Usage and Care

Updated January 2014

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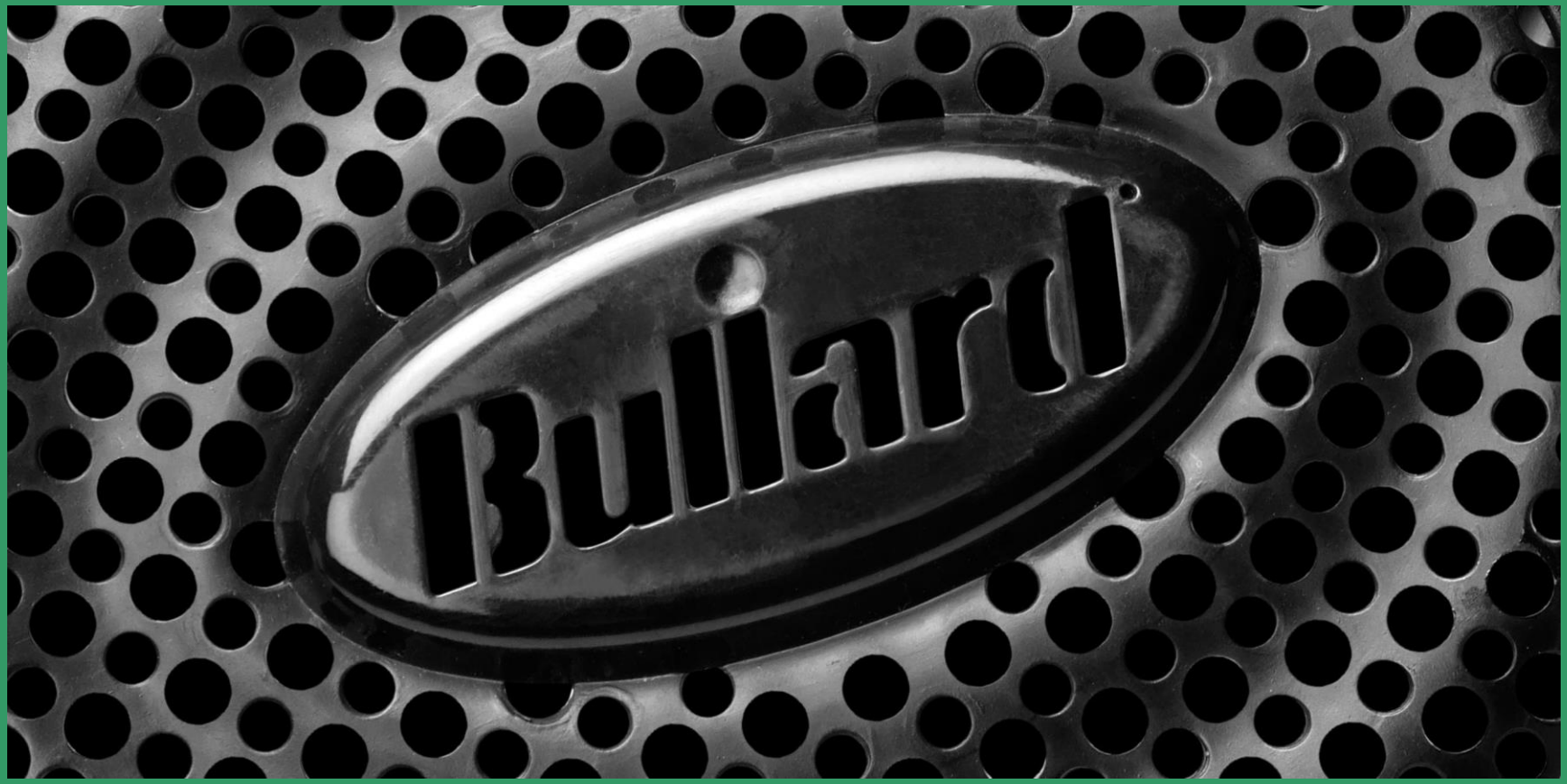
Thank You for Choosing EVA



