



# **3M Breathe Easy™ Turbo PAPR Assembly**

*User Instructions for 3M™ 022-00-03R01 Turbo Motor Blower Unit, 3M™ 520-15-00 Breathe Easy™ Turbo Belt-Mounted PAPR Assembly, 3M™ 520-17-00 Breathe Easy™ Turbo Belt-Mounted PAPR Assembly, Intrinsically Safe*

*(Keep insert for reference)*

## SAFETY GUIDELINES

### Intended Use

The 3M™ Breathe Easy™ Turbo is a belt-mounted blower/filtration unit. To form a complete powered air purifying (PAPR) respirator system, the Breathe Easy™ turbo must be combined with the appropriate filters/cartridges or canisters, battery pack and respirator headpiece. 3M Breathe Easy™ Turbo PAPR systems are intended to provide respiratory protection against certain particulates, organic vapors, acid gases and other inorganic gases.

### WARNING

Use only 3M parts and accessories for the 3M Breathe Easy™ Turbo respirator system as described in these *User Instructions*.

Always don the respirator system properly and in an uncontaminated area.

If you discover any of the wear and damage described in the Troubleshooting Section of these *User Instructions*, discard the component and replace it with a new one. Failure to do so may adversely affect respirator performance and result in sickness or death.

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### Important:

Before use, the wearer must read and understand these *User Instructions*. Keep this insert for future reference.

If you have any doubts about the applicability of these respirator systems to your job situation, consult an industrial hygienist or call the 3M OH&ESD technical service department

### General Description

The 3M Breathe Easy™ Turbo is the blower/filtration component in a series of NIOSH-approved Powered Air Purifying Respirator (PAPR) systems. A complete Breathe Easy™ PAPR system includes a 3M Breathe Easy™ Turbo blower/filtration unit, appropriate respirator headpiece assembly, breathing tube assembly, rechargeable battery and appropriate filter/cartridge/canister.

There are three battery packs available for the 3M Breathe Easy™ Turbo blower/filtration unit:

- Standard rechargeable NiCad;
- Intrinsically safe rechargeable NiCad; and
- Non-rechargeable lithium manganese.

The filter/cartridge/canister used determines which of the battery packs must be used to maintain your system's NIOSH approval. Use the following table to verify that you are using the correct battery pack for your system:

Battery Part Number	Description	Use Only with these Filters/Cartridges/Canisters
520-01-15R01	Standard NiCad Rechargeable Black Case w/Yellow Label	OV/HE (AP3) OV/Acid Gas/HE (AEP3) OV/Hydrogen Fluoride/SO <sub>2</sub> /HE (ALP3) Ammonia/Methylamine/HE (KP3) Formaldehyde/Acid Gas/HE (EP3) FR57 Cartridge FR40 CANISTER
520-01-17R01	Intrinsically Safe NiCad Rechargeable Blue Case	Organic Vapor (A) Acid Gas (E) Ammonia/Methylamine (K) Organic Vapor/Acid Gas (AE) HE (P3)
520-04-57R01	Lithium, Non-Rechargeable (Butyl rubber hood and full facepiece only)	Organic Vapor/HE (AP3) OV/Acid Gas/HE (AEP3) FR57 Cartridge FR40 Canister

The Breathe Easy™ Turbo PAPR with 520-01-17 battery pack has been tested by Factory Mutual Research Corporation for intrinsic safety. This system can be used in the following Division 1 locations: Class I, Groups A, B, C, D; Class II, Groups E, F, G; and Class III.

There are three battery chargers available for the rechargeable batteries:

- Single unit smart charger;
- Five unit smart charger; and
- Ten unit smart charger.

The Turbo unit is secured to the wearer via a belt assembly. The belts are available in three materials: nylon, polyurethane-coated nylon and leather, and will accommodate up to 60" waist sizes.

