every second), leave the contaminated area immediately and re-charge the battery. Operating the respirator after the low battery alarm has sounded can cause the flow to fall below the manufacturer's minimum designed flow, which may result in overexposure to contaminants and lead to sickness.*

*In the extremely rare circumstance that the battery is damaged and electrolyte comes in contact with eyes, flush with water immediately and seek urgent medical attention.*

*Never dry the mask or exhalation valve with a cloth that may leave behind lint. Lint contamination of the exhalation valve may cause it to leak, resulting in overexposure to contaminants and lead to sickness.*

*The Power Unit contains a battery, sensitive electronics and a motor. NEVER immerse it in water or use anything wetter than a damp cloth to clean it.*

*The Steri-Plus Exhalation Filter (CS3039) is an electrostatic filter and its performance will be degraded by exposure to certain organic solvents including isopropanol (IPA), xylene and toluene. Always remove the Exhalation Filter before cleaning the mask. If there is a possibility that the Exhalation Filter has become contaminated with any solvent, replace it.*

*You must recalibrate the internal pressure sensor any time that your CleanSpace2 is exposed to changes in temperature of more than 36°F (20°C). It is best practice to also re-calibrate if the unit has been in storage, particularly if the storage temperature is not known.*

# 5.  NIOSH – Approval, Cautions and Limitations

**NIOSH APPROVAL**

CleanSpace2 is a NIOSH-approved respirator system. Refer to these User Instructions and to the NIOSH approval label provided with each CleanSpace2 for a listing of components that can be used to form a NIOSH-approved respirator.

**NIOSH CAUTIONS AND LIMITATIONS**

A - Not for use in atmospheres containing less than 19.5 percent oxygen.

B - Not for use in atmospheres immediately dangerous to life or health.

C - Do not exceed maximum use concentrations established by regulatory standards.

F - Do not use powered air-purifying respirators if airflow is less than four cfm (115 lpm) for tight fitting facepieces or six cfm (170 lpm) for hoods and/or helmets.

I – Contains electrical parts that may cause an ignition in flammable or explosive atmospheres.

J - Failure to properly use and maintain this product could result in injury or death.

L - Follow the manufacturer's User's Instructions for changing cartridges, canister and/or filters.

M - All approved respirators shall be selected, fitted, used, and maintained in accordance with MSHA, OSHA, and other applicable regulations.

N - Never substitute, modify, add, or omit parts. Use only exact replacement parts in the configuration as specified by the manufacturer.

O - Refer to User's Instructions, and/or maintenance manuals for information on use and maintenance of these respirators.

P - NIOSH does not evaluate respirators for use as surgical masks.

S - Special or critical User's Instructions and/or specific use limitations apply. Refer to User's Instructions before donning.

# 6.  S - Special or Critical User Instructions

**This respirator contains a system for synchronizing with your breathing and regulating mask pressure. This system requires re-calibration whenever it experiences a change in temperature of more than 36°F (20°C). It is best practice to also re-calibrate if the unit has been in storage, particularly if the storage temperature is not known.**

**For the most accurate battery charge indication, <u>the respirator must be plugged into its charger</u>. To be sure it is fully charged, plug in the charger and wait for all 3 LEDs to light solidly without flashing. If the 3rd LED is flashing rapidly, the battery is 95% charged.**

**When fitted with HE + Nuisance Odor filter PAF-1108 the respirator offers nuisance level relief from**

- o **Organic vapors**
- o **Acid gases**
- o **Ammonia**

**that are below the Permissible Exposure Limit (PEL). Nuisance level refers to concentrations not exceeding the OSHA PEL or other government occupational exposure limits, whichever is lower.**

*Note: NIOSH does not evaluate the effectiveness of Nuisance Odor Filters for the removal of Nuisance Odors.*

# 7.  Limitations of Use

Use this Respirator strictly in accordance with all instructions in these user instructions. Never modify or alter this product.

- **Do not remove the Respirator until you have left the contaminated area**,
  unless you have pressing health reasons to do so (for instance you are experiencing dizziness and believe removing the respirator while you leave the contaminated area may help).

- Only suitable for use by clean-shaven personnel. Facial hair under the seal reduces protection and is not permitted.
- This respirator DOES NOT PROTECT YOUR EYES. In conditions that may damage or irritate eyes, use protective eyewear.
- Only use your respirator with the parts and accessories listed on the Approval Label.
- Do not use the respirator unless it is powered and running normally.
- Do not use the respirator while it is being charged via the AC adaptor.
- Do not use in airborne contaminant concentrations above those specified in your national regulations.
- Do not use for respiratory protection against unknown atmospheric contaminants or when concentrations of contaminants are unknown or immediately dangerous to life or health (IDLH).
- Do not use in oxygen deficient or oxygen enriched atmospheres. Do not use in flammable or explosive environments.
- Only for use by trained personnel.
- Filters need to be changed regularly. The frequency of change depends on use and the concentration of contaminants in the atmosphere.
- Do not use for escape purposes. National regulations may impose specific limitations on the use of filters depending on the filter class and the facemask used.

**LEAVE THE CONTAMINATED AREA IMMEDIATELY IF:**

- respirator warning lights and/or sounds activate for low battery or blocked filter
- any part of the respirator is damaged
- air flow into the mask decreases or stops
- breathing becomes difficult or increased resistance occurs
- you feel dizzy or your airway is irritated
- you can taste or smell contaminants.

Your respirator is suitable for use in the following atmospheric conditions:
- Temperature: 14°F to 113°F (-10°C to 45°C).
- Relative humidity: 0 to 90% non-condensing.

The respirator will stop functioning if its internal temperature rises above 140°F (60°C) or falls below 14°F (-10°C).

If the respirator has been used in an area that has caused it to become contaminated with a substance requiring special decontamination procedures it should be placed in a suitable container and sealed until it can be decontaminated.

Do not disassemble the respirator case. There are no user serviceable parts inside.

Failure to follow all instructions on the use of this product, and/or failure to use the respirator during times of exposure, may lead to adverse effects on the wearer's health and may render the warranty void.

> ⚠️ **WARNING**
> *This product is part of a system that helps reduce exposure to certain airborne contaminants. Misuse may result in sickness. For proper use, consult an Occupational Health Specialist, these user instructions or contact CleanSpace Technology Customer Support on sales@cleanspacetechnology.com or the website: cleanspacetechnology.com/welcome/*

# 8. Respirator Program Management

Occupational use of respirators must be in compliance with applicable health and safety standards. By United States regulation employers must establish a written respiratory protection program meeting the requirements of the Occupational Safety and Health Administration (OSHA) Respiratory Protection standard 29 CFR 1910.134, Standard Practice for Respiratory Protection ASTM F3387 and any applicable OSHA substance specific standards. For additional information on this standard contact OSHA at www.OSHA.gov. In Canada, CSA standard Z94.4 requirements and/or the requirements of the applicable jurisdiction must be met. Contact an industrial hygienist or CleanSpace Technical Service with questions concerning the applicability of the respirator to your job requirements.
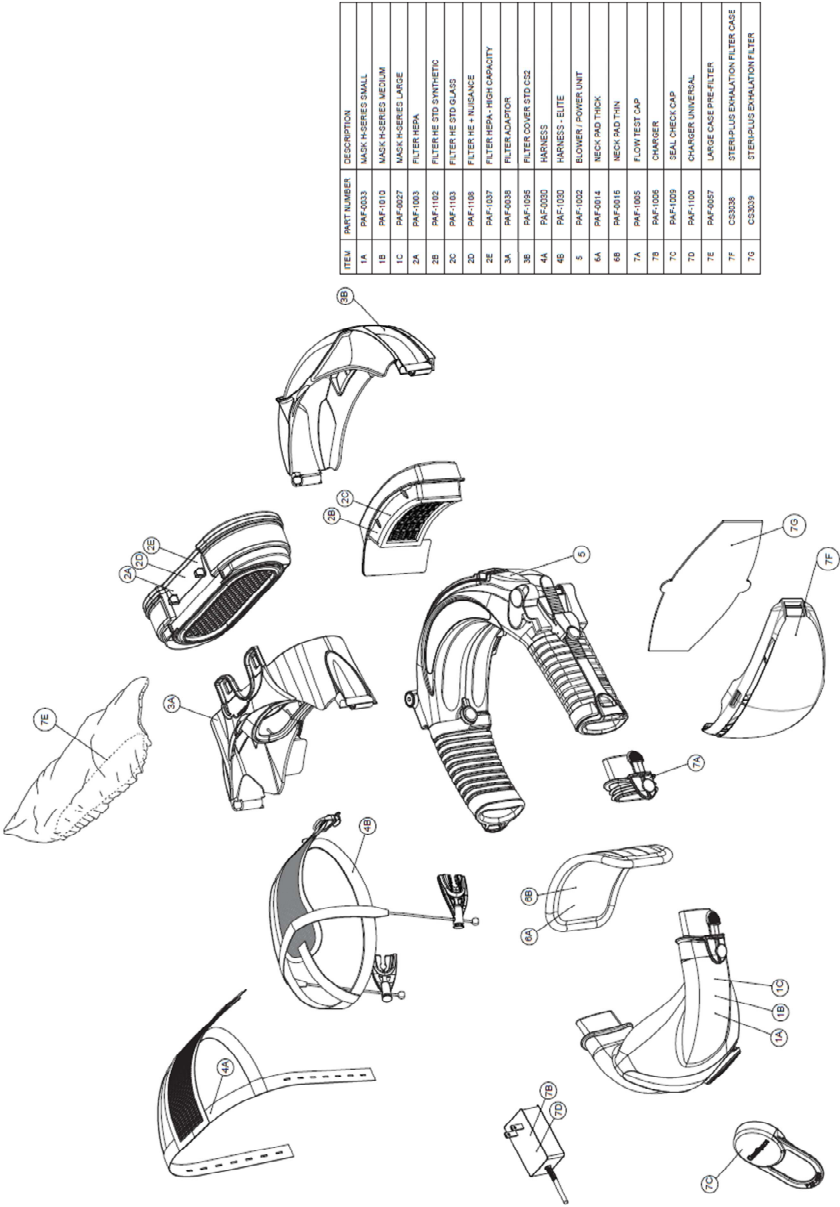
# 9. System Components