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Chapter One:
Pre-Donning Checks

Before You Don:

- Review System Components
- Review Key Specifications
- Review User Manual
- Pre-Operational Checklist

System Components

- EVA is NIOSH Approved
- An EVA PAPR System consists of four components:
  - Hood or Mask
  - Breathing Tube
  - Blower Assembly
  - Purifying Filter Cartridge

User Manual

- Warnings, Cautions, Limitations
- Principles of Operation
- Battery Pack
- Pre-Operational Checklist
- Mounting the Breathing Tube
- Checking Air Flow
- Air-Purifying Elements
- Mounting and Replacing Cartridges
- Donning the Blower
- Low Battery Alarm
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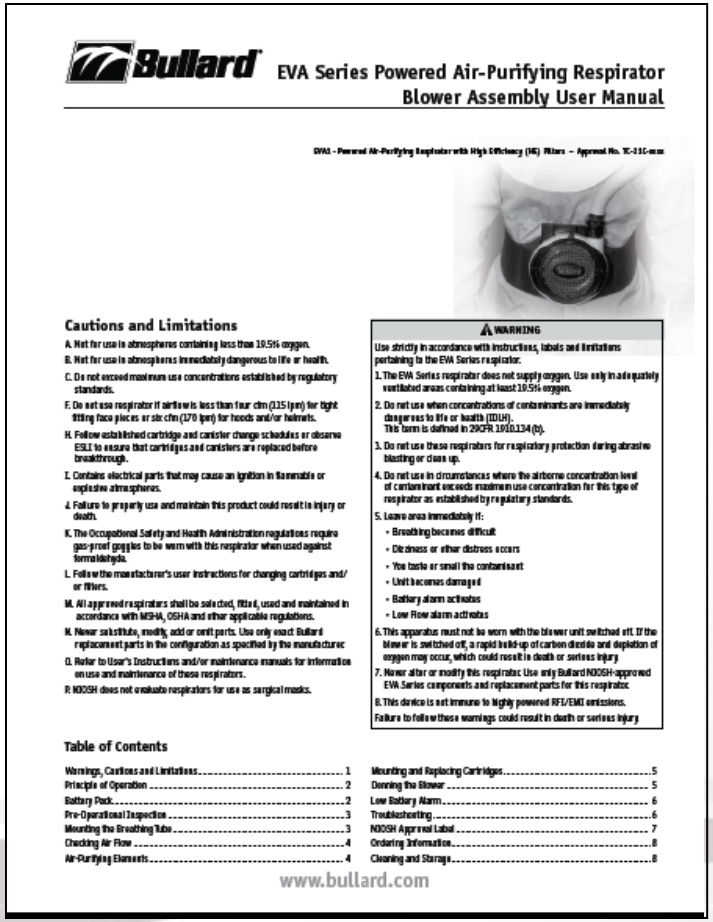
- NIOSH Approval Label
- Ordering Information
- Cleaning and Storage



Bullard EVA Series Powered Air-Purifying Respirator
Blower Assembly User Manual

EVA1 - Powered Air-Purifying Respirator with High Efficiency (HE) Filters – Approval No. TC-21C-xxxx

Cautions and Limitations

A. Not for use in atmospheres containing less than 19.5% 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 respirator if airflow is less than four cfm (115 lpm) for tight fitting face pieces or six cfm (170 lpm) for hoods and/or helmets.

H. Follow established cartridge and canister change schedules or observe ESLI to ensure that cartridges and canisters are replaced before breakthrough.

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.

K. The Occupational Safety and Health Administration regulations require gas-proof goggles to be worn with this respirator when used against formaldehyde.

L. Follow the manufacturer's user instructions for changing cartridges 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 Bullard 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.

WARNING

Use strictly in accordance with instructions, labels and limitations pertaining to the EVA Series respirator.