### **Service Life of Chemical Cartridges and Filters:**

The useful service life of chemical cartridges will depend upon the flow rate, the specific type, volatility and concentration of the contaminants and environmental conditions such as humidity and temperature. Replace cartridge/filter combination in accordance with an established cartridge change schedule, filter time-use restrictions, or an end of service life indicator (ESLI), whichever occurs first. Cartridges should be changed earlier if smell, taste or irritation from the contaminant is detected. Filters must be replaced if they became damaged, soiled or if increased breathing resistance occurs.

### **Use For:**

Respiratory protection against certain airborne contaminants including particulates (dusts, fumes, mists, radionuclides and asbestos); organic vapors; acid gases; and other inorganic gases.

### **Do Not Use For:**

Atmospheres where oxygen concentration is below 19.5%; where concentrations of contaminants are: unknown; immediately dangerous to life or health (IDLH); exceed applicable local standards or OSHA

standards for maximum use concentrations for the respirator, whichever is lower. Refer to additional limitations and cautions under NIOSH Cautions and Limitations.

## Respirator Selection

3M™ Breathe Easy™ Turbo respirator systems must be used in accordance with applicable health and safety standards, respirator selection tables contained in such publications as ANSI standard Z88.2-1992, or pursuant to the recommendations of an industrial hygienist. A written respirator program must be in place which is in accordance with the OSHA respiratory protection standard found in 29 CFR 1910.134 prior to using any respirator system.



These respirator systems help protect against certain contaminants. **Misuse may result in sickness or death.** For proper use, read all instructions in these *User Instructions* and the *User Instructions* provided with the respirator headpiece to be used. Before use, see your supervisor, or contact the 3M OH&ESD technical service department

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## Respirator Training

Before using 3M Breathe Easy™ Turbo respirator systems, the employer must assure that each respirator user has been trained by a qualified person in the proper use and maintenance of the respirator system according to the instructions contained in these *User Instructions* and other applicable *User Instructions*.



Before using a 3M Breathe Easy™ Turbo respirator system each person must read and understand the information in these *User Instructions* and the *User Instructions* provided with the respirator headpiece to be used. Use of these respirator systems by untrained or unqualified persons, or use that is not in accordance with these instructions, may adversely affect respirator performance and may result in sickness or death.

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## Assigned Protection Factors

Refer to the *User Instructions* supplied with the respirator headpiece for information on protection factors.

## NIOSH Approval

For a listing of the components of NIOSH approved 3M™ Respirator Systems using 3M Breathe Easy™ Turbo, refer to the NIOSH approved label insert.

## 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.
- H– Follow established cartridge and canister change schedules or observe ESLI to ensure that cartridge and canisters are replaced before breakthrough occurs.
- I– Contains electrical parts which have not been evaluated as an ignition source in flammable or explosive atmospheres by MSHA/NIOSH.
- 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’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.

## **SPECIFICATIONS**

- Heat and flame resistance – The 3M Breathe Easy™ Turbo is not designed for high temperature environments and should not be exposed directly to radiant heat sources, sparks or flame.
- Airflow range – 4 to 15 scfm (114 to 425 lpm) (depending on headpiece)
- Weight – Turbo unit w/o filter/cartridge/canister: Approximately 1.8 pounds  
 Battery pack (NiCad): Approximately 1.8 pounds  
 Battery pack (lithium): Approximately 1.0 pounds

## **SYSTEM COMPONENTS AND REPLACEMENT PARTS**

### **NIOSH Approved Respirator Systems**

For a listing of the components of a NIOSH approved respirator system using 3M Breathe Easy™ Turbo respirators, refer to the NIOSH approval label insert.