| ITEM | PART NUMBER | DESCRIPTION |
|---|---|---|
| 1A | PAF-0033 | MASK H-SERIES SMALL |
| 1B | PAF-1010 | MASK H-SERIES MEDIUM |
| 1C | PAF-0027 | MASK H-SERIES LARGE |
| 2A | PAF-1003 | FILTER HEPA |
| 2B | PAF-1102 | FILTER HE STD SYNTHETIC |
| 2C | PAF-1103 | FILTER HE STD GLASS |
| 2D | PAF-1108 | FILTER HE + NUISANCE |
| 2E | PAF-1037 | FILTER HEPA - HIGH CAPACITY |
| 3A | PAF-0038 | FILTER ADAPTOR |
| 3B | PAF-1096 | FILTER COVER STD CS2 |
| 4A | PAF-0030 | HARNESS |
| 4B | PAF-1030 | HARNESS - ELITE |
| 5 | PAF-1002 | BLOWER / POWER UNIT |
| 6A | PAF-0014 | NECK PAD THICK |
| 6B | PAF-0015 | NECK PAD THIN |
| 7A | PAF-1005 | FLOW TEST CAP |
| 7B | PAF-1006 | CHARGER |
| 7C | PAF-1009 | SEAL CHECK CAP |
| 7D | PAF-1100 | CHARGER UNIVERSAL |
| 7E | PAF-0057 | LARGE CASE PRE-FILTER |
| 7F | CS3036 | STERI-PLUS EXHALATION FILTER CASE |
| 7G | CS3039 | STERI-PLUS EXHALATION FILTER |

Figure 1 - System Components

## PARTS OF THE RESPIRATOR

Your respirator can be used with either a standard filter (PAF-1102 or PAF-1103) or with a range of high capacity filters (PAF-1003, PAF-1108 & PAF-1037). The high capacity filters are used with a filter adaptor (PAF-0038) and the standard filters are used with a filter cover (PAF-1095). Most functions of the respirator are the same regardless of which filter is being used. Where there are differences, they are explained in this manual.

| Respirator with Standard Filter and Filter Cover | Respirator with High Capacity Filter and Filter Adaptor |
|---|---|
|  |  |
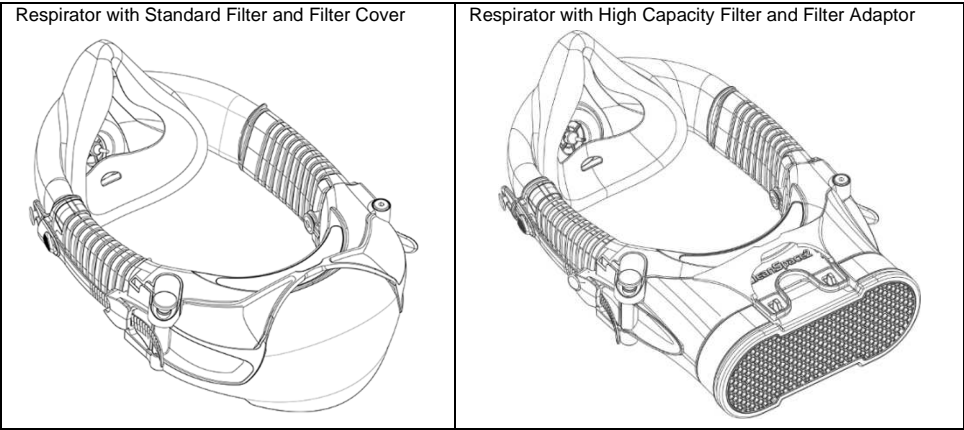
Through this manual reference is made to various commonly-used components and features of the machine. Familiarize yourself with these parts before reading the rest of the manual. See Figure 2.
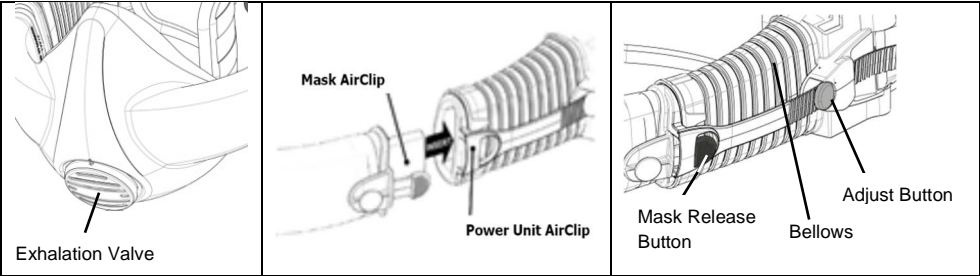


Figure 2 - Parts of the Respirator

# 10. Controls and Indicators

### POWER BUTTON

*This button is used to switch between the three (3) operating Modes: "On", "Standby" and "Off" Mode.*

i) **Standby Mode** is when the green battery indicator lights are on, the motor is not running and there is no airflow to the mask. The respirator will automatically switch to Standby Mode within ten (10) seconds of the user taking it off. If the respirator is in Off Mode it will switch to Standby Mode when the Power button is pressed.

ii) **On Mode** is when the respirator is being worn, the motor is running and there is air flow to the mask. The motor will start (called On Mode) when the respirator detects a change in pressure in the mask triggered by your breathing. In On Mode you should hear the motor running and feel the airflow on your face. You can also switch to On Mode (start the motor) from Standby Mode by pressing the Power button once.

iii) **Off Mode** is when the green battery indicator lights are off and the motor is not running and there is no air flow to the mask. The respirator automatically switches into Off Mode three (3) minutes after it has been removed from the user's face and the sensors detect that there is no breathing.

To conserve battery life, the respirator is designed to automatically switch from On Mode to Standby then to Off Mode when not being worn.

Important: CleanSpace2 switches into On Mode when it is in Standby Mode and the wearer starts to breathe. The respirator can only switch into On Mode from Standby Mode.

### FLOW TEST BUTTON

This button is used to check that the respirator is able to deliver its minimum designed flow. Pressing it once, when the CleanSpace2 is in Standby Mode (not ON Mode), starts the flow test which lasts about 5 seconds. **See Section 12 Step 3 for instructions on running the flow test.**

### BATTERY INDICATOR LIGHTS

Your respirator is equipped with an indicator of battery charge. There are three (3) battery indicator lights. With the charger plugged in and three green lights lit, the battery is fully charged and has up to eight (8) hours of operating time. The respirator should be fully charged before use.

If you need to be sure the battery is 100% charged plug in the charger. Even if the battery is fully charged, the 3rd LED will flash for at least three minutes while the respirator checks its condition. Once **all 3 LEDs light solidly without flashing the battery is at 100%.**

For how to assess the level of charge, see Section 16.

When the battery approaches a level at which it would not be able to supply the Manufacturer's Minimum Design Flow, an alarm sounds (3 beeps, repeated once per second). All green battery lights are extinguished. **If the low battery alarm sounds you must leave the contaminated area immediately and recharge the battery.**

*Operating time is strongly affected by work rate, altitude, and other factors. The operating times quoted above are average durations at moderate work rates at sea level. Actual operating times may vary widely from average durations.*

### FILTER WARNING ALARM

CleanSpace2 has a Filter Warning Alarm, which is triggered when the filter is blocked**. If the Filter Warning Alarm sounds** (two beeps, repeated once per second) or the Filter Warning Alarm light comes on, **you must move out of the contaminated area**, **and change the filter**.

# 11. Mask Fitting

Before you use your respirator you must determine the right mask for your face and know how to adjust the machine to achieve a good fit.

It is vital that your mask is the right size for your face and fits properly. **Mask fitting must be carried out by a specialist / designated mask fitter**. The fit must be confirmed by a **fit test** performed according to OSHA

regulations 1910.134. A fit test must be performed during initial selection of a respirator, or whenever the user's face changes shape (for instance due to weight gain or loss) and at least annually.

**Qualitative Fit Testing -** To perform a **qualitative** fit test, follow the relevant standard and/or the instructions provided with the test substance. A qualitative test provides only a PASS/FAIL result, not a fit factor.

**Quantitative Fit Testing -** To carry out a quantitative fit test your specialist mask fitter will require **PAF-0025 PortaCount Adaptor** and the accompanying **S005-7174 Quantitative Fit Test Instructions.** The PortaCount Adaptor is an accessory that fits between the mask and the exhalation valve and allows the air in the mask to be sampled. It comes with detailed instructions on how to carry out a quantitative fit test.

