EVAHL1 - Powered Air-Purifying Respirator

Powered Air-Purifying Respirator with High Efficiency (HE) Filters - Approval No. TC-21C-0922 (PAPRFC3)

Powered Air-Purifying Respirator with OV-AG-HE Filter Cartridges for organic vapors, chlorine, hydrogen chloride, sulfur dioxide, chlorine dioxide, hydrogen fluoride and particulates – Approval No. TC-23C-2765 (PAPRFC4)

Powered Air-Purifying Respirator with AM-FM-MA-AG-HE Filter Cartridges for ammonia, formaldehyde, methylvamine, chlorine, hydrogen chloride, sulfur dioxide, chlorine dioxide, hydrogen fluoride and particulates – Approval No. TC-23C-3097 (PAPRFC5)

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.
D. 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.
E. Follow established cartridge and canister change schedules or observe ESLI to ensure that cartridges and canisters are replaced before breakthrough.
F. Contains electrical parts that may cause ignition in flammable or explosive atmospheres.
G. Failure to properly use and maintain this product could result in injury or death.
H. Follow the manufacturer’s user instructions for changing cartridges and/or filters.
I. All approved respirators shall be selected, fitted, used and maintained in accordance with MSHA, OSHA and other applicable regulations.
J. Never substitute, modify, add or omit parts. Use only exact Bullard replacement parts in the configuration as specified by the manufacturer.
K. Refer to User’s Instructions and/or maintenance manuals for information on use and maintenance of these respirators.
L. NIOSH does not evaluate respirators for use as surgical masks.

* At very high work rates, the pressure in the respirator may become negative at peak inhalation flow.

Respirator Program Management

Oklonmental 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 and any applicable OSHA substance specific standards.

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EVAHL Series - Principle of Operation

The EVAHL Series Powered Air-Purifying Respirator (PAPR) System is configured in six parts:

1. The blower and belt assembly:
   - EVAHL1 Blower Unit
   - EVAHEL1 or EVAHEL2 Comfort Belt, Decon Belt
   - PA1AFI Air Flow Indicator

2. The battery pack (Part No. EVAHLBAT1). One fully charged pack will power the blower for approximately 4 to 10 hours depending upon factors such as speed, cartridge selected and cartridge loading.

3. The breathing tube, which is available in three different types and three lengths:
   - PAHBT Powered Air Hood Breathing Tube Assembly (standard length - 26’)
   - PAHBTXL Powered Air Hood Breathing Tube Assembly (short length - 22’)
   - PAHBTXLL Hood breathing tube assembly with clamp (long length - 32’)
   - PAHBTXSH Hood breathing tube assembly with clamp (short length - 22’)
   - PAHBTXSL Hood breathing tube assembly with clamp (long length - 32’)
   - PA20LFBT Loose fitting facepiece breathing tube assembly (standard length - 32’)
   - PA20LFBTX Loose fitting facepiece breathing tube assembly (short length - 26’)
   - PA20LFBTXL Loose fitting facepiece breathing tube assembly (long length - 38’)

4. The High Efficiency Particulate Arrestance (HEPA) filter or chemical filter cartridge.

5. The hood with headband suspension (except for the RT Series) and/or hard hat, or loose fitting facepiece. The following hood models may be used with the EVAHL Series blower unit:
   - RT1, RT1T Hood with long inner and outer bib (NIOSH approved for use without a headband suspension)
   - RT2, RT2T Hood with long inner and outer bib (NIOSH approved for use without a headband suspension)
   - RT3, RT3T Hood with long inner and outer bib (NIOSH approved for use without a headband suspension)
   - RT4, RT4T Hood with long inner and outer bib (NIOSH approved for use without a headband suspension)

6. The Battery Charger:
   - EVAHLGC Gang charger, six port
   - EVAHLSMC Quick charger, single port

The battery pack mounts in a compartment on the back of the blower. A fully charged battery pack will power the blower for approximately 4 to 10 hours depending upon factors such as speed selected, cartridge selected, and filter/cartridge loading.

The EVAHL Series Blower is equipped with two alarms: A 77 db continuous alarm will sound when the air flow falls below approximately 185 lpm and a 77db intermittent chrip alarm will activate to indicate that the battery has approximately 15 minutes of remaining capacity.

Type C Airline Respirators - CC20 Series (TC-19C-154), RT Series (TC-19C-412)

Most of the same headpieces approved for use with the CC20 and RT Series of supplied air respirators (SAR) are also approved for use with the EVAHL Series of powered air-purifying respirators. CC20 and RT Series respirators provide a high level of respiratory protection and user comfort over long work periods, in a wide variety of hazardous environments.

The CC2 and RT SAR air flow control devices and other components are described in the CC20 and RT Series User Instructions.