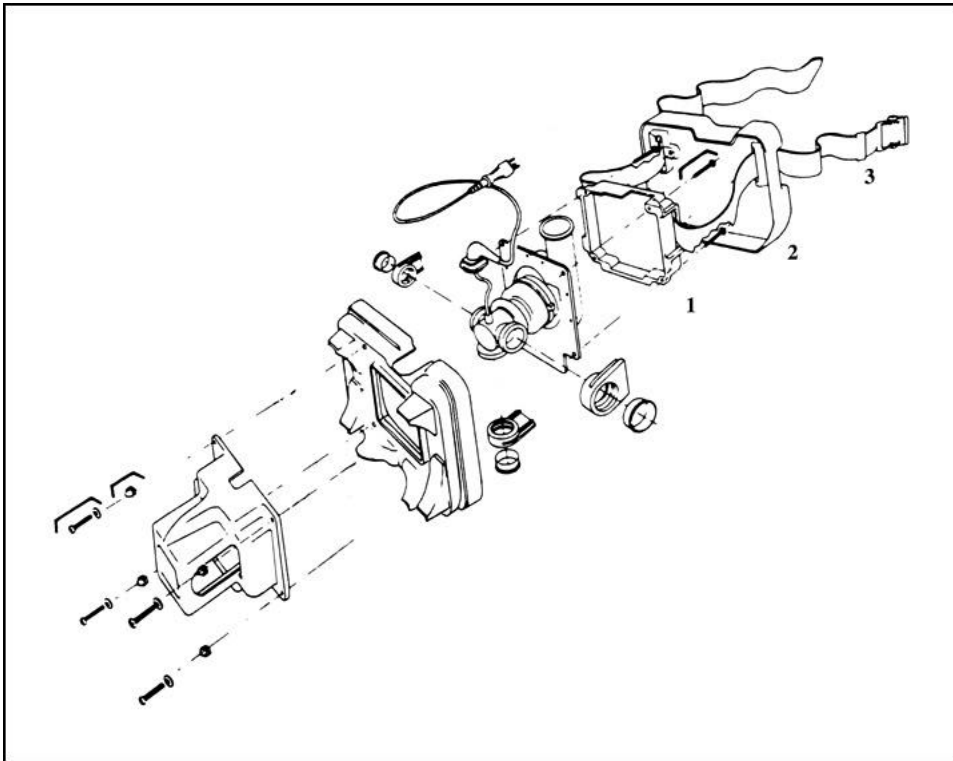
The components of a NIOSH approved 3M Breathe Easy™ Turbo powered air purifying respirator (PAPR) include:

- Turbo PAPR blower unit
- Approved respirator headpiece
- Breathing tube and clamp assembly
- Battery pack (standard or intrinsically safe)
- Battery charger (single, five or ten unit)
- Flow meter
- Appropriate filter/cartridge/canister

# 3M™ Breathe Easy™ Turbo System

## 3M Breathe Easy™ Turbo Blower/Filtration Components

Figure Number	Part Number	Description
–	520-15-00	Breathe Easy™ Turbo Belt-Mounted PAPR Assembly, Standard
–	520-17-00	Breathe Easy™ Turbo Belt-Mounted PAPR Assembly, Intrinsically Safe
–	022-00-03R01	Breathe Easy™ Turbo PAPR Unit
1	022-12-00R01	Rear Cover for Turbo Unit
2	022-19-03R01	Back Cover for Turbo Unit
–	022-25-06R01	Pad
–	520-01-21	Flow Meter
3	520-02-23R01	Belt, Decontaminable (polyurethane-coated nylon), 50" Long x 2" Wide
–	520-02-90R01	Belt Assembly, Standard (Nylon), 60" x 2" with Plastic Buckle
–	524-01-19R01	Belt, Leather, 60" Long x 2" Wide
–	524-01-04R01	Harness Assembly (backpack)
–	527-01-01R01	Breathing Tube Cover, Tyvek®
–	529-01-93R01	Breathing Tube Clamp



## **Batteries and Chargers**

520-01-15R01	Battery Pack, NiCad (black) – Use with Type AP3, AEP3, ALP3, KP3, EP3 Cartridges Only
520-01-17R01	Battery Pack, NiCad Intrinsically Safe (blue) – Use with Type A, E, K, AE, P3 Filters Only
520-01-61	Smart Battery Charger, 10-Unit
520-03-72	Smart Battery Charger, 5-Unit
520-03-73	Smart Battery Charger, Single Unit
520-04-57R01	Lithium Battery Pack – Use with Type AP3, AEP3, FR57 and FR40 Cartridges Only
529-01-56R01	Battery Cover, Water Repellent