1. The EVA Series respirator does not supply oxygen. Use only in adequately ventilated areas containing at least 19.5% oxygen.
2. Do not use when concentrations of contaminants are immediately dangerous to life or health (IDLH). This term is defined in 29CFR 1910.134 (b).
3. Do not use these respirators for respiratory protection during abrasive blasting or clean up.
4. Do not use in circumstances where the airborne concentration level of contaminant exceeds maximum use concentration for this type of respirator as established by regulatory standards.
5. Leave area immediately if:
   - Breathing becomes difficult
   - Dizziness or other distress occurs
   - You taste or smell the contaminant
   - Unit becomes damaged
   - Battery alarm activates
   - Low flow alarm activates
6. This apparatus must not be worn with the blower unit switched off. If the blower is switched off, a rapid build-up of carbon dioxide and depletion of oxygen may occur, which could result in death or serious injury.
7. Never alter or modify this respirator. Use only Bullard NIOSH-approved EVA Series components and replacement parts for this respirator.
8. This device is not immune to highly powered RFI/EMI emissions.

Failure to follow these warnings could result in death or serious injury.

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Warnings

1. The EVA Series respirator does not supply oxygen. Use only in adequately ventilated areas containing at least 19.5% oxygen.
2. Do not use when concentrations of contaminants are immediately dangerous to life or health (IDLH) as defined in 20CFR1910.134(b).
3. Do not use these respirators for respiratory protection during abrasive blasting or clean up.
4. Do not use in circumstances where the airborne concentration level of contaminant exceeds the maximum use concentration for this type of respirator as established by regulatory standards.

Warnings

5. **Leave the area immediately if:**
   - *Breathing Becomes Difficult*
   - *Dizziness or other distress occurs*
   - *You taste or smell the contaminant*
   - *The unit becomes damaged*
   - *The battery alarm activates*
   - *The low flow alarm activates*

Warnings

6. **This apparatus must not be worn with the blower unit switched off as it may cause a rapid build-up of carbon dioxide and depletion of oxygen, which could result in death or serious injury.**
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Cautions

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Cautions

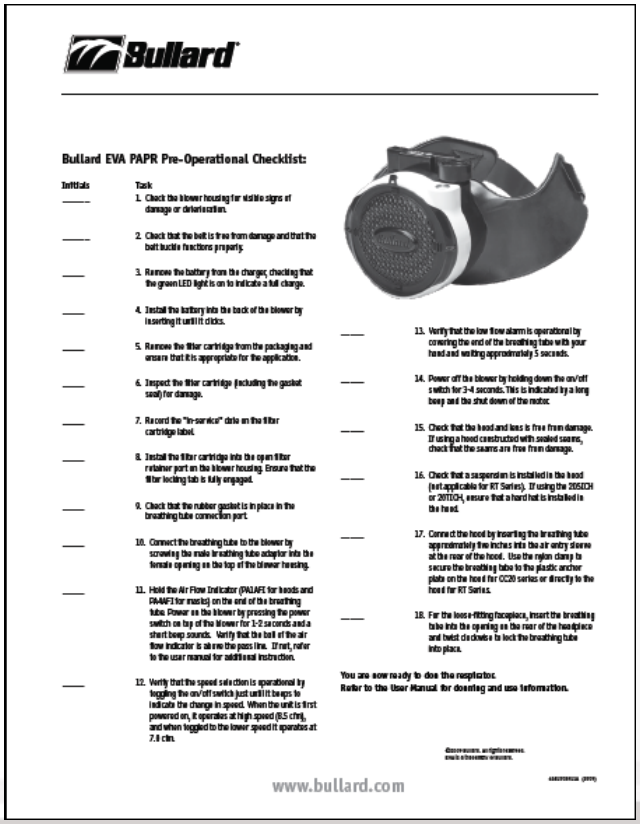
6. Contains electrical parts that may cause an ignition in flammable or explosive atmosphere.
7. Failure to properly use and maintain this product could result in injury or death.
8. The Occupational Safety and Health Administration regulations require gas-proof goggles to be worn with this respirator when used against formaldehyde.
9. Follow the manufacturer's user instructions for changing cartridges and/or filters.