⚠️ **WARNING**
**No Half Mask or Full Facepiece PAPR can fully protect you if you are not clean shaven. CleanSpace2 is not suitable for users with facial hair.**

## MASK SELECTION GUIDELINES

**No set of guidelines can ensure that you have the right size mask for your face. You must confirm the fit with a fit test** performed according to OSHA regulations 1910.134**.** However, the information below will help your mask fitting specialist to select the mask most likely to fit you, and may therefore save time.

| Description | Diagram |
|---|---|
| **Face Width** |  |
| **Face Length** |  |

Using the above definitions of face width and length, the face size of a user can be determined by employing the NIOSH panel below.
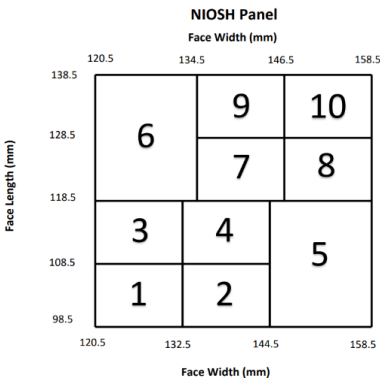
The table below specifies the fitting sequence that should be employed based on the face size of the user. The 'fitting sequence' is simply the order in which the face masks should be checked for fit.

**Half Mask Fitting Sequence**

| NIOSH Panel Number | First Try | Then Try |
|---|---|---|
| 1-2 | Small | Medium |
| 3-7 | Medium | Small OR Large* |
| 8-10 | Large | Medium |

* If the medium mask fails initially, the mask fitting specialist will determine whether to try the small or large mask next.

## CHECKING FIT BEFORE CONDUCTING A FIT TEST

Your mask fit must be confirmed by a **fit test** performed according to OSHA regulations 1910.134. But before carrying out that test, you can watch for some simple signs that the mask is not fitted correctly.

**Evaluating mask fit is best done with a <u>buddy</u> to help you check adjustments and fit!**

*No Gaps:*  There should be no visible gaps between your face and the mask. Have your buddy check.

*No Creases:*  If the mask is pulled too tight, or is too large for the face, creases may develop at around the level of the mouth or on the centerline at the bottom of the cushion. Loosen the mask a little or try a smaller mask.

*Look Down:*  Look down and have your buddy check for a gap between the bridge of the nose and the mask. Also check that the mask has not come loose around the chin. Try to fit the chin further into the mask. If that does not work, try a smaller mask.

*No air in the eyes:*  With CleanSpace2 running, check no air leaks into your eyes. If it does, try tightening the mask, or loosen the harness a little (dropping the height of mask on the face). If those adjustments do not fix the problem, try a different size mask.

*Check for Distortion*:  You should be able to achieve a good fit without the mask being uncomfortably tight.

*Beyond a certain point, tightening the mask makes the fit worse not better*: Check the outer surfaces of the mask. They should curve outwards. If they are curved in towards the face, you have the mask on too tight.



If these surfaces cave in - mask is too tight!
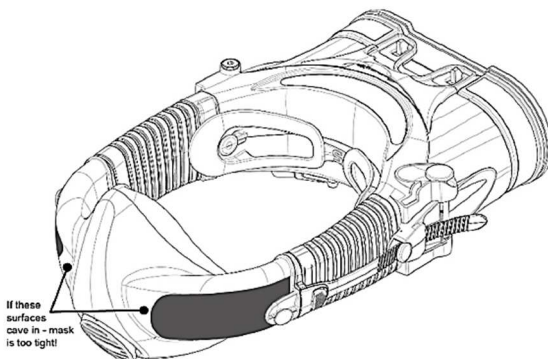
Once you have achieved an acceptable mask fit and confirmed it with a fit test, record the mask size, neck pad size (if any) and, if a quantitative test has been performed, the fit factor achieved.

⚠ **WARNING**
**If a satisfactory quantitative fit factor or a passing qualitative test cannot be achieved with any of the masks, CleanSpace2 must not be used. A satisfactory quantitative fit factor for half masks is 1000 for Power On testing and 100 for Power Off testing.**

# 12. Using CleanSpace2

Complete the following five steps each time you use your respirator.

## STEP 1 - INSPECT

### Before each entry into a contaminated area, the following inspections must be performed:

- Visually check the entire respirator system including the blower ("Power Unit"), mask, harness, filter cover or filter adaptor and filter. If parts are missing or damaged replace them only with approved parts before proceeding. Check the top and bottom case of the Power Unit, the Filter Cover and the Filter Adaptor for cracks or other damage. Do not use the device if there is any damage.
- Remove the filter and check it carefully. The seal must be clean and free from damage of any kind. If necessary it can be cleaned with a cloth dampened with water. Examine the visible internal surfaces for any sign that dust has leaked past a damaged seal. If found, replace the filter. The body of the filter must not be cracked or show any sign of damage. Examine the filter carefully for any sign that it has sustained an impact or been scratched. If any sign of impact or scratching is found, discard the filter. Refit the filter (see Section 15).



**WARNING**
***Do not use compressed air or a brush to clean the filter! HE filters are very easily damaged by compressed air or by brushing. Misuse by cleaning the filter may result in overexposure to contaminants and lead to sickness.***

- Check that the battery is fully charged by pressing the power button. All three battery LEDs must light. See Section 16.
- Check both bellows for splits or holes. Check that the bellows have not become distorted so as to partially or fully close the air path to the mask.
- Check the mask to ensure that there are no cracks, tears or dirt; check the mask is not distorted.
- Check the exhalation valve for damage or dirt build up. If it is dirty, remove the exhalation valve cover. Remove any dirt, hairs or anything that could affect the seal of the valve against its seat. Check that the valve seat is clean. Reinstall the valve cover. If the valve is damaged, replace the mask.
- Check the harness is intact and is not frayed or damaged. It must be adjusted to support some of the weight of the respirator.

## STEP 2 – CALIBRATE

This respirator contains a system for synchronizing with your breathing and regulating mask pressure. **This system requires re-calibration whenever it experiences a change in temperature of more than 36°F (20°C). It is best practice to also re-calibrate if the unit has been in storage, particularly if the storage temperature is not known. To re-calibrate:**

1. Remove the mask (if fitted). The Flow Test Cap must not be fitted.
2. **Remove the filter from the respirator**. If using a standard filter, close the filter cover. If using the filter adaptor leave it in place. Place the respirator on a stable surface such as a table.
3. With the respirator in standby mode (one or more green LEDs lit), press and hold both the Power button and the Flow Test button.
   *If no LEDs are lit, press the Power button once to enter standby mode.*
4. When both the blue and red LEDs light, release both buttons. Leave the respirator sitting still.
5. After 5 – 10 seconds the motor will start and run for 5 – 10 seconds.
6. When the motor stops, calibration is complete.
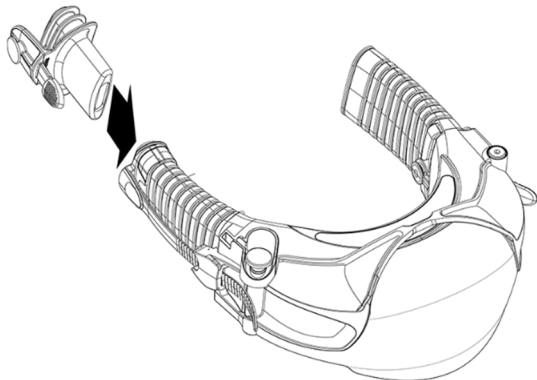7. Re-fit the filter.

*Important Note:* Failure to remove the filter prior to calibration may result in reduced run times. In order to restore performance of the respirator, calibration must be performed again with the filter removed.

## STEP 3 – TEST FLOW RATE

*This test checks that the machine is able to deliver the Manufacturer's Minimum Design Flow of 115 liters/minute. This check must be completed before entry into a contaminated area.*

*If no LEDs are lit, press the Power button once to enter standby mode.*

**1.** *Remove the mask from the respirator.* **Leave the filter in place.**

2. Fit the yellow Flow Test Cap to the <u>left</u> bellow. See Figure 3.



> **To avoid unnecessary filter changes, it is important to fit the Flow Test Cap to the LEFT bellow.**
>
> **No air flows out of the right bellow. Fitting the Flow Test Cap to the right bellow will result a FAIL result, even if the filter is clean and battery fully charged.**

Figure 3 - Flow Test

3. Make sure nothing is blocking the Flow Test Cap or the filter inlet. Place the respirator flat on a table or other support.

4. Press and release the button marked "Flow Test".

5. The respirator automatically runs the Flow Test. The motor will run fast and air will be discharged from the Flow Test Cap.