## **Filter/Cartridges**

456-00-01R06	Organic Vapor Cartridge A, 6/pk
456-03-01R06	Organic Vapor/Chlorine/Hydrogen Chloride/Sulfur Dioxide Cartridge AE, 6/pk
453-03-01R06	Organic Vapor/Chlorine/Hydrogen Chloride/Sulfur Dioxide/High Efficiency AEP3, 6/pk
453-07-01R06	Organic Vapor/Hydrogen Fluoride/Sulfur Dioxide/High Efficiency ALP3, 6/pk
453-00-01R06	Organic Vapor/High Efficiency Cartridge AP3, 6/pk
456-02-01R06	Formaldehyde/Chlorine/Hydrogen Chloride/Sulfur Dioxide E, 6/pk
453-01-01R06	Formaldehyde/Chlorine/Hydrogen Chloride/Sulfur Dioxide/High Efficiency Cartridge EP3, 6/pk
456-01-01R06	Ammonia/Methylamine Cartridge K, 6/pk
453-02-01R06	Ammonia/Methylamine/High Efficiency Cartridge KP3, 6/pk
450-00-01R12	High Efficiency Filter P3, 12/pk
453-03-02R06	Ammonia/Chlorine/Chlorine Dioxide/Formaldehyde/Hydrogen Chloride/Hydrogen Fluoride/Methylamine/Organic Vapor/Sulfur Dioxide FR57, 6/pk

## **Canisters**

456-00-07R06	Organic Vapor Canister A, 6/pk
456-01-07R06	Ammonia/Methylamine Canister K, 6/pk
456-02-07R06	Formaldehyde/Chlorine/Hydrogen Chloride/Sulfur Dioxide E, 6/pk
453-03-03R06	Ammonia/Chlorine/Chloroacetophenone/Chlorobenzylidene Malononitrile/Hydrogen Chloride/Organic Vapor/Phosphine/Sulfur Dioxide FR40, 6/pk



## ASSEMBLY

### Battery Charging

A completely exhausted battery pack should be charged for 16 to 24 hours. To use the smart charger, place the charging station horizontally on a flat surface and plug the station AC power cord into a regulated 120v-60Hz outlet. The green LED light will turn on.

Insert the charging lead into the battery pack. The LED will turn off, indicating that the battery pack attached is being charged in a high rate mode. After approximately eight hours (depending on the amount of charging required) the LED will turn back on, indicating that the charger has switched to a trickle rate mode, preventing damage to the battery from overcharge.

3M batteries provide up to 500 charge/discharge cycles. However, the life of 3M batteries will be significantly reduced when they are exposed to high heat over an extended period of time. To maximize battery life, these guidelines should be followed:

- Charge 3M battery packs before they are completely discharged. Damage may occur if the battery pack is completely discharged (“deep discharged”) frequently.
- 3M battery packs may be charged any time during the discharge cycle. Voltage depression (AKA, memory) is not a significant factor for 3M PAPR battery packs. Whether it has been used 30 minutes or 8 hours, the battery pack may be charged.
- Always charge batteries at a temperature of 77° F (25° C) or less. At higher temperatures, the battery pack may not accept a full charge. If a battery pack feels hot, let it cool for 1/2 hour before charging.
- Batteries may be left on trickle rate mode to maintain optimum capacity for up to 30 days. Without periodic charging, a NiCad battery in storage loses approximately 1% of its charge each day. Infrequently used battery packs should be fully charged, initially, then charged overnight once per week or one hour each day to maintain a full charge. Allowing a battery to self-discharge during extended storage will not harm the battery pack. Batteries subjected to prolonged storage (longer than 6 months) may lose their capacity to hold a full charge. Battery capacity can be checked by running the PAPR motor/blower unit for eight hours and checking that airflow is maintained at six CFM or greater. Several charge/run-down cycles may restore battery capacity.
- Do not charge multiple battery packs in an enclosed cabinet without ventilation.
- When using the Lithium battery pack, refer to the *User Instructions* provided with the Lithium battery pack (part number 520-04-57R01).

### Attaching Filters/Cartridges/Canisters

Remove three filters/cartridges/canisters from their packaging and verify that they are the appropriate type for the application by examining the label attached to the filter/cartridge/canister housing.