Cautions

10. All approved respirators shall be selected, fitted, used and maintained in accordance with MSHA, OSHA, and other applicable regulations.
11. Never substitute, modify, add or omit parts. Use only exact Bullard replacement parts in the configuration as specified by the manufacturer.
12. Refer to the User's Instructions and/or maintenance manuals for information on use and maintenance of these respirators.
13. NIOSH does not evaluate respirators for use as surgical masks.

Pre-Operational Inspection

- Utilize the EVA Pre-Operational Checklist.
- Execute this checklist *before* donning.
- Physical inspection of blower, battery, belt, filter cartridge, hood, and breathing tube.
- Operational checks of air flow and low flow alarm.



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Bullard EVA PAPR Pre-Operational Checklist:

Initials	Task
____	1. Check the blower housing for visible signs of damage or deterioration.
____	2. Check that the belt is free from damage and that the belt buckle functions properly.
____	3. Remove the battery from the charger, checking that the green LED light is on to indicate a full charge.
____	4. Install the battery into the back of the blower by inserting it until it clicks.
____	5. Remove the filter cartridge from the packaging and ensure that it is appropriate for the application.
____	6. Inspect the filter cartridge (including the gasket seal) for damage.
____	7. Record the "In-service" date on the filter cartridge label.
____	8. Install the filter cartridge into the open filter retainer port on the blower housing. Ensure that the filter locking tab is fully engaged.
____	9. Check that the rubber gasket is in place in the breathing tube connection port.
____	10. Connect the breathing tube to the blower by screwing the male breathing tube adaptor into the female opening on the top of the blower housing.
____	11. Hold the Air Flow Indicator (PAIAFI for hoods and PAMAFI for masks) on the end of the breathing tube. Power on the blower by pressing the power switch on top of the blower for 1-2 seconds and a short beep sounds. Verify that the ball of the air flow indicator is above the pass line. If not, refer to the user manual for additional instruction.
____	12. Verify that the speed selection is operational by toggling the on/off switch just until it beeps to indicate the change in speed. When the unit is first powered on, it operates at high speed (6.5 cfm), and when toggled to the lower speed it operates at 7.8 cfm.
____	13. Verify that the low flow alarm is operational by covering the end of the breathing tube with your hand and waiting approximately 5 seconds.
____	14. Power off the blower by holding down the on/off switch for 3-4 seconds. This is indicated by a long beep and the shut down of the motor.
____	15. Check that the hood and loss is free from damage. If using a hood constructed with sealed seams, check that the seams are free from damage.
____	16. Check that a suspension is installed in the hood (not applicable for RT Series). If using the 20S1CH or 20T1CH, ensure that a hard hat is installed in the hood.
____	17. Connect the hood by inserting the breathing tube approximately five inches into the air entry sleeve at the rear of the hood. Use the nylon clamp to secure the breathing tube to the plastic anchor plate on the hood for CC20 series or directly to the hood for RT Series.
____	18. For the loose-fitting facepiece, insert the breathing tube into the opening on the rear of the headpiece and twist clockwise to lock the breathing tube into place.

You are now ready to don the respirator.
Refer to the User Manual for donning and use information.

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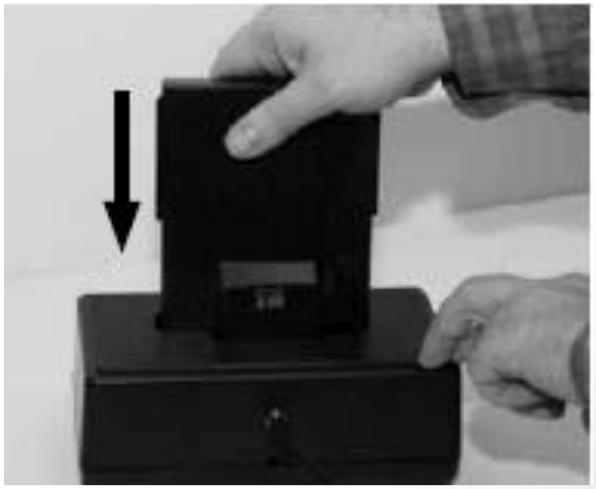
Charging the Battery

- Do not charge batteries in hazardous areas.
- Plug the pronged connector of the charger power supply into the electrical outlet.
- Plug the barrel connector of the charger power supply (aka brick) into the charger base.
- Perform these steps before placing the battery in the cup.