6. After 2 seconds the respirator reports the result of the test using the LEDs on the keypad. Use the table below to interpret the LEDs.

| LIGHTS | Meaning |
|---|---|
| **3 LEDs:** | PASS (Excellent: flow >180 l/min)** |
| **2 LEDs:** | **PASS (Good)** ** |
| **1 LED:** | **PASS (Acceptable)** |
| **ALL LEDs FLASH** | **FAIL (Flow <115 l/min)** |
| | **Do not use the respirator until a new filter has been fitted and / or battery charged and the test has been repeated with a PASS result.** |
| | *Reset the respirator by pressing the Power button. Fully charge the battery and / or replace the filter. Repeat the flow test. If filter is new and battery fully charged but the respirator fails the test, contact CleanSpace and do not use until it has been evaluated.* |

***\*\* This test is not a battery charge test. Three LEDs means that, as of the moment it is tested, the unit can deliver high flow. <u>It does not mean the battery is full</u>. You must check the battery condition separately. See Section 16.***

7. Remove the yellow Flow Test Cap and store for later use.

## STEP 4 - DON THE RESPIRATOR

**NOTE:    Please read STEP 4 <u>all the way through</u> before beginning to don the respirator.**

**NOTE: If using the Elite Harness PAF-1030 please consult the instructions that came with that harness to complete Step 4.**

Locate your Power Unit, mask, neck pad and harness. **Make sure the mask and neck pad are of the size that you used for your last successful fit test.**

### Fit a mask to CleanSpace2

*Examine the mask AirClips. One is open and one is closed. Find the one that is **closed**. Seen from above it is on the right-hand side as shown in Figure 4. Locate the right-hand Power Unit AirClip. It is on the same side of the Power Unit as the "Flow Test" button. See Figure 5.*



Figure 4 - Right hand (closed) mask AirClip
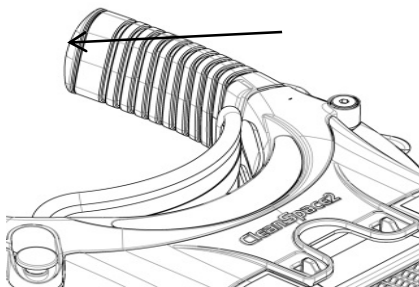


Figure 5 - Right hand Power Unit AirClip

*Join the AirClip, so that the mask is attached to the Power Unit. See Figure 6 and Figure 7.*



Figure 6 - Join AirClip



Figure 7 - Mask on Power Unit (Note connection on right hand side)

***Check that the mask is the right way up!*** *The pointed, nose section of the mask must face up, in the same direction as the keypad. See Figure 8.*
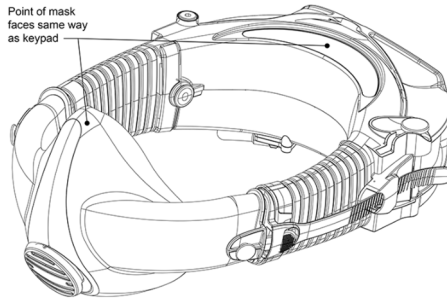
Figure 8 - Nose section of mask and keypad must both face up

*Leave the other mask arm and bellow free until you are fitting the respirator. Familiarize yourself with the Adjust Buttons and the Mask Release Buttons. See Figure 9.*
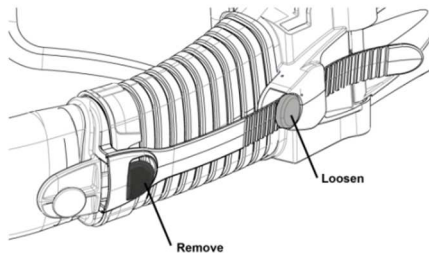


Figure 9 - Mask Release Button and Adjust Button

### Fit the Harness

*Locate the strap on the harness that is made from loop-pile material. This is the back strap. If a neck pad is in place, remove it by pulling it away from the two strips of loop-pile material on the Power Unit. Locate the section of hook material on the end of the back strap of the harness. Fit the back strap of the harness to the Power Unit by pressing the section of hook material on the end of the strap against the two strips of loop-pile material on the Power Unit. Note that the rear strap fits behind the neck pad. See Figure 10.*
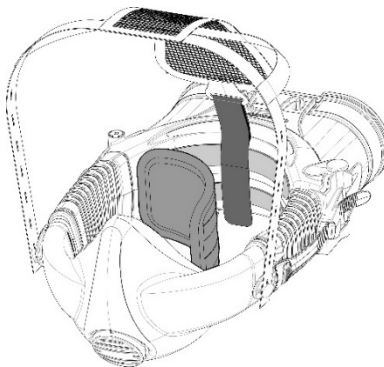


Figure 10 - Harness Rear Strap

*The two front straps of the harness fit to the AirClips on the mask. See Figure 11. If unsure of your fitting, start with the 3$^{rd}$ hole from the end of the strap.*
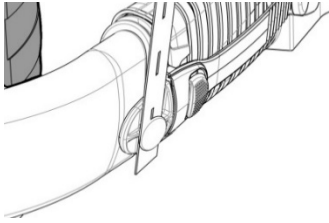
Figure 11 - Harness Front Strap

*Make sure to use the same settings on the harness as you used in your last successful fit test.*

## Fit a Neck Pad

*The pad is fitted with two strips of hook fabric. Press these strips against the matching strips of loop fabric on the Power Unit. The centerline of the Neck Pad should align with the centerline of the Power Unit. Figure 12 shows the neck pad being fitted.*
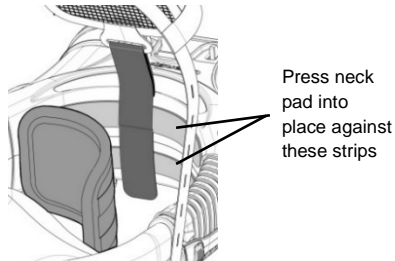


Press neck pad into place against these strips

Figure 12 - Fitting neck pad

*Make sure to fit the same size neck pad as you used in your last successful fit test.*

## Loosen both bellows to their widest opening

*Press the adjust button on the Power Unit and pull on the bellows to extend them. See Figure 13.*
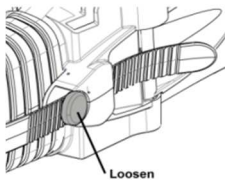


Loosen

Figure 13 - Adjust Button

## Place the machine in Standby Mode

*Press the Power button once.*

### Install the PAF-0057 Pre-Filter (Optional)

*If using your CleanSpace2 with the PAF-1037 high-capacity filter, you have the option of installing the PAF-0057 Pre-Filter. To do this, simply stretch the Pre-Filter over the installed PAF-1037 filter as shown in Figure 14 and Figure 15.*



Figure 14 – Installed Pre-Filter (Top View)



Figure 15 – Installed Pre-Filter (Rear View)

### Don the respirator and start to breathe. (The motor should start)

*Place the Power Unit behind your neck with the bellows and mask hanging down one side. See Figure 16.*

*Hold the mask in your left hand and the harness in your right. See Figure 17.*

*Pull the mask around onto your face and the harness over your head. See Figure 18.*

*Press your chin into the cup at the bottom of the mask and your nose into the top section of it.*

*Fasten the AirClip on your left-hand side. See Figure 19 and Figure 20.*

*Reach up and pull the harness forward to settle it on your head. See Figure 21.*
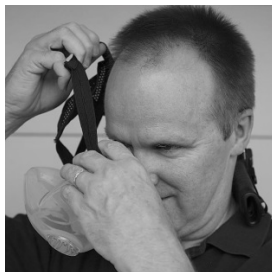


Figure 16 - Power Unit behind neck



Figure 17 - Left hand on mask, right on harness



Figure 18 - Mask on face, harness on head
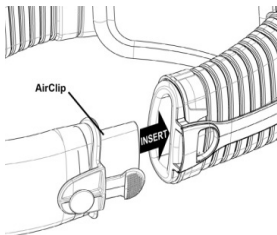


Figure 19 - Fasten AirClip



Figure 20 - AirClip



Figure 21 - Settle harness

*Breathe normally. The motor should start and you should feel fresh air on your face. If the motor does not start, it was not in Standby Mode. Take the respirator off, press the Power button to activate Standby Mode and don it again as described above.*

### Check the Harness

*The Harness should take a little of the weight of the mask and support the Power Unit so that the respirator system sits level on your head. If necessary adjust the harness. This is mostly done by shortening or*

*lengthening the front straps of the harness, by moving between the different button holes. Remember to shorten or lengthen each side by the same amount. The length of the rear strap can be changed by adjusting the length of the top loop of strap where it passes around an eye in the mesh "cap". See Figure 22. To adjust the strap, doff the respirator, adjust the strap, and don it again.*
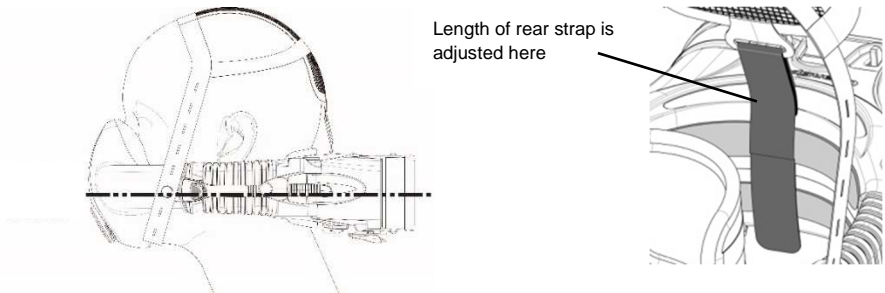
Length of rear strap is adjusted here

Figure 22 - Correct CleanSpace2 Position

### Tighten the mask on your face

*Tighten the mask until you do not feel any leaks between the mask cushion and your face.*

*To tighten the mask, place one hand against the back of the Power Unit and the other over the front of the mask. Push the Power Unit forwards and the mask back, tightening the fit. You will hear a series of clicks as the mask is tightened. See Figure 23.*

*Be careful to tighten each side by the same amount.*

Figure 23 - Tightening Mask

## STEP 5 – CHECK MASK SEAL

**It is essential to do a Seal Check every time you wear a CleanSpace2.**

*Locate PAF-1009, the red Seal Check Cap. Fit the Seal Check Cap over the exhalation valve in the mask. The Cap should snap into place. See Figure 24.*
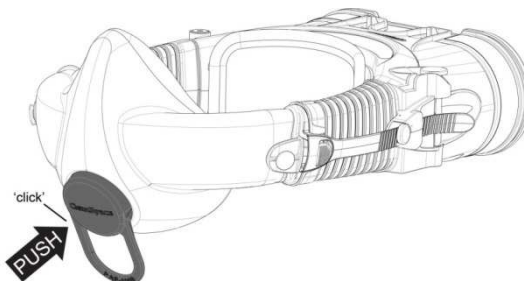
'click'