Battery Pack

One fully charged battery pack will power the blower for approximately 4 to 10 hours depending upon factors such as speed selected, cartridge selected and filter/cartridge loading.

**WARNING: EXPLOSION HAZARD**

- Only use Bullard battery part number: EVAHLBAT1. Substitution of any other battery pack may impair suitability for Division 2.
- Do not charge battery packs in hazardous locations.
- Only charge using Bullard Desktop battery pack chargers.
- Do not insert or remove the battery pack unless the area is known to be free of ignitable concentrations.

**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.

To charge the battery pack, do the following:

- Use a flat head tool to release the battery from the blower. (See Figure 1.)
- Place battery into the charging port of the battery charger. (See Figure 2.)
- Connect the battery charger to a 110-volt AC electrical outlet.
- Charge the battery pack for approximately 4 hours. While the battery is charging, the light on the charger will remain red. The charger light will illuminate green when charging is complete.

Table-top gang chargers with 6 ports are also available.

Figure 1

Figure 2
Battery Storage
Storage of Li Polymer batteries is relatively easy. Unlike Nickel batteries, they lose a very small amount of power (less than 0.5% per day) and therefore can be charged and stored ready for use. If long-term storage is required, it is best to store the battery in a cool place not below -5°C/23°F with at least 40% charge still remaining.

NOTE
Discharging and re-charging the battery fully at least once every 3 months is suggested to ensure the longest possible life of the battery. Do not leave on the charger for more than 30 consecutive days.

To maximize battery life, these guidelines should be followed:

- 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. It 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.
- 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.

Battery Fuel Gauge:
EVAHL Battery Packs are equipped with an on-board fuel gauge to indicate the amount of remaining capacity left in the battery pack. To check the remaining capacity, simply depress the button labeled “Push” and LEDs will illuminate indicating the level of battery capacity remaining. When fully charged all four LEDs will illuminate green, and when 25% or less charge is available a single LED will illuminate red.

Pre-Operational Inspection
Prior to each work shift, perform the following Pre-Operational Inspection to ensure proper operation and to ensure that the unit is completely assembled.

1. Belt Mounted Blower Unit, Part No. EVAHL1
   - Check that the unit is clean and undamaged.
   - Inspect for deterioration, physical damage and improper assembly.

2. Filter/Cartridges
   - Inspect the filter/cartridge for any physical damage
   - Check the label to ensure the filter/cartridge has not exceeded its “use-by” date.
   - Inspect the gasket on the filter for any physical damage.

NOTE
Each filter comes with a permanent gasket.

- Ensure that the correct filter/cartridge is appropriate for the contaminant.
- Consult the NIOSH approval label and your own in-plant safety professional if you have any questions as to the suitability and efficiency of the Air-Purifying Element.
- Screw the cartridge into the port until hand-tight and the locking tab is secure. (Refer to Mounting and Replacing Filters on Blower Unit on page 4)

3. Battery Pack
   - Check that the battery is not damaged.
   - Check the Fuel Gauge to determine sufficient charge is available.
   - Place the battery pack in the battery compartment on the blower.
   - Use flat head tool to secure the battery. (See Figure 4)

WARNING
Lock the battery release before placing the blower in service. The blower shall not be used in a hazardous location with the release unlocked.

4. Hood with Suspension or Hard Hat, or Loose Fitting Facepiece
   - The hood is constructed of one of the following materials: Tychem 2000 (QC) or Tychem 4000 (SL).
   - Depending on the model of the hood selected, it may be used with either a headband suspension or a hard hat (Note: RT Series hoods are part of NIOSH approved respirator assemblies when used without a headband suspension or a hard hat).
   - The loose fitting facepiece is constructed of Tychem 2000 (QC) and features an internal suspension.
   - Inspect the hood or loose fitting facepiece for any physical damage.

Mounting the Breathing Tube on the Blower

- Ensure that a rubber gasket is in place in the breathing tube coupler on the blower unit.
- Screw one end of breathing tube into the blower unit. (Hand tight is sufficient.) (See Figure 5).
- Ensure that neither the breathing tube nor the filter is blocked.
- Ensure that the on/off Switch is in the off position.
- Switch on the blower by pressing the on/off button for 1-2 seconds confirmed by a short beep.
- If the Low Battery Alarm sounds at this time, the battery needs to be recharged. See instructions on page 2 regarding properly charging the battery.
- If the Low Flow Alarm sounds at this time, the hood, breathing tube and filter should be checked for leakage.
Checking Airflow with the Airflow Indicator (PA1AFI - sold separately)

With the blower switched ON and the filters/cartridges mounted, take the free end of the breathing tube in one hand, hold it upright and place the Airflow Indicator into the end of the tube. (See Figure 6). Apply a light downward pressure to the Airflow Indicator to get a reasonable seal at the breathing tube end. Ensure that the air outlet holes in the Airflow Indicator tube are not blocked. Two hands may be used if preferred, one to hold the breathing tube and one to hold the Airflow Indicator. The position of the ball in the Airflow Indicator should be observed. If any part of the ball is below the PASS LINE on the Airflow Indicator, check for:

- Blower malfunction.
- Clogged or damaged Air-Purifying filter elements on the HE filter. See “Mounting and Replacing Cartridges on the Blower Unit” on page 4.
- Low battery or battery malfunction.