Charging the Battery

- **Insert the battery (upside down) into the charger base.**
- **The power supply LED will illuminate RED while charging and GREEN when charging is complete.**
- **The EVA charger can charge an empty battery in approximately 4 hours.**



Installing the Battery Pack

- **Inspect the battery pack for physical damage.**
- **Place the battery pack into the blower by inserting into the battery compartment until the locking tab is engaged and clicks.**

Note: The battery has built-in short circuit protection. In the event of a short circuit, an internal polyfuse will trip. The fuse will reset itself within 5-10 seconds allowing the battery to resume normal operation.

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Inspecting and Installing the Filter Cartridge

- If new, remove from packaging and record “in-service” date on the label.
- Inspect the filter cartridge and its sealing gasket.
- If used previously, check the age versus change schedule.

Inspecting and Installing the Filter Cartridge

- With the locking tab of the filter cartridge oriented toward the 11:00 position on a clock, lower the filter cartridge into the blower port opening.
- Turn the filter cartridge clockwise until the locking tab completely engages at the 12:00 position.

Inspecting & Installing the Breathing Tube

- Inspect the breathing tube for physical damage.
- Verify that a rubber gasket is in place in the breathing tube port of the blower unit.
- Screw threaded end of the breathing tube into the blower unit.
- Hand tight is sufficient.

Testing the Air Flow

- With gasket present in the breathing airway port, attach breathing tube to blower unit.
- With a filter cartridge installed, turn blower power on.

Testing the Air Flow

- **Hold free end of breathing tube upright and place the Airflow Indicator into the end without blocking the outlet holes.**
- **Apply a slight downward pressure on the Airflow Indicator against the breathing tube to get a reasonable seal.**
- **If the ball is *completely* above the Pass Line then the system is ready for use.**

Testing the Low Flow Alarm

- Turn on the unit by pressing the on/off button of the blower and holding it down for 1-2 seconds until a short beep sounds.
- Then cover the breathing tube port with your hand and wait approximately 5 seconds.
- The 77dBA audible alarm will sound indicating a low flow condition of less than 170 lpm.
- Remove your hand from the breathing tube port and the alarm will cease when flow returns to normal.

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Inspecting Hoods

- Inspect for rips, tears, or damage from excessive wear.
- Inspect inner neck cuff (if applicable) for elasticity.
- Inspect lens for cracks, scratches, or any other signs of damage.
- Inspect headband (if applicable) for tears, cracks, or fraying straps.

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Chapter Two:
Proper Donning

Donning

- Prepare to don in a safe, hazard free area.
- Install the battery, breathing tube, head piece and filters.
- Put belt and blower assembly onto waist.
- Adjust Belt as necessary.

Donning

- Switch the blower on.
- Place the hood on the head making any final adjustments to the fit as required for comfort and stability.
- If the hood has an inner bib then it should be tucked completely inside user's shirt or coveralls.

Installing the Belt

- With the blower filter side down, orient the lever locks as shown.
- Lay the belt over the blower as shown.
- Rotate the level locks until they are oriented as shown to secure the belt.

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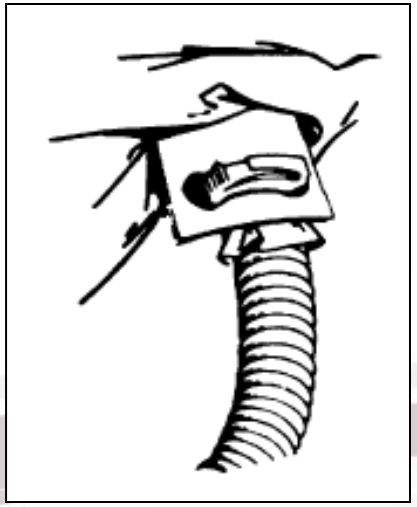
Installing a CC20 Series Hood