Remove screw caps from each filter/cartridge/canister and retain them for future use. Ensure that the air inlet insert is seated inside each of the three rubber air inlets on the Turbo unit and that the threads and sealing surfaces are free of dirt and debris. Screw a filter/cartridge/canister loosely into each of the three threaded inlets. When all three filters/cartridges/canisters are in place, hand-tighten them so that an airtight seal is achieved between the neck of each filter/cartridge/canister and the rubber molding inside the threaded inlet. Dispose of used filters/cartridge/canister in accordance with applicable regulations.



Fig. 2 Turbo inlet

### WARNING

Do not over-tighten filter/cartridge/canister. Over-tightening may result in distortion or displacement of the seal and may allow contaminated air to enter the respirator headpiece and may result in sickness or death.

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Ensure that all plugs are removed from the filter/cartridge/canister ends before using the system. Retain the plugs for later use.

### **Connecting the 3M™ Breathe Easy™ Turbo Powered Air Blower/Filtration Unit**

Place the hose clamp onto the free end of the breathing tube. Slide that end of the breathing tube over the Turbo PAPR blower unit outlet, and tighten the clamp. Ensure that the breathing tube is secured to the Turbo PAPR blower unit outlet and that the end of the breathing tube is visible between the Turbo PAPR blower unit and the hose clamp.

### **Adjusting the Belt Length**

Pull the whole belt to the right or left through the Turbo PAPR blower unit's bracket so the buckle centers at your waist (in front) and the Turbo PAPR blower unit is behind you.

### **Donning the 3M Breathe Easy™ Turbo Powered Air Blower/Filtration Unit**

To don the Turbo PAPR blower unit, place the unit back cover against your lower back (along your spinal column) with the breathing tube extending upward. Fasten the belt around your waist at the front so the Turbo unit rests comfortably and securely against your lower back. Plug the Turbo PAPR blower unit into a fully charged battery pack, and attach the battery pack to the belt.

## OPERATING INSTRUCTIONS



Use of these respirator systems by untrained or unqualified persons, or use not in accordance with these instructions may adversely affect respirator performance and result in sickness or death. Refer to additional warnings listed in the Safety Guidelines Section of these User Instructions.

Use of these respirator systems must be in accordance with applicable safety and health standards, respirator selection tables contained in such publications as ANSI Z88.2-1992, or pursuant to the recommendations of an industrial hygienist. Use of a respirator requires that a written respirator program be in place, which is in accordance with the OSHA respiratory protection standard found in 29 CFR 1910.134 prior to using any respirator system.

Before use, the user must be trained by the employer in the proper use and maintenance of the 3M Breathe Easy™ Turbo PAPR blower unit respirator system. Such training must be in accordance with these User Instructions. Each person using these respirator systems must first read and understand this entire User Instructions. Failure to do so may adversely affect respirator system performance and result in sickness or death.

If these respirator systems fail any of the requirements of the user inspection and performance check, do not use the respirator system until all necessary repairs have been made and the respirator system passes the performance check. Failure to do so may adversely affect respirator system performance and result in sickness or death.

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If you have any doubts about the applicability of the equipment to your job situation, consult an industrial hygienist or call the technical service department of 3M OH&ESD

### User Performance Check

After assembling the system in accordance with the Assembly Section, complete a user performance check as follows:

1. Prior to beginning each work shift, check that the system is providing adequate airflow as follows:
  - With the breathing tube assembly disconnected from the Turbo PAPR blower unit and the system running, insert the base of the flow meter into the Turbo unit outlet. Be sure that the Turbo PAPR blower unit and flow meter are resting in a vertical position. The Turbo unit may need to be propped up so that the lower cartridge opening is not blocked.
  - Check that the center of the float rests at or above the appropriate mark. The Turbo must maintain at least 6 cfm. If the flow rate is below 6 cfm, replace filters/cartridges/canisters and check flow again. If the flow rate is still below 6 cfm, refer to the Troubleshooting Section for further instructions before using.
2. Verify that the respirator headpiece is connected to the Turbo blower/filtration unit and that air is flowing before donning the respirator headpiece.