If the ball is completely above the PASS LINE on the Airflow Indicator, then the system is ready for use.

**WARNING**

If the blower malfunctions during use in a hazardous area:

- Remain calm and LEAVE the hazardous area immediately.
- DO NOT use a blower that fails the flow test (air flow indicator sold separately).
- Use ONLY Bullard filter/cartridges which comply with and have the NIOSH approval label and which are appropriate for the contaminant.

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

EVAHL Series PAPR Air-Purifying Elements

Principle of Operation

The following filter/cartridge protection classification applies when used with any of the hoods or loose fitting facepieces.

<table>
<thead>
<tr>
<th>Protection</th>
<th>Filter/Cartridge Type</th>
<th>NIOSH / ANSI Color Code for Cartridge Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>HE</td>
<td>PAPRFIC3</td>
<td>Magenta</td>
</tr>
<tr>
<td>OV/CL/HC/SD/CD/HF/HE</td>
<td>PAPRFIC4</td>
<td>Olive and Magenta</td>
</tr>
<tr>
<td>AM/FM/VA/O/HC/SD/CD/HF/HE</td>
<td>PAPRFIC5</td>
<td>Olive and Magenta</td>
</tr>
</tbody>
</table>

HE particulate filters are 99.97% effective against all particulate aerosols. The following abbreviations are approved by NIOSH to indicate the particulates, gases, or vapors which are removed by the gas/vapor cartridges: HE High Efficiency Particulate; OV Organic Vapor; AM Ammonia; CD Chlorine Dioxide; CL Chlorine; FM Formaldehyde; HC Hydrogen Chloride; HF Hydrogen fluoride; MA Methylamine; SD Sulfur Dioxide

**WARNING**

Use only the filter/cartridge(s) described in the above table. Do not change cartridges while in a hazardous atmosphere. Incorrect cartridge selection will invalidate all performance statements and approvals for this equipment. Follow established cartridge change schedules to ensure that cartridges are replaced before breakthrough occurs. Failure to follow these warnings could result in death or serious injury.

Mounting and Replacing Filters on the Blower Unit

High efficiency particulate filters must be replaced when retained particles clog the filters and reduce air flow below acceptable levels, as indicated by testing with the Air Flow Indicator as described at left.

To Replace Filters

- Remove the air-purifying element from its packaging, and inspect for damage. If in doubt do not use.
- Check that the air-purifying element has not exceeded its "use-by" date.
- Check that the filter connecting thread and gasket are in good condition.
- Check that the air-purifying element is appropriate to the hazard. If in doubt consult your respirator program administrator or supervisor.
- Check that the threads in the blower unit port are in good condition and clear of contaminant.
- Screw the air-purifying elements into the receptacles (see Figure 8) until the cartridge is hand tight. DO NOT OVERTIGHTEN.
- Check to see that the locking tab is secure. (see Figure 9)

To Replace Combination Filter/Cartridge

- Follow the steps above, but beware that the filter locking tab is beneath the filter rim. (see Figure 10)

Installing and Removing the Belt on the Blower Unit

To install the belt

- With the blower filter side down, orient the lever locks as shown in Figure 11
- Lay belt over blower as shown in Figure 12
- Rotate level locks until they are oriented as shown in Figure 13

To remove the belt

- With the blower filter side down, orient the lever locks as shown in Figure 12
- Remove belt from blower
Donning the Blower / CC20 Series Hood Use

5 Donning the Blower / CC20 Series Hood Use

NOTE
Plastic insert may be removed for cleaning as shown in Figure 14-15. See back page for more information on cleaning.

Donning the Blower and Respirator

Initial Donning
Prepare to don the blower, battery and hood in a safe, hazard-free area and do the following:

- Ensure that the filter/cartridges used are suitable for the contaminant in question and are compatible with the EVAHL Blower Unit.
- Check that the filter/cartridge is properly mounted on the blower unit.
- Place the battery in the battery compartment on the back of the blower.
- Fit the blower and belt around the user’s waist and adjust the belt for a comfortable fit (suspenders are also available).
- Remove the belt and blower to install the hood or loose fitting facepiece and corresponding breathing tube.

NOTE
Plastic insert may be removed for cleaning as shown in Figure 14-15. See back page for more information on cleaning.