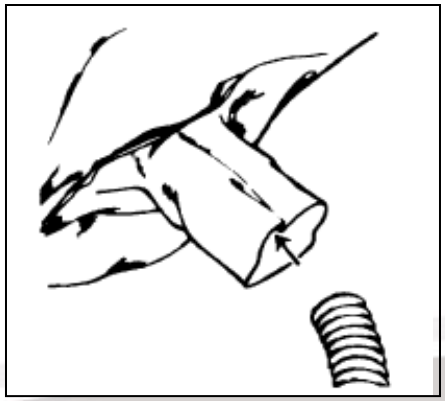
- **Insert the breathing tube approximately 5” into the air entry sleeve at the rear of the hood and secure with nylon clamp and anchor plate.**



Installing an RT Series Hood

- **Insert the breathing tube approximately 5” into the air entry sleeve at the rear of the hood and secure with nylon clamp.**

Note: RT Series hoods do not have anchor plates.



Installing a Loose Fitting Facepiece

- **Bullard Loose Fitting Facepieces are designed for quick attachment.**
- **Insert the bayonet connector of the breathing tube into the hood connector and turn clockwise until it locks.**

Completed Donning

Donning the Blower and Respirator

Figure 15

Figure 16

Chapter Three:
Proper Use

Operating Temperature

- **The operating temperature should be:**
  - -5 C to 54 C
  - 23F to 129F
- **Below -5C (23F) the battery pack will shut down**
- **At 50 C (122F) the unit will alarm to warn of high temperature**
- **Above 54 C (129F) the battery pack will shut down**

Principles of Operation

- The blower unit draws in ambient air through the filter cartridges.
- The purified air is blown into the wearer's hood or facepiece through the breathing tube.
- A flow indicator is available to check that there is an adequate volume of air available to the wearer prior to use.

Principles of Operation

- The system is designed to operate at a minimum air flow of approximately 7.0 cfm (210 lpm) in the hood on the standard speed setting and 8.5 cfm (240 lpm) on the high speed setting.
- A feedback loop from the Mass Flow Sensor to the impellor continually monitors and adjusts the air flow to keep it constant at the design set point.

Changing Airflow Speed

- Turn the unit on by holding down the on/off switch for 1-2 seconds until a short beep sounds.
- When the unit is first powered on it will operate on the high speed for maximum comfort and air flow. ***8.5 CFM (240 lpm)***
- Pressing the on/off button and holding down until a short beep sounds will toggle the unit into the low speed setting for personal preference and lesser air flow. ***7.0 CFM (200 lpm)***
- Additional button pushes will toggle the unit between the two speeds.

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Active Flow Technology

Think cruise control for your PAPR

- **Car cruise control**

  Constant Speed

  Changing hill or gas tank conditions

- **PAPR control**

  Constant flow

  Changing Hood Types or Filter Cartridge Conditions

- **Other PAPRs**

  Indirect flow control via RPM or voltage

- **EVA Active Flow Technology**

  Unique feedback control loop that measures the flow directly with a mass flow sensor

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Battery Capacity

- To check the capacity of an EVA battery simply press the Fuel Gauge button.
- LEDs illuminate to display the remaining capacity in 25% increments.
- When the battery is in an EVA blower and operating the Audible Low Battery Alarm, it will beep when approximately 20 minutes of battery run time remains.

Maximizing Battery Life

- Remove the battery from the blower unit when not in use.
- Charge the battery before it is completely discharged. The low battery alarm indicates that the battery needs to be charged.
- The battery is designed with a circuit to protect the battery and will not allow the battery to be discharged below a safe voltage for the cells, regardless of airflow, without the alarm sounding. When the battery reaches the voltage cutoff, it will automatically cease operation.

Maximizing Battery Life

- Always charge the batteries at room temperature or cooler. At higher temperatures, the battery pack may not accept a full charge. If the battery pack feels hot, let it cool for 30 minutes before charging.
- Do not charge battery packs in an enclosed cabinet without ventilation.