Fig. 3 Turbo unit with cartridges and flow meter

### WARNING

Before you enter a hazardous atmosphere wearing this respirator system, you must inspect the respirator system, complete a user performance check, and don the system according to the instructions in the Assembly Section of these *User Instructions*. Failure to do so may adversely affect respirator performance and may result in sickness or death. Do not wear this respirator system to enter areas where atmospheric concentrations of contaminants are unknown, immediately dangerous to life or health, exceed the Maximum Use Concentration (MUC) for the respirator headpiece, or where atmospheres contain less than 19.5% oxygen.

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3. With the respirator system in operation and donned according to the instructions in the Assembly Section, enter the contaminated area, breathing normally. Keep the PAPR assembly away from equipment, vehicles and other physical and chemical hazards.

### WARNING

Do not remove the respirator system while you are in a hazardous atmosphere. Doing so may result in sickness or death. Contaminants which are dangerous to your health include those which you may not be able to see or smell.

Leave the contaminated area immediately if:

- Any part of the system becomes damaged
- Airflow into the respirator headpiece decreases or stops
- Breathing becomes difficult
- You feel dizzy or your vision is impaired
- You taste or smell contaminants
- Your face, eyes, nose or mouth become(s) irritated
- You suspect that the concentration of contaminants may have reached levels at which this respirator system may no longer provide adequate protection.

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4. Remove the respirator system in an uncontaminated area. Refer to the Cleaning and Inspection Section of these *User Instructions* for cleaning, inspection and storage information.

## CLEANING AND INSPECTION

### Cleaning the 3M Breathe Easy™ Turbo Powered Air Blower/Filtration Unit

Solvents should not be used to clean the Turbo PAPR blower unit or battery case. Liquid solvents may chemically weaken the plastic. Wipe the Turbo PAPR blower unit and battery pack with a mild cleaning solution. Do not immerse the Turbo PAPR blower unit or battery pack.

Follow the hygiene practices established by your employer for the specific contaminants to which you have been exposed.

### ⚠ WARNING

If excessive wear and/or damage to the respirator system or its components is observed at any time, do not use the respirator system until all necessary repairs have been made and the wearer has successfully completed the user performance check described in the Operating Instructions Section of these *User Instructions*.

Misuse may adversely affect respirator performance and may result in sickness or death.

### Inspecting the 3M Breathe Easy™ Turbo Powered Air Blower/Filtration Unit

#### Turbo PAPR Blower Unit

- Remove the filters/cartridges or canisters.
- Examine the blower housing for cracks. Replace if cracked or damaged.
- Examine the inside of the blower intake manifold (note the red and white wires). The presence of dust or other particulate matter inside the manifold or on the wires may indicate a damaged filter, improper seating of the filter/cartridge/canister or incorrect filter/cartridge/canister selection.  
Contact 3M Technical Service for assistance.
- Examine the outside of the battery pack for cracks. Replace if damaged.
- Inspect the breathing tube and replace if punctured, cracked or worn.

#### Breathing Tube

- Carefully examine the entire breathing tube. Look for tears, holes or cracks.
- Bend the tube to verify that it is flexible.

#### Storage

- Store your respirator at room temperature in a dry area that is protected from exposure to hazardous contaminants.



Blower manifold/wires

## TROUBLESHOOTING

Use the table below to help identify possible causes and corrective action for problems you may experience.

<b>Problem</b>	<b>Probable Causes</b>	<b>Corrective Action</b>
Breathing tube pulls headpiece out of comfortable position	Breathing tube too long Breathing tube too short	Select appropriate length breathing tube
Headpiece is noisy	Twisted breathing tube inlet	Assure that the breathing tube is securely fastened to the headpiece and is not twisting the inlet opening.
Low airflow	Battery needs charging  Filter is loaded  PAPR blower malfunction	Leave work area immediately Switch to fully charged battery  Replace filter  Switch to a different blower unit

### **NBC Safety**

World Leaders in Defense Technology