WARNING
The use of any filter/cartridge not approved with the EVAHL blower unit may put the user at risk and could result in death or serious injury.

Donning the EVAHL with the CC20 Series Hood

Adjusting and Installing Headband Suspension in Hood

NOTE
20LF and 20LF2 series loose-fitting facepiece hoods have a sewn-in headband.

NOTE
The 20SICH, 20TICH and GRH Hoods may use a hard hat or suspension.

NOTE
RT Series hoods do not use a suspension.

1. Adjust headband before installing into hood.
2. Turn ratchet until it is at its largest size.
3. Place suspension on head.
4. Adjust ratchet knob until snug and comfortable fit achieved. (Figure 16)
5. Remove from head.
6. Place suspension into hood.
7. Snap 4 white buttons of suspension into 4 white buttons on hood. (Figure 17)

Adjust Crown Straps for Vertical Fit
To improve suspension comfort, adjust crown straps vertically by repositioning the crown strap posts in the crown straps. Vertical adjustment makes the headband ride higher or lower on the wearer’s head. To adjust, push crown strap post from slot, move to new slot, and snap in to secure. Move key to desired vertical position. Repeat for other crown strap post. (Figure 18).

NOTE
If the hood rises off your head during use, first verify proper air pressure, then select a different hood for your application, or use the optional chin strap.

Adjusting and Installing Hard Hat in Respirator Hood (20SICH & 20TICH)

1. Assemble and adjust the standard Bullard hard hat suspensions RS4PC or RS6PC or the optional ratchet suspensions RS4RC or RS6RC by following the directions on instruction sheet attached to headband on hard hat. Read all hard hat warning labels and instructions. The following Bullard hard hat models are approved for use with CC20 Series hoods as part of a NIOSH approved respirator assembly: C30, C30R, S51 and SS1R.
2. If desired, install and adjust optional ES42 hard hat chinstrap.
3. Before inserting hard hat into hood, remove the two adhesive-backed Velcro® strips attached to the Velcro piece that is sewn into the hood (see Figures 20 & 21).
4. Peel the backing off the longer Velcro tab and apply it to the inside center rear of the hard hat, about 1/4” up from the edge. Apply shorter Velcro tab to the underside of the brim of the hard hat (see Figure 20).
5. Insert hard hat into respirator hood with cap visor facing front of hood (see Figure 19).
6. Tuck cap brim on top of front elastic Velcro band sewn into hood (see Figure 20).
7. Loop the Velcro strip sewn inside the hood around the back of the cap and affix it to the corresponding Velcro tab previously installed inside the hard hat in step 4 (see Figure 21).
8. Remove protective plastic from plastic lens of respirator hood. If desired, apply optional 20LCL adhesive-backed lens covers designed to protect the respirator’s plastic lens. Apply 2-3 lenses at a time. When lens becomes soiled, remove by pulling tab at edge of lens cover to clear your vision.
Installing Breathing Tube Assembly in CC20 Hoods

For hoods without a threaded port at the rear, Breathing Tubes PA1BT, PA1BTXS and PA1BTXL will attach to the hood with a clamp as follows:

1. Remove nylon clamp from plastic anchor plate on hood (see Figure 22).
2. Insert the open end of the breathing tube approximately five inches into hood's air entry sleeve (see Figure 23). Do not insert breathing tube into hood air entry sleeve more than 6 inches as it may cause a flow restriction.
3. Install nylon clamp over air entry sleeve and breathing tube, inserting clamp locks through two holes in plastic anchor plate that is sewn into hood. Locks should face away from user's neck (see Figure 24). The air entry sleeve seams should be on the top and bottom of the breathing tube when properly installed and worn.
4. Engage clamp locks and squeeze together until tight. Air entry sleeve should not be twisted or restricted (see Figure 25). If so, then remove the clamp and repeat steps 2-4.

For hoods with a threaded port at the rear (designated with a "T" suffix), Breathing Tubes PAHBT, PAHBTXS, PAHBTXL will attach to the hood by the threading into the port at the rear (See Figure 23A).

1. Remove nylon clamp from the breathing tube (see Figure 23).
2. Insert the open end of the breathing tube approximately five inches into hood's air entry sleeve (see Figure 29). Do not insert breathing tube into hood air entry sleeve more than 6 inches as it may cause a flow restriction.
3. Install nylon clamp over air entry sleeve and breathing tube. If desired, 2 or more clamps may be used (see Figure 30). The air entry sleeve seams should be on the sides of the breathing tube when properly installed and worn.
4. Engage clamp locks and squeeze together until tight. Air entry sleeve should not be twisted or restricted (see Figure 31). If so, then remove the clamp and repeat steps 2-4.
5. With PAPR blower unit running, put on RT Series respirator hood. Pull the hood over your head until the neck cuff is securely around your neck.
6. Ensure that the neck cuff is down below the chin and that the air outlets of the cuff (see Figure 27) are not restricted. If the neck cuff is not below the chin, then pull down before continuing (See Figure 27).