PUSH

Figure 24 - Fitting Seal Check Cap

*Check that no air is flowing from the exhalation valve. Breathe normally. Using your fingers, feel around the perimeter of the mask for leaks. You will feel any leak as a cool flow of air over your finger. For greater sensitivity breathe out firmly to raise the mask pressure. Wetting your fingers will make it easier to feel tiny leaks. If necessary*

*tighten the mask. To tighten the mask, place one hand against the back of the Power Unit and the other over the front of the mask. Push the Power Unit forwards and the mask back, tightening the fit. You will hear a series of clicks as the mask is tightened. Be careful to tighten each side by the same amount. After each tightening, feel for leaks again. Tilt your head down (look at the ground) and up (look at the sky). Check that there are still no leaks. Look right and left, checking for leaks. Adjust if necessary. Once you can feel no leaks from the mask, the seal check is complete.*

> **WARNING**
> *If a satisfactory Seal Check cannot be achieved, do not enter the contaminated zone.*

*Remove the Seal Check Cap by gently twisting the handle so that one side of the cap comes loose from the exhalation valve. Be careful not to dislodge the exhalation valve cover. See Figure 25.*
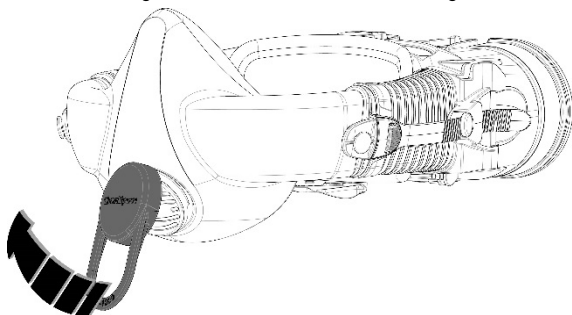

Figure 25 - Removing Seal Check Cap

> **WARNING**
> *Be sure to remove the Seal Check Cap before entering the contaminated area. The Cap blocks the exhalation valve, making it more difficult for your exhaled air to be expelled from the mask. Failure to remove the cap will lead to increased levels of rebreathed Carbon Dioxide, and may result in headache or dizziness. Never leave the Cap in place for more than 2 minutes!*

## STEP 6 – INSTALL STERI-PLUS EXHALATION FILTER (OPTIONAL)

*First, ensure the Steri-Plus (CS3038 and CS3039) is assembled by following the instructions located in Section 15. Then, remove the respirator and align the assembled case and filter to the valve cover so that the vents on the outer case are at the bottom of the mask. Push the assembled case onto the exhalation valve until it clicks into place as shown in Figure 26.*
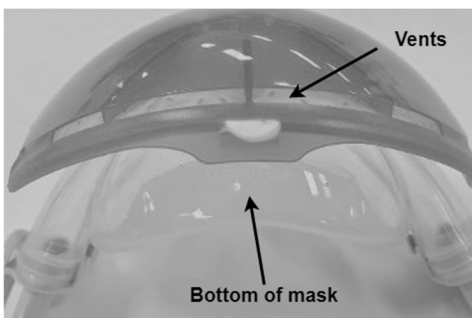

Figure 26 – Installing Steri-Plus Assembly

*The CleanSpace2 is now ready to be re-donned for use. Re-don the respirator, repositioning the harness on your head and tighten the mask bellows so the mask feels the same on your face as prior to fitting the Steri-Plus Exhalation Filter. Ensure the mask fits snugly and that there are no leaks by feeling around the perimeter of the mask for leakage while exhaling firmly.*

# 13. Entering and Exiting the Contaminated Area

Prior to entering the contaminated area, complete the inspections and checks listed in these user instructions.

1. Ensure Seal Check has been done and motor is responding to your breathing
2. Check that none of the alarms are sounding.
3. Remember that if your workplace is very noisy you may not be able to hear the device alarms. **In this case you must follow the special precautions set out in Section 14.**
4. Enter the work area
5. Do not remove the respirator until you have left the contaminated area, unless you have pressing health reasons to do so (for instance you are experiencing dizziness and believe removing the respirator while you leave the contaminated area may help).
6. Leave the contaminated area immediately if any of the following conditions occur:
   a. Any part of the system is damaged.
   b. Airflow into the mask decreases or stops.
   c. The battery of filter alarms are triggered (even if only the audible or only the visible alarm triggers).
   d. Breathing becomes difficult.
   e. You feel dizzy or your vision is impaired.
   f. You smell or taste contaminants.
   g. Your face, eyes, nose or mouth become irritated.
   h. You suspect the concentration of contaminants may have reached levels at which this respirator may no longer provide adequate protection.
7. Follow the exiting and decontamination procedures as documented in the workplace Respiratory Protection Program.

To remove the respirator, find the Mask Release Button and press to release the mask from the blower ("Power Unit"). See Figure 27.
**The mask release button has a rough, dimpled finish that you can feel with your fingertips. All the other buttons are smooth.**
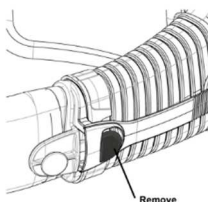


Figure 27 - Mask Release Button

Note:  The respirator motor will automatically switch off and go into Standby Mode in approximately 10 seconds when no breath is detected. In Standby Mode, if after three (3) minutes no breath is detected, the Respirator will automatically go into Off Mode. In Off Mode, all the battery indicator lights will be off and the motor will not be triggered by the wearer's breathing.

⚠️ **WARNING**
**Do not remove the respirator until you have vacated the contaminated area unless you have pressing health reasons to do so (for instance you are experiencing dizziness and believe removing the respirator while you leave the contaminated area may help).**

# 14. Working in Noisy Environments

In most noisy environments the CleanSpace2 alarms are still clearly audible to the wearer. But if there is a chance that you will not hear the alarms, you must take the following extra precautions.

- Never enter the contaminated zone unless all three green battery indicator lights are illuminated.
- Never work in the high noise area for more than four (4) hours. At the end of four hours, leave the contaminated zone and check that
  - o The filter blocked light is not illuminated; AND
  - o All three green battery indicator lights are still illuminated.
- If two or fewer green battery indicator lights are illuminated, recharge CleanSpace2 until 3 lights are showing again (and the 3$^{rd}$ one has stopped flashing).
- If the filter blocked light is illuminated, change the filter.
- Be particularly aware of difficulty breathing or of the air flow stopping. If these things happen, exit the contaminated zone immediately.

# 15. Fitting & Changing the Filter

Before using the respirator you must ensure that you are using the correct filter type for the environment you are working in.

**WARNING**
***It is essential that the correct filter type is selected for the chosen application.***

Before changing the filter, move out of the contaminated area and remove the respirator. Used filters should be disposed of responsibly and treated as non-recyclable hazardous* waste (* dependent on the contaminant being filtered). Filters need to be regularly changed. The frequency of change depends on use and concentration of contaminants in the atmosphere.

### BLOCKED FILTER ALARM
All CleanSpace respirators have a Filter Blocked alarm, which is triggered when the filter requires replacement (2 beeps, repeated every second).

**WARNING**
***If the blocked filter alarm is triggered (2 beeps, repeated every second, red LED flashes), leave the contaminated area immediately and replace the filter. Operating the respirator after the blocked filter alarm has sounded can cause the flow to fall below the manufacturer's minimum designed flow, which may result in overexposure to contaminants and lead to sickness.***

(Pressing the Power button once will mute the Filter Blocked alarm, allowing you to concentrate while you exit the contaminated zone. After 15 minutes, if the filter has not been changed, the alarm will resume).

### WHEN TO CHANGE THE PARTICULATE FILTERS
Change the filter

- When the Blocked Filter Alarm sounds.
- If the Flow Test indicates that the respirator is not able to produce the Minimum Design Flow.
- If there is any sign of damage to the filter.
- When the filter reaches its expiry date (marked on the filter label).
- When the outside of the filter is heavily soiled.
- When the filter is wet.
- If there is any sign of dust or contaminants on the inside surface of the filter.

A respirator with a clean filter will run for much longer than one with a filter that is dirty. To maximize your work time between battery charges, it is best to change the filter more often. CleanSpace filters cannot be cleaned.
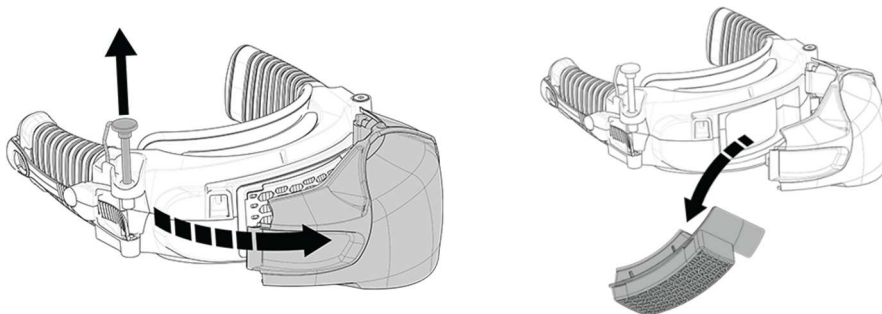
**WARNING**
***Do not use compressed air or a brush to clean the filter! HE filters are very easily damaged by compressed air or by brushing. Misuse by cleaning the filter may result in overexposure to contaminants and lead to sickness.***

## WHEN TO CHANGE THE NUISANCE ODOR FILTER

In addition to the triggers listed above, you should change the nuisance odor filter if you notice any smell of gas in the mask.