Trouble Shooting

- **If the low flow alarm sounds check for:**
  - *Clogged or damaged filters*
  - *Blower malfunction*
  - *Airway obstruction in hood or breathing tube*
- **If any part of the airflow indicator ball is below the Pass Line check for:**
  - *Clogged or damaged filters*
  - *Low battery charge or battery malfunction*
  - *Blower malfunction*
- **If the low battery alarm sounds:**
  - *Exit the hazardous area immediately*
  - *Recharge the battery*

Warning

- **Leave the hazardous area immediately if:**
  - *Breathing becomes difficult*
  - *Dizziness or other distress occurs*
  - *You taste or smell the contaminant*
  - *Unit becomes damaged*
  - *Low Voltage Alarm Sounds*
- **Do Not remove the respirator inlet covering, blower or waist-belt while in the hazardous area.**
- **After reaching a hazard-free area, immediately remove the hood and respirator.**
- **Do Not use a blower that fails the air flow test.**
- **Failure to observe these warnings could result in death or serious injury.**

Chapter Four:
Proper Doffing

Doffing

- **Do Not remove the respirator inlet covering, blower or waist-belt while in the hazardous area.**
- **After reaching a hazard-free area:**
  - *Follow your facility's SOPs for decontamination*
  - *Remove Hood*

    Discard or hang upright

    Do not tuck bibs inside hood or hang upside down
  - *Turn off blower by pressing the on/off button*

    3-4 seconds until a long beep sounds and the motor shuts down.

Removing the Battery

- Press the battery release on the pack to remove the battery from the back of the blower.
- Lift vertically.

Removing the Belt

- With the blower filter side down, orient the lever locks as shown.
- Remove the belt from the blower.
- The plastic back plate may be removed for cleaning as shown.




Chapter Five: Maintenance

Maintenance

- No calibration or maintenance is necessary – just simple inspection.
- Inspect blowers, belts, batteries, breathing tubes, and hoods before and after each use.
- Check air flow with air flow indicator before each use.
- Check low flow alarm before each use.

Cleaning

- **Hoods**
  - *Laundering is not recommended.*
  - *Warm water and mild detergent may be used to hand-sponge.*
  - *Rinse and then air dry.*
  - *Mineral spirits may be used to remove paints or coatings from the solvent resistant lens 20TP and 20TPC hoods.*
- **Breathing Tubes**
  - *Hand sponge with warm water and mild detergent, being careful not to get water inside.*

Cleaning

- **Blowers**
  - *EVA blowers have been laboratory tested to be safely cleaned with mild detergent, isopropyl alcohol (70% or less concentration), or chloride based wipes such as Sani-Cloth.*
  - *If wearing the blower into a decon shower, filters should be left installed with shower caps and the blower kept running.*

Cleaning

- **Batteries**
  - *Hand sponge with mild detergent, isopropyl alcohol (70% or less concentration), or chloride based wipes such as Sani-Cloth.*
- **Belts & Belt Backplates**
  - *Hand sponge with mild detergent, isopropyl alcohol (70% or less concentration), or chloride based wipes such as Sani-Cloth.*

Chapter Six: Storage

Respirator Storage

- **Store the respirator and its components where they will be protected from contamination, distortion, and damage from elements such as dust, direct sunlight, heat, extreme cold, excessive moisture and harmful chemicals.**
- **The storage temperature should be:**

  -5 C to 54 C

  23F to 129F

Battery Storage

- **Store where they will be protected from contamination, distortion, and damage from elements such as dust, direct sunlight, heat, extreme cold, excessive moisture and harmful chemicals.**
- **The storage temperature should be:**
  - -5 C to 54 C
  - 23F to 129F
- **Unlike NiMH batteries, very little self discharge occurs with Li Polymer batteries**
- **Discharging and re-charging the battery full at least once every 3 months is suggested to ensure the longest possible life of the battery.**
- **For long-term storage, it is best to store the battery with at least 40% charge still remaining.**

Chapter Seven: Technical Support

For More Information

Call 1-877-Bullard

or

visit www.bullard.com