Donning the CC20 and EVAHL

1. With PAPR Blower Unit Running, put on CC20 Series respirator hood.
2. Position headband suspension or hard hat for a comfortable fit.
3. If using an optional chin strap, pull elastic strap under your chin. Adjust for a secure and comfortable fit.
4. Tuck inner bib of hood into shirt or protective clothing if using hood with inner bib (see Figure 26).
5. Pull respirator outer bib over collar of shirt or protective clothing.
6. Ensure that the neck cuff is down below the chin and that the air outlets of the cuff (see Figure 27) are not restricted. If the neck cuff is not below the chin, then pull down before continuing (See Figure 27).

WARNING
Do not put on or remove these respirators in a hazardous atmosphere except for emergency escape purposes. Failure to heed these warnings could result in death or serious injury.
WARNING

The user should ensure that the neck cuff is unrestricted all around the neck to allow proper inflation and reduce restrictions. Battery run time will be reduced by a restricted or improperly donned hood.

For hoods with a threaded port at the rear (designated with a “T” suffix), Breathing Tubes PAHBT, PAHBTXS, PAHBTXL will attach to the hood by the threading into the port at the rear (See Figure 24A).

NOTE

The RT3 and RT4 hoods have an adjustable velcro strap near the top of the lens that allows the user to customize the curvature of the lens to his/her personal preference. This strap may be removed if desired.

7. Make sure that the breathing tube is not twisted after donning.
8. Tuck inner bib of hood into shirt or protective clothing (see Figure 26).
9. Pull respirator outer bib over collar of shirt or protective clothing. Pull the long outer bib down on the outside of clothing and secure with tie down straps or tape (if employer operating procedures will allow).

Loose-Fitting Facepiece Use

Installing Breathing Tube Assembly in Loose-Fitting Facepieces

1. The 20LFM, 20FL, 20LFXL, 20LF2S, 20LF2M and 20LF2L loose-fitting facepieces have a sewn-in breathing tube connector on the back. The PA20LFBT breathing tube has a special connector on the hood end with bayonet type pins.
2. Insert the bayonet connector of the PA20LFBT breathing tube in the hood connector and turn clockwise until it locks in place (see Figure 32).

Available in extra large 20LFXL, large 20LF2L or 20LF, medium 20LF2M or 20LFM, and small 20LF2S. Select the size that fits most comfortably and matches your head size. Remove the protective cover from the visor. Pull the hood over your head and adjust the headband around your head and the elasticized edge of the faceseal under your chin. Make sure that the breathing tube is not twisted after donning.

Final Donning:

- Attach the other end of breathing tube to blower unit (if not already attached) by screwing adapters together.
- Remove any protective film covering the lens of the headpiece.
- Put on the belt and blower assembly and make any final adjustments to the belt as necessary, keeping the breathing tube and hood behind the head.
- Turn the blower on by depressing and holding the on/off switch (Figure 33) for approximately 1 second indicated by a short beep.
- Buckle the belt onto the waist (blower unit should be in the lower back of the wearer).
- Don the headpiece.
- Choose speed setting (see below).
- Place the hood on the head making any final adjustments to the fit as required at this time to ensure a comfortable and stable fit.
- Tuck inner bib into coveralls or shirt if using a hood with inner bib.

Final Donning

<table>
<thead>
<tr>
<th></th>
<th>Front</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC20 Single Bib</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>CC20 Double Bib</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>RT Series</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>20LFL</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>20LF2L</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
</tbody>
</table>

WARNING

Do not enter a hazardous area until you are sure that the blower and hood are fully operational and the blower is running. The user should periodically leave the hazardous area to check the airflow through the system. If the low battery or low flow alarm should sound, or if the user experiences any difficulty in breathing, or senses any taste or any odors from the hazard, the user should leave the hazardous area immediately. Failure to observe these warnings could result in death or serious injury.

Speed Selection

The EVAHL Blower is equipped with the ability for the user to select one of two speeds for operation.

When the unit is initially turned on, the blower will operate at approximately 8.5 cfm = 240 lpm (high speed). Note: The battery life is reduced at the higher speed.

Pressing the on/off switch will change the speed to approximately 7 cfm = 198 lpm (low speed).

Pressing the on/off switch additional times will toggle the unit between the two speeds.

NOTE

Speed change is confirmed by a short beep.
Low Battery Alarm and Low Flow Alarm

The EVAHL1 Blower unit is equipped with a Low Battery Alarm and a Low Flow Alarm.