## CHANGING THE STANDARD FILTERS (PAF-1102 & PAF-1103)

To unlock the filter cover, lift the pin located on the end of the filter cover. The filter cover will swing open exposing the used filter. Remove the filter. Check that the area where the filter sits is clean. If necessary wipe it with a clean cloth or a CleanSpace Cleaning Wipe. Fit a new filter. Swing the filter cover back into closed position and hold it firmly against the body of the respirator with one hand. Press the pin down until clicked back into place. Check that the blocked filter alarm is working, as described below.



| ⚠ | **WARNING**<br>**When fitting a new filter the blocked filter alarm shall be tested before the respirator is put back into service. See the heading "Testing the Blocked Filter Alarm" below.** |
|---|---|

## USING HIGH CAPACITY FILTERS (PAF-1003, PAF-1108 & PAF-1037)

The high capacity filters require the use of an adaptor. Follow the steps below to fit the Adaptor.
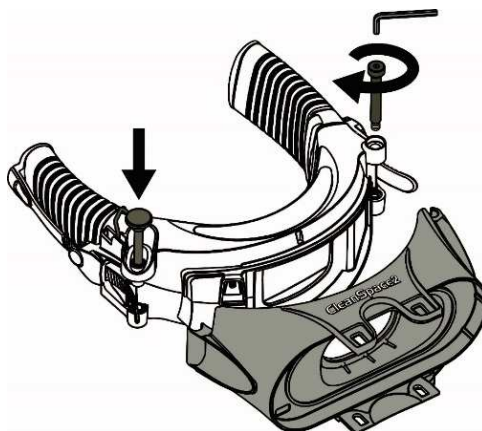


Figure 28 - Fitting the Filter Adaptor

(Note adaptor shown without "Hoop", which does not affect fitting or removal)

- **The Filter Adaptor comes with a 3mm hex key. The 3mm hex key can be found clipped on to the inside the Filter Adaptor.**
- Remove the Filter Cover by lifting the pin located at one end and open the cover.

- Using the hex key, remove the bolt at the opposite end of the Filter Cover. The Cover can now be lifted away and stored.
- Fit the Filter Adaptor to the back of the respirator. Ensure the adaptor is correctly aligned with the silver CleanSpace logo facing up - the same side as the keypad.
- Replace and tighten the bolt using the hex key to secure one end of the Filter Adaptor. Before replacing the pin, pivot open the Adaptor out from the respirator and clip the hex key back into place to store.
- Press the Adaptor against the unit and push the pin back into place. The Filter Adaptor is now ready to use.
- (To remove the Filter Adaptor, simply reverse the steps above).

## CHANGING THE HIGH CAPACITY FILTERS (PAF-1003, PAF-1108 & PAF-1037)

### STEP 1. Removing the filter from the filter adaptor
- If the PAF-0057 Pre-Filter is installed, first remove this from the PAF-1037 filter.
- Turn the respirator upside down. Using your thumb, move the latch lock out of the way and then pull the latch firmly away from the filter. The filter can now be removed. See Figure 29.
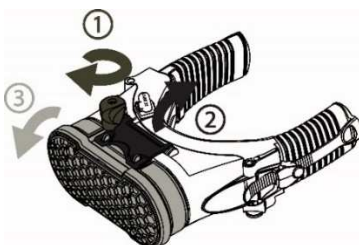


Figure 29 - Removing HE Filter

Note: The PAF-0057 Pre-Filter cannot be cleaned. Used Pre-Filters should be disposed of responsibly and treated as non-recyclable hazardous* waste (*dependent on the contaminant).

### STEP 2. FITTING A NEW FILTER TO THE FILTER ADAPTOR
- Clean the sealing surfaces on the adaptor and on the filter.
- Hold the new filter so that the blue seal is facing the adaptor. Locate 2 ribs on the filter body into the slots in the top of the filter adaptor and rotate the filter into place. See Figure 30.
- **If using PAF-1108 HE + Nuisance filter, check that it is the right way up, with the air openings at the bottom.** (The "CleanSpace" text on the cover of the filter must be the right way up when you are wearing the respirator). See Figure 31.
- Snap the latch firmly over the 2 ribs on the bottom of the filter body. You will hear 2 clicks when the filter is positioned correctly. **Note: The latch lock will move to one side automatically.** See Figure 30.
- The filter is now sealed to the respirator and ready to use.
- Check the blocked filter alarm as described below.
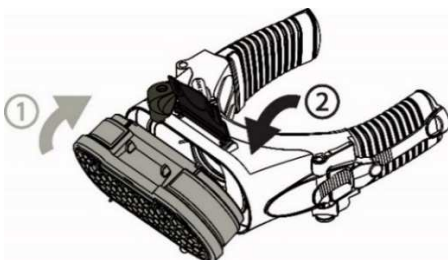- Don the respirator as described in Section 12 before use.
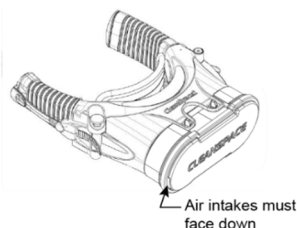


Figure 30 – Fitting a new HE filter



Air intakes must face down

Figure 31 – HE + Nuisance Filter Orientation

**WARNING**
**Use only NIOSH-approved CleanSpace filters. If used with other filters the CleanSpace2 is not NIOSH approved. Use of other filters may result in overexposure to contaminants and lead to sickness.**



**WARNING**
**When fitting a new filter the blocked filter alarm shall be tested before the respirator is put back into service. See the heading "Testing the Blocked Filter Alarm" below.**

## TESTING THE BLOCKED FILTER ALARM

*After changing the filter, check that the Blocked Filter Alarm is audible and the Filter LED is working. Do not fit the Flow Test Cap for this test.*

1. To prepare for this test you must completely block the entry to the filter.

    a. If using a standard filter, open the filter cover and place your hand to completely cover the filter grille (see Figure 32**Error! Reference source not found.**).

    b. If using the high capacity filters PAF-1003 or PAF-1037, stand the machine on a flat surface so that the inlet to the filter is completely blocked (see Figure 33**Error! Reference source not found.**).

    c. If using the HE + Nuisance Odor filter PAF-1108, use both palms to cover the air intake slots on the cover of the filter, so that they are completely blocked (See Figure 34**Error! Reference source not found.**).

2. With the respirator in Standby mode (one or more green LEDs lit), press and release the Power button. The blue LED will light and the respirator starts blowing.

    *If no LEDs are lit, press the Power button once to enter Standby mode.*

3. After 5 - 10 seconds, the red Filter LED will light and the blocked filter alarm will sound (2 beeps, repeated every second).

4. Reset the machine by pressing the Power button.

    *If the red Filter LED does not light or the alarm does not sound, check that the inlet of the filter is **completely blocked**. **If the Filter LED and/or audible alarm are still not working, do not enter the contaminated zone**. Contact CleanSpace for assistance.*



Figure 32 - Blocking the standard filter



Figure 33 - Blocking the high-capacity filter



Figure 34 – Blocking the nuisance filter

## ASSEMBLE THE STERI-PLUS EXHALATION FILTER

*If using your CleanSpace2 respirator with the PAF-1037 filter, you have the option of installing the Steri-Plus Exhalation Filter. To assemble the Steri-Plus, insert a new filter to the outer case, making sure that the filter tabs are positioned in the case slots to hold the filter in place (see Figure 35**Error! Reference source not found.**). The filter is 'reversible' and can be oriented in either direction.*
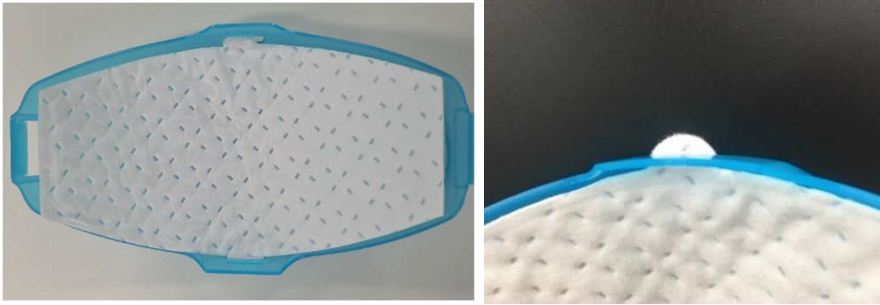
Figure 35 – Inserting Filter into Outer Case

*Then, place the inner case over the filter. Align the end (A) to slot in and then close and clip the case shut (B). This is shown below in Figure 36Error! Reference source not found..*
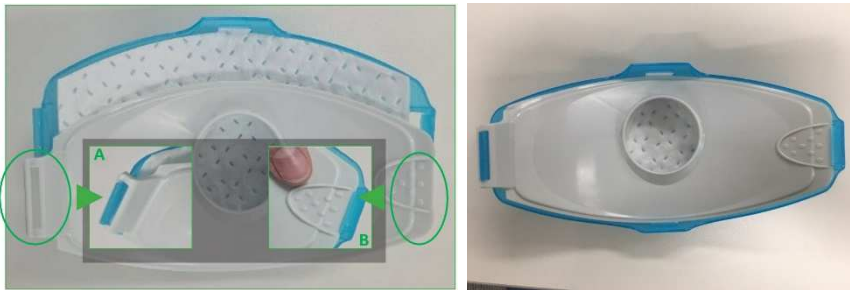

Figure 36 – Connecting Inner and Outer Case

## CHANGING THE STERI-PLUS EXHALATION FILTER CS3039

To remove the Steri-Plus Exhalation Filter, first remove the exhalation filter and cover assembly from the half mask. The best way to do this is to squeeze the mask with one hand whilst pulling the filter/cover assembly off using a twisting motion. This is shown below in Figure 37.


