

**Powered Air-Purifying Respirator with High Efficiency (HE) Filter – Approval No. TC-21C-0765**

**PA20 PAPR  
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.
- 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.
- 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 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.

| <b>⚠ WARNING</b>   |
|--|
| <p>Use strictly in accordance with instructions, labels and limitations pertaining to the PA20 respirator.</p> <ol style="list-style-type: none"> <li>1. The PA20 respirator does not supply oxygen. Use only in adequately ventilated areas containing at least 19.5% oxygen.</li> <li>2. Do not use when concentrations of contaminants are immediately dangerous to life or health.</li> <li>3. Do not use these respirators for respiratory protection during abrasive blasting.</li> <li>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.</li> <li>5. Leave area immediately if:               <ul style="list-style-type: none"> <li>• Breathing becomes difficult</li> <li>• Dizziness or other distress occurs</li> <li>• You taste or smell the contaminant</li> <li>• Unit becomes damaged</li> <li>• Battery alarm sounds</li> </ul> </li> <li>6. This apparatus must not be worn with the blower unit switched off. If the blower switched off, a rapid build-up of carbon dioxide and depletion of oxygen may occur, which could result in death or serious injury.</li> <li>7. Never alter or modify this respirator. Use only NIOSH approved PA20 components and replacement parts for this respirator.</li> </ol> <p>Failure to follow these warnings could result in death or serious injury.</p> |

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# PA20 Series Powered Air-Purifying Respirator PA1/PA2 Blower Assembly User Manual

## PA1/PA2 - Principle of Operation

The PA20 Powered Air-Purifying Respirator (PAPR) System is supplied in four parts:

1. The Blower Assembly (Part No. PA1, or Part No. PA2) which includes:

- PA1BU, or PA2BU Blower Unit with Battery
- PA1FG Filter/Gasket
- PA1SB Belt Assembly
- PA1AFI Air Flow Indicator
- User Instructions

2. The hood with headband suspension and/or hard hat, or loose fitting facepiece. The following hood models may be used with the PA1BU or PA2BU blower unit: (See listing of hoods for materials and packaging quantities.)

- 20TJ Hood
- 20TP Hood with Solvent-Resistant lens
- 20TIC Hood with Inner Bib
- 20TPC Hood with Inner Bib and Solvent-Resistant Lens
- 20TICH Hood for use with Bullard Hard Hat
- 20TICS Hood with Taped and Sealed Seams
- 20SIC Hood with Taped and Sealed Seams
- 20SICH Hood with Taped and Sealed Seams for use with Bullard Hard Hat
- 20LFM Loose-Fitting Facepiece Hood, Small-Medium\*
- 20LFL Loose-Fitting Facepiece Hood, Large\*

\*Uses PA20LFBT Breathing Tube

3. The breathing tube. Choose PA1BT for hoods and PA20LFBT for loose fitting facepieces

4. The Battery Charger. Both standard and quick chargers are available.

The high efficiency air-purifying element must be mounted inside the blower body. The blower unit draws in contaminated air through the filter. The filtered air is blown into the wearer's hood through the breathing tube. A flow indicator is provided to check that there is an adequate volume of air available to the wearer prior to use.

The units are designed for use at temperatures from 32° F to 90° F (0° C to 32° C).

The system is designed to operate at a minimum air flow of 7.5 cubic feet of air per minute (210 liters per minute) in the hood under normal use. In a heavily contaminated environment, the battery life may be reduced due to clogging of the filter.

The PA1BU system (only) is fitted with an audible alarm which will sound due to low battery power.

### NIOSH Approval No. TC-19C-154, Type C

The same headpieces approved for use with the PA20 Series of Powered Air-Purifying Respirators are also approved for use with the CC20 Series of Supplied Air Respirators. CC20 Series Respirators provide a high level of respiratory protection and user comfort over long work periods, in a wide variety of hazardous environments.

The CC20 SAR air flow control devices and other components are described in the CC20/PA20 Series User Manual.



## Battery Pack

A fully charged battery pack will power a blower unit to provide adequate air volume for the respirator hood for approximately 10 hours for the PA1BU, and approximately 6 hours for the PA2BU, under normal working conditions. The battery pack is mounted inside the blower unit body and is not designed to be removed or replaced except by authorized service personnel. The ON/OFF switch must be in the OFF position for re-charging.

### NOTE

If using a Quick Charger or Gang Charger, please see the instructions in "Initial Charging Procedure with Quick Charger" prior to charging the battery for the first time. Also, follow this procedure following periods of extended storage.

Charging for periods longer than 16 hours with the standard charger will reduce battery capacity.

To charge the battery pack, do the following (see Figure 1):

- Open the cover on the charging port of the blower unit by turning the retaining collar counter-clockwise and pulling it off.
- Connect the lead from the battery charger to the charging port on the blower unit.
- Connect the battery charger to a 120-volt (AC) electrical outlet.
- The ON/OFF switch on the blower must be off.

Charge the battery pack for 14 to 16 hours with standard charger and 8 hours with quick charger.

While the battery is charging the light on the charger will remain on.

### WARNING

The charging port plug and cover assembly must be