The Low Battery Alarm will sound an intermittent 77 dba electronic beep indicating that there are approximately 15 minutes of remaining battery capacity. The delays between beeps will get shorter and shorter as time runs out. The Low Flow Alarm will sound a continuous 77 dba electronic beep indicating that the flow to the hood has dropped below the design specification of 185 lpm = 6.5 CFM (Note: The NIOSH minimum required flow is 170 lpm = 6 CFM).

When either of these alarms sounds, the user should immediately do the following:
- Leave the hazard area
- Remove the headpiece
- Disconnect the breathing tube from the hood
- Check the airflow with the airflow indicator (see page 4).
- Check the operation of the low-flow alarm by blocking the end of the breathing tube. The device will first ramp up to compensate and if correct flow cannot be achieved, the alarm will sound within 5 seconds.

If the airflow indicator indicates insufficient airflow, the battery should be fully charged (see "Battery Pack" on page 2), and/or the filter/cartridge should be replaced.

NOTE

The EVAHL1 blower is provided with a circuit to protect the battery. It 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. When the Low Battery Alarm sounds and the filter cartridges are not clogged, the battery should be recharged to protect the battery and thereby prolong the working life of the unit. If the ball in the Airflow Indicator is BELOW or PARTLY BELOW the PASS LINE with a fully charged battery, the filter cartridges may need to be changed.

Doffing the Respirator

Prepare to doff the blower, battery and hood in a safe, hazard-free area and do the following (in conjunction with your employer’s standard operating procedures):
- Remove the hood.
- Turn the blower off by holding down the on/off switch for 5 seconds. This is confirmed by a long beep and a shut down of the motor.
- Remove the waist belt.
- Disconnect the hood from the breathing tube.
- Disconnect the breathing tube from the blower.
- Clean and inspect components as necessary.
- Place battery on charger (as desired).
- Place components in storage.

Troubleshooting

The following guide will assist you in troubleshooting to locate possible issues with your respirator:

<table>
<thead>
<tr>
<th>Circumstance</th>
<th>Possible Cause(s)</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Battery Alarm is sounding</td>
<td>Low Voltage</td>
<td>Charge the battery</td>
</tr>
<tr>
<td></td>
<td>Blower malfunction</td>
<td>Return blower for analysis</td>
</tr>
<tr>
<td>Low Flow Alarm is sounding</td>
<td>Clogged/damaged air-purifying filter element</td>
<td>Replace the filter/cartridge</td>
</tr>
<tr>
<td></td>
<td>Battery Low</td>
<td>Re-charge the battery</td>
</tr>
<tr>
<td></td>
<td>Blower malfunction</td>
<td>Leave hazardous area immediately and check equipment. If the problem persists and no damage is found, return equipment for repair. Replace breathing tube and/or hood.</td>
</tr>
<tr>
<td></td>
<td>Hood neck cuff is restricting flow</td>
<td>Adjust neck cuff position</td>
</tr>
<tr>
<td>Smell or taste contaminant</td>
<td>Equipment damaged</td>
<td>Leave hazardous area immediately and check equipment</td>
</tr>
<tr>
<td></td>
<td>Filter needs to be replaced</td>
<td>Replace filter</td>
</tr>
<tr>
<td></td>
<td>Low airflow</td>
<td>Leave hazardous area immediately and check equipment</td>
</tr>
<tr>
<td></td>
<td>If the problem persists and no damage is found, return equipment for repair.</td>
<td></td>
</tr>
<tr>
<td>Blower unit does not run full service life</td>
<td>Damaged Battery</td>
<td>Return battery for analysis</td>
</tr>
<tr>
<td></td>
<td>Malfunctioning Battery Charger</td>
<td>Return charger for analysis</td>
</tr>
<tr>
<td></td>
<td>Hood neck cuff is restricting flow</td>
<td>Adjust neck cuff position</td>
</tr>
</tbody>
</table>
EVAHL Series Powered Air-Purifying Respirator
This respirator is approved only in the following configurations:

<table>
<thead>
<tr>
<th>Protection</th>
<th>Alternate Hood Assemblies</th>
<th>Alternate Suspension / Hard Hat Assemblies</th>
<th>Alternate Breathing Tubes</th>
<th>Alternate Cords / Power Source</th>
<th>Batteries</th>
<th>Alternate Belt Assemblies</th>
<th>Accessories</th>
<th>Cautions and Limitations</th>
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<tbody>
<tr>
<td>HE</td>
<td></td>
<td></td>
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<tr>
<td>OV/CD/CL/HC/SD/HE</td>
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<tr>
<td>AM/CL/HC/MA/FM/HF/SD/CD/HE</td>
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</tr>
</tbody>
</table>