Figure 37 – Removing the Exhalation Filter Assembly from a Half Mask

Then, unclip the two parts of the filter case by placing your thumb on the end of the case with the dimpled thumb print. Pull outwards on the outer case (as if trying to straighten it) and it will unclip from the inner case. Once unclipped the filter case will swing open and the filter can then be easily removed and replaced as shown in Figure 38.
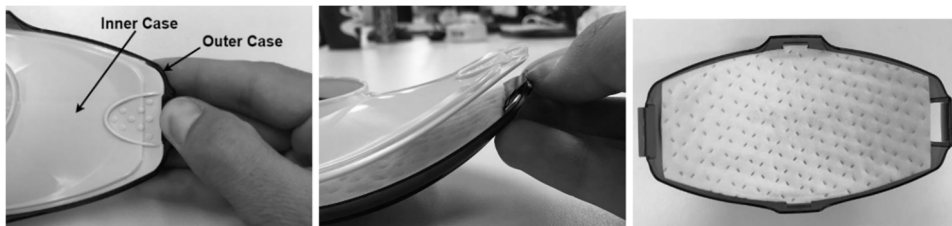
Figure 38 – Replacing Steri-Plus Exhalation Filter

# 16. Battery Information

⚠️

**WARNING**
*CleanSpace2 is not intrinsically safe. Do not use in flammable or explosive atmospheres. Doing so may result in injury or death.*

⚠️

**WARNING**
*Always correctly use and maintain the internal lithium-ion battery packs. Failure to do so may result in fire or explosion or could adversely affect respirator performance and result in injury, sickness or death. Do not charge the on-board battery with unapproved chargers, in enclosed cabinets without ventilation, near flammable liquids or gases, or near sources of high heat. Do not immerse the device in water. Do not use, charge or store the device outside the recommended temperature limits.*

**ASSESSING STATE OF CHARGE**

The three LEDs on the control panel indicate the level of charge. When the unit is in use (not on charge) they work like a fuel gauge allowing you to estimate your remaining work time. When the unit is on charge, the 3rd LED turns on solidly (no flashing) only when the battery is fully charged (100%), making it easy for you to tell when the unit is 100% charged.

If you need to be sure the battery is 100% charged plug in the charger. Even if the battery is fully charged, the 3rd LED will flash for at least three minutes while the respirator checks its condition. Once **all 3 LEDs light solidly without flashing the battery is at 100%.**

| With the unit NOT on charge | | |
|---|---|---|
| Green LEDs | Charge | Approximate Run Time* |
| 🟢🟢🟢 | 85 - 100% | 4 – 8 hours |
| 🟢🟢 | 15 – 85% | 1 – 4 hours |
| 🟢 | 5 – 15% | Recharge! (20min to 1 hour) |

\* *Operating time is strongly affected by work rate, altitude, and other factors. The operating times quoted above are average durations at moderate work rates at sea level. Actual operating times may vary widely from average durations.*

**CHARGING THE INTERNAL BATTERY**

The internal battery must only be charged with a CleanSpace charger.

- To charge the internal battery, turn the respirator upside down, and locate the charging port. See Figure 39.
- Lift off the flexible polymer charging port cover. Slide the charger cable connector into the charging port. Ensure the charger is plugged into a power socket.
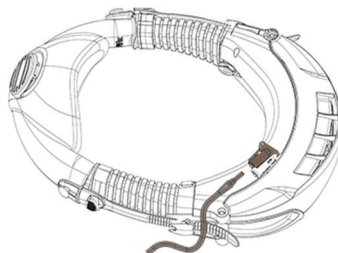


Figure 39 - Charging Port

Turn the respirator over and **check that one of the green LEDs on the keypad is flashing**. If none of the LEDs is flashing, the unit is not charging. Check that the charger is plugged into the wall socket and the charger cable is plugged securely into the socket on the underside of the respirator. If the respirator is still not charging, contact CleanSpace Technology Customer Support on sales@cleanspacetechnology.com or the website: cleanspacetecology.com/welcome/

- **Charging is complete when the blower ("Power Unit") shows three (3) green solid lights.** If the third green LED is flashing rapidly, charging is 95% complete.
- When the respirator is fully charged, disconnect the charger cable from the Power Unit charging port. IMPORTANT Ensure you replace the charging port cover to prevent dirt and contaminants getting into the port.
- Note: The battery can only be charged at temperatures between 32°F and 95°F (0°C and 35°C). Outside this temperature range no charging will occur.

Do not charge the battery in electro-magnetically noisy environments, such as near welding machines.

## LOW BATTERY ALARM

Your respirator has a low battery alarm, which is triggered when the battery has approximately 5 minutes life remaining (3 beeps, repeated every second). You cannot mute the low battery alarm except by connecting the respirator to its charger or by stopping the motor (doff the respirator and either press the Power Button once or allow the respirator to detect that there is no breathing and stop).

When the battery voltage becomes extremely low, the motor will stop.

> **WARNING**
> *If the battery alarm sounds (3 beeps, repeated every second), leave the contaminated area immediately and re-charge the battery. Operating the respirator after the low battery alarm has sounded can cause the flow to fall below the manufacturer's minimum designed flow, which may result in overexposure to contaminants and lead to sickness.*

## GENERAL BATTERY INFORMATION

Your respirator has an internal lithium ion (Li-ion) polymer battery. Lithium ion (Li-ion) batteries have the highest energy density of all battery types, and are widely used today in portable electronic devices across many different industries. The commonly available Li-ion polymer batteries are similar to Li-ion batteries, except they are packaged in a soft polymer film as opposed to the metal case commonly used for Li-ion cells. The soft packaging allows the cells to expand slightly under extreme heat, making them safer in fault conditions. CleanSpace respirators use quality Li-ion polymer batteries and are designed to be viable over a minimum of 500 complete charge and discharge cycles while still maintaining at least 70% of their specified full capacity.

## RESPIRATOR STORAGE

To maintain the integrity of the internal battery, the respirator must be stored under the following conditions when not being used:

Long term storage (> 30 days)          30% - 50% RH, 65°F to 82°F (18°C to 28°C)

Short term storage (< 30 days)          30% - 50% RH, 14°F to 95°F (-10°C to 35°C)

**The following precautions must be followed during use:**
- Avoid mechanical shocks or impacts from any sharp or hard objects.
- Do not use or place the respirator in extreme heat, such as in direct sunlight, near heat sources, etc. The battery will be damaged if its temperature rises above 212°F (100°C).   Note: The respirator will stop functioning if its internal temperature rises above 140°F (+60°C) or falls below 14°F (-10°C).
- Do not dispose of the respirator in a fire.
- Do not use the respirator in heavy rain, or allow it to get wet or immersed in liquid.
- Do not disassemble the Power Unit case, there are no user serviceable parts inside.
- Do not use the respirator if there are any signs of severe mechanical damage.

# 17. Cleaning

We recommended that you clean your respirator after every use. The mask, blower ("Power Unit"), neck pad and harness need to be cleaned separately. Disassemble the mask, neck pad and harness from the Power Unit before cleaning. CleanSpace Cleaning Wipes are recommended as a simple and effective method of cleaning the Power Unit and masks.

## CLEANING THE MASK

There are two methods for cleaning the mask. Before washing the mask, remove the valve cover covering the exhalation valve leaf. To remove the valve cover, find the small inlet located under the lower, inside edge of the valve. Use your finger nail to unclip and push up the valve cover. See Figure 40. The valve cover is easily fitted back by placing it with the clip aligned to the inlet on the valve seating and pushing down. The valve cover will gently snap back into place.
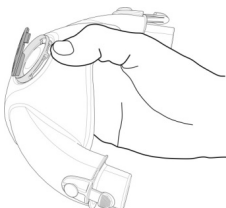


Figure 40 - Removing Exhalation Valve cover

### 1. CleanSpace Non-Alcohol Wipes for face piece

- CleanSpace Cleaning Wipes are impregnated with benzalkonium chloride, a bactericidal solution ideally suited for silicone face pieces.
- To clean the exhalation valve, remove the valve cover (using the instructions above), gently wipe the leaf edge. Replace the valve cover before use.

### 2. Hand wash in warm soapy water

- Wash the mask thoroughly with a mild detergent in warm water (less than 122°F (50°C)).
- A soft brush or sponge can be used to remove any stubborn dirt or grit.
- To clean the exhalation valve, gently wash the warm water solution through the valve and use a sponge to gently clean the valve surface.
- Rinse the mask and valve well in warm running water. IMPORTANT: If the mask is not rinsed thoroughly, residue from cleaning solution may irritate the wearer's skin or cause the valve to stick. Replace the valve cover before use.

### Drying the mask

After cleaning, allow the mask to air dry in a clean environment, valve up to prevent water pooling. Note: Do not dry the mask by exposing directly to heat i.e. hair dryers or heaters. The mask can also be hand-dried with a clean, lint-free cloth. IMPORTANT: Cleaning can cause the exhalation valve leaf to stick. Before use, check that the exhalation valve leaf operates freely by gently lifting the valve. Replace the valve cover before use.