1 Protection
- HE - High Efficiency Particulate Air Filter for Powered Air Purifying Respirators
- OV - Organic Vapor
- AM - Ammonia
- CD - Chlorine Dioxide
- CL - Chlorine
- FM - Formaldehyde
- HC - Hydrogen Chloride
- HF - Hydrogen Fluoride
- MA - Methylamine
- SD - Sulfur Dioxide

2 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.
D. Do not use this respirator if airflow is less than four cfm (115 lpm) for tight-fitting facepieces or six cfm (170 lpm) for hoods and / or helmets.
E. Follow established cartridge and canister change schedules or observe ESLI to ensure that cartridges and canisters are replaced before breakthrough occurs.
F. Contains electrical parts that may cause 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 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 replacement parts in the configuration 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.
Cleaning

⚠️ WARNING

Avoid contaminant entry into the breathing tube, as this will compromise respiratory protection and could result in death or serious injury. Consult your local safety professional if you suspect that contaminant has entered the breathing tube.

When cleaning the equipment, do the following:
- Ensure water does not enter filter/cartridges. Replace wet filter/cartridges.
- DO NOT use gasoline, organic-based solvents, or chlorinated degreasing fluids (such as trichloroethylene), as they will cause damage.
- DO NOT immerse the equipment in water or other cleaning fluid, as this may cause contamination in the breathing tube and blower interior that will be difficult to remove.
- Use a lint-free cloth moistened in a mild solution of soap and warm water to clean the outer surface of the equipment.

Failure to observe the instructions and warnings in this manual invalidates all performance statements and approvals for this equipment and could result in death or serious injury.

The following chemicals have been tested and approved as cleaning agents for the blower housing, belt and battery:
- A. Process NPD (1.25%) from Steris
- B. Spor Klenz (undiluted) from Steris
- C. Clorox liquid bleach at 10% concentration
- D. Sani-Cloth HB wipes
- E. 100% Methanol
- F. 70% IPA

Once filter/cartridges have reached the end of their useful life, discard in accordance with federal, state, and local guidelines, and in conformance with plant safety regulations.

Consult the appropriate CC20 or RT Series Hood User Manual for cleaning instructions for the hood components.

Storage

When the blower is completely dry, store in a clean, dry area, away from direct sunlight and sources of direct heat.

The storage temperature should be between 23º F to 129º F (-5º C to 54º C) with humidity less than 90% RH.

Consult the appropriate CC20 or RT Series Hood User Manual for storage instructions on hood components.

One Year Limited Warranty

Bullard warrants to the original purchaser that the EVAHL Powered Air-Purifying Respirator and Loose-Fitting Facepiece or Hood will be free of defects in material and workmanship under normal use and service for a period of one (1) year from the date of purchase. Bullard’s obligation under this warranty is limited to repairing or replacing, at its option, articles that are returned within the warranty period and that are, after examination, shown to Bullard’s satisfaction to be defective, subject to the following limitations;

a) EVAHL Powered Air-Purifying Respirator and Loose-Fitting Facepiece or Hood must be returned to the Bullard factory with shipping charges prepaid.

b) EVAHL Powered Air-Purifying Respirator and Loose-Fitting Facepiece or Hood must not be altered from its original factory configuration.

c) EVAHL Powered Air-Purifying Respirator and Loose-Fitting Facepiece or Hood must not have been misused, subjected to negligent use, or damaged in transport.

d) The date of purchase is within the one year warranty period. (A copy of the purchaser’s original invoice showing the date of purchase is required to validate warranty coverage.)

In no event shall Bullard be responsible for damages for loss of use or other indirect, incidental, consequential or special costs, expenses or damages incurred by the purchaser, notwithstanding that Bullard has been advised of the possibility of such damages.

ANY IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO ONE (1) YEAR FROM THE DATE OF PURCHASE OF THIS PRODUCT.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or allow limitations on how long an implied warranty lasts, so the above limitations or exclusion may not apply to you. This warranty gives you specific rights.

Return Authorization

The following steps must be completed before Bullard will accept any returned goods. Please read carefully.

Follow the steps outlined below to return goods to Bullard for repair or replacement under warranty or for paid repairs:

1. Contact Bullard Sales Support by telephone or in writing at:

   Bullard
   1898 Safety Way
   Cynthiana, KY 41031-9303
   Toll-free: 877-BULLARD (285-5273)
   Phone: 859-234-6616

   In your correspondence or conversation with Sales Support, describe the problem as completely as possible. For your convenience, your sales support specialist will try to help you correct the problem over the phone.

2. Verify with your sales support specialist that the product should be returned to Bullard. Sales Support will provide you with written permission and a return authorization number as well as the labels you will need to return the product.

3. Before returning the product, decontaminate and clean it to remove any hazardous materials which may have settled on the product during use. Laws and/or regulations prohibit the shipment of hazardous or contaminated materials. Products suspected to be contaminated will be professionally discarded at the customer’s expense.