**WARNING**
*Never dry the mask or exhalation valve with a cloth that may leave behind lint. Lint contamination of the exhalation valve may cause it to leak, resulting in overexposure to contaminants and lead to sickness.*

## CLEANING THE POWER UNIT

⚠️
> **WARNING**
> **The Power Unit contains a battery, sensitive electronics and a motor. NEVER immerse it in water or use anything wetter than a damp cloth to clean it.**

- After removing the mask, remove the neck pad. Leave the filter in place to prevent any dust or liquids from getting into the Power Unit.

⚠️
> **WARNING**
> **Do not use compressed air or a brush to clean the filter! HE filters are very easily damaged by compressed air or by brushing. Misuse by cleaning the filter may result in overexposure to contaminants and lead to sickness.**

- Use a gentle brush to remove any dirt, grit or fibers from the loop-pile material attached to the Power Unit.
- Using CleanSpace Cleaning Wipes, wipe down the outside of the Power Unit. The Power Unit can also be cleaned with a damp cloth.
- Allow the Power Unit to air dry in a clean environment. The Power Unit can also be hand-dried with a clean lint-free cloth. Note: **Do not dry the Power Unit by exposing to heat (i.e. hair dryers or heaters) or compressed air**.

## CLEANING THE HARNESS AND NECK PADS

The harness and neck pads can be washed in warm soapy water or machine washed. After cleaning, allow the harness and neck pads to air dry in a clean environment.

Note: Do not dry the harness or neck pads by exposing directly to heat i.e. hair dryers or heaters

## CLEANING THE CS3038 STERI-PLUS EXHALATION FILTER CASE

The Steri-Plus Exhalation Filter Case can be cleaned using the methods described for the half mask; or disposed of and replaced with a new one, depending on the disinfection policies of the user.

## DISPOSING OF THE CS3039 STERI-PLUS EXHALATION FILTER

The Steri-Plus Exhalation Filter cannot be cleaned. Dispose of after use.

⚠️
> **WARNING**
> **The Steri-Plus Exhalation Filter (CS3039) is an electrostatic filter and its performance will be degraded by exposure to certain organic solvents including isopropanol (IPA), xylene and toluene. Always remove the Exhalation Filter before cleaning the mask. If there is a possibility that the Exhalation Filter has become contaminated with any solvent, replace it.**

# 18. Periodic Maintenance & Checking

**Recalibration**

⚠️
> **WARNING**
> **You must recalibrate the internal pressure sensor any time that your CleanSpace2 is exposed to changes in temperature of more than 36°F (20°C). It is best practice to also re-calibrate if the unit has been in storage, particularly if the storage temperature is not known.**

See Section 12 for how to calibrate your respirator.

# 19. Specifications

| Air Flow | Greater than 115 liters/minute. |
| --- | --- |
| | *Breath-responsive, with max inflow to mask 115 – 200 liters per minute, dependent on altitude, filter and battery condition.* |
| Operating Temperature Range | **14°F to 113°F (-10°C to 45°C).** |
| | *The motor will shut down while the temperature of the battery pack is above 140°F (60°C) or below 14°F (-10°C).* |

| Operating Humidity Range | Zero to 90%, non-condensing. |
|---|---|
| Operating Altitude Range | Approximately sea level to 10,000 feet (3000m). |
| Charging Temperature Range | **32°F to 95°F (0°C to 35°C).** <br> *Below 32°F (0°C) and above 95°F (35°C) the battery will not accept charge.* |
| Storage Conditions | **Short term storage under 30 days:** <br> Out of direct sunlight, in a clean, dry environment (30% - 50% RH), 14°F to 95°F (-10°C to 35°C). <br><br> *To maintain the integrity of the internal battery, the respirator must be stored under the following conditions when it will not be used for longer than 30 days.* <br> **Long term storage (> 30 days):** <br> Out of direct sunlight, in a clean, dry environment (30% - 50% RH), 65°F to 82°F (18°C to 28°C). |
| Battery Type | Lithium Ion Polymer. |
| Run Time | Approximately 4.5 – 8 hours. <br> *Run time is strongly influenced by work rate, filter condition, altitude and other factors. The run time specified above assumes moderate work rates at sea level with a clean filter. Different conditions will produce widely varying run times.* |
| Recharge Time | 2 hours (to 95%). |
| Low Battery Voltage Alarm | **Triggers when the remaining run time is around 5 to 10 minutes.** <br> *Audible alarm, 3 beeps, repeated every second, 75dB(A) at ear.* |
| Filter Blocked Alarm | **Triggers when the filter requires replacement.** <br> *Audible alarm sounds until a key is pressed, 2 beeps repeated every second, 75dB(A) at ear plus red filter LED flashes. When the alarm first sounds, and if the battery is almost completely run flat, the maximum flow that can be delivered has been reduced to about 140 liters/minute.* |
| Charger | Input: 100 – 240VAC, 50 – 60 Hz. |
| Weights | PAF-1002 Blower / Power Unit with Filter Adaptor PAF-0038, PAF-0016 Neck Pad Thin, PAF-0030 Harness and PAF-1108 HE + Nuisance Odor fitted: 26.5 oz. (750gram). <br><br> PAF-1002 Blower / Power Unit with standard filter PAF-1102/PAF1103 and filter cover PAF-1095, PAF-0030 Harness and PAF-0016 Neck Pad Thin: 18.3 oz. (520 gram). <br><br> Masks: 4.2 to 5.3 oz. (120 to 150 gram). |
| Intrinsic Safety | CleanSpace2 is not an intrinsically safe system. |

# 20. Product and Accessory information

*Refer to the NIOSH approval matrix for approved combinations.*

**Blower, Filter Cover, Filter Adaptor**

| Product Code | Description |
|---|---|
| PAF-1002 | Blower / Power Unit |
| PAF-1095 | Filter Cover |
| PAF-0038 | Filter Adaptor |

**Filters**

| Product Code | Description |
| --- | --- |
| PAF-1102 | Filter HE Standard Synthetic |
| PAF-1103 | Filter HE Standard Glass |
| PAF-1003 | Filter HEPA |
| PAF-1108 | *Filter HE + Nuisance Odor*<br>*This filter offers nuisance level relief from*<br>    -   *Organic vapors*<br>    -   *Acid gases*<br>    -   *Ammonia*<br>*that are below the Permissible Exposure Limit (PEL). Nuisance level refers to concentrations not exceeding the OSHA PEL or other government occupational exposure limits, whichever is lower.*<br><br>*Note: NIOSH does not evaluate the effectiveness of Nuisance Odor Filters for the removal of Nuisance Odors.* |
| PAF-1037 | Filter HEPA – High Capacity |

**Masks**

| Product Code | Description |
| --- | --- |
| PAF-0033 | Mask H Series Small |
| PAF-1010 | Mask H Series Medium |
| PAF-0027 | Mask H Series Large |

**Harness, Neck Pads**

| Product Code | Description |
| --- | --- |
| PAF-0030 | Harness |
| PAF-1030 | Elite Harness |
| PAF-0014 | Neck Pad - Thick |
| PAF-0016 | Neck Pad - Thin |

**Accessories**

| Product Code | Description |
| --- | --- |
| PAF-0032 | CleanSpace Cleaning Wipes (100 pack) |
| PAF-0025 | PortaCount Adaptor for Fit Testing |
| PAF-1009 | Seal Check Cap |
| PAF-1006 | Charger |
| PAF-1100 | Universal Charger |
| PAF-1005 | Flow Test Cap |
| PAF-0057 | Large Case Pre-Filter |
| CS3038 | Steri-Plus Exhalation Filter Case |
| CS3039 | Steri-Plus Exhalation Filter |

# 21. Product Warranty

This product has been manufactured using quality parts and processes.

CleanSpace Australia Pty Ltd warrants that the product is free from defective workmanship and parts for a period of two (2) years from the date of original purchase provided the product has been used, cleaned and maintained in accordance with these instructions and CleanSpace's recommendations. This warranty does not include consumable parts, such as filters and face masks, which must be replaced regularly by the user. Consumable parts are warranted up to the point of use, provided they have been stored correctly and are within their expiry date.

This warranty does not cover:

- Where the product has been used for industrial purposes outside the recommendations of CleanSpace Australia Pty Ltd;
- Where damage has been caused by misuse, neglect, accident, or excessive wear and tear.

Any claim under this warranty must be made within two (2) years of the date of purchase of the product. All warranty claims must be made by returning the defective product to your supplier together with the proof of purchase. The purchaser is responsible for all freight. In the event that any part of the product is found by CleanSpace to be defective, CleanSpace will either repair or at its discretion replace the faulty part.

This warranty is given by:

CleanSpace Technology Pty Ltd
Unit 5, 39 Herbert Street
St. Leonards NSW 2065 Australia;

E. sales@cleanspacetechnology.com

This warranty is provided in addition to other rights and remedies you have under law. You are entitled to replacement or refund for a major failure. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

## Disclaimer:

Whilst CleanSpace has made every effort to ensure that the details and information given in both our printed and online publications are accurate at the time of issue, full technical specifications are not necessarily included. Furthermore CleanSpace has a policy of continuous improvement and the right is reserved to alter details and information as the need arises. Accordingly the Customer should check any details and information they wish to rely on with CleanSpace at the time of purchase. CleanSpace cannot accept liability in respect of any errors or omissions herein contained or for any loss or damage malfunction or consequential loss arising from reliance upon our publication.

The Customer will be responsible for any risk to health or safety from goods in the Customer's possession and/or control. The Customer's attention is drawn to the fact that statutory regulations and recognized codes of practice exist covering the use and handling of some goods (including safety products). The Customer must ensure that persons who use the goods receive adequate training and safety literature.

## CleanSpace Technology Pty Ltd

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