4. Ship products to be returned, including those under warranty, with all transportation charges pre-paid. Bullard cannot accept returned goods on a freight collect basis.

5. Returned products will be inspected upon return to the Bullard facility. Bullard Sales Support will telephone you with a quote for required repair work which is not covered by warranty. If the cost of repairs exceeds stated quote by more than 20%, your sales support specialist will call you for authorization to complete repairs.

After repairs are completed and the goods have been returned to you, Bullard will invoice you for actual work performed.
Ordering Information

Blower Assemblies
EVAHL1 Blower unit only
EVAHL2 Blower unit, belt, battery and charger
EVAHL3 Blower unit, belt, battery

Replacement Batteries and Chargers
EVAHLGEC Table top gang charger (6 ports)
EVAHLBAT1 Lithium Polymer Battery Pack (Black)

Replacement Cartridges
PAPRFC3 HE (6 per box)
PAPRFC4 OV/AG/HE (6 per box)
PAPRFC5 AM/FM/MA/AG/HE (6 per box)

Respirator Hoods (“T” suffix designates thread connection)

Single bib hood, for use with headband suspension
20TJ, 20TJT Tychem 2000 (QC) 20RT headband suspension
20TJN, 20TJNT Tychem 2000 (QC) No headband suspension

Double bib hood for use with headband suspension
20TIC, 20TICT Tychem 2000 (QC) 20RT headband suspension
20TICN, 20TICNT Tychem 2000 (QC) No headband suspension, taped and sealed seams
20SIC, 20SICT Tychem 4000 (SL) 20RT headband suspension, taped and sealed seams
20SICN, 20SICNT Tychem 4000 (SL) No headband suspension, taped and sealed seams, PVC lens
20SICV, 20SICVT Tychem 4000 (SL) 20RT headband suspension, taped and sealed seams, PVC lens

Double bib hood for use with Bullard hard hat (“T” suffix designates thread connection)
20TICH, 20TICH T Tychem 2000 (QC) Hard hat not included
20SICHT Tychem 4000 (SL) Hard hat not included, taped and sealed seams
20SICVHT Tychem 4000 (SL) Hard hat not included, taped and sealed seams, PVC lens

Loose fitting facepieces with sewn-in suspension
20LFL Tychem 2000 (QC), Extra large
20LFL Tychem 2000 (QC), Large
20LFL Tychem 2000 (QC), Medium
20LFL Tychem 2000 (QC), Large, narrow profile
20LFL Tychem 2000 (QC), Medium, narrow profile
20LFL Tychem 2000 (QC), Small, narrow profile

Double bib hood for use without a headband suspension
RT1, RT1T Tychem 2000 (QC), Inflatable neck collar
RT2, RT2T Tychem 4000 (SL), Inflatable neck collar
RT3, RT3T Tychem 2000 (QC), Sport neck collar
RT4, RT4T Tychem 4000 (SL), Sport neck collar

Accessory Items for Hoods
20LCL Mylar lens covers, CC20 Series (25/pk)
RTLCL Mylar lens covers, RT Series (25/pk)

Headband Suspensions and Hard Hats
20TG Standard headband suspension
20RT Sure-Lock® ratchet headband suspension
30WHP Hard hat with standard suspension, white
30WHR Hard hat with ratchet suspension, white
51WHP Hard hat with standard suspension, white
51WHR Hard hat with ratchet suspension, white

Accessories for Headbands Suspension and Hard Hats
RS6PC Standard replacement suspension for 30WHP hard hat
RS6RC Replacement ratchet suspension for 30WHP hard hat
RS4RC Standard replacement suspension for 51WHR hard hat
20NC Chinstrap for 20TG and 20RT headband suspension
ES42 Chinstrap for C30 and S51 hard hats

Replacement Parts and Accessories
EVABELT1 Replacement belt
EVABELT2 Vinyl belt
PAPRSUSP1 Suspenders
EVAEXT1 Extension belt kit
PAPRSUSP1 PAPR suspenders (1 pair)
P1AIFI Air flow indicator
PAHBT Powered air hood breathing tube assembly; standard length
PAHBTXS Powered air hood breathing tube assembly; short length
PAHBTXL Powered air hood breathing tube assembly; long length
PA1BT Hood breathing tube assembly; includes tube and clamp; standard length
PA1BT XS Hood breathing tube assembly; includes tube and clamp; short length
PA1BT XL Hood breathing tube assembly; includes tube and clamp; long length
PA20LFBT Loose fitting facepiece breathing tube assembly; standard length
PA20LFBT XS Loose fitting facepiece breathing tube assembly; short length
PA20LFBT XL Loose fitting facepiece breathing tube assembly; long length
PA1BT S Breathing tube/cartridge seal
S18051 Breathing tube clamp (10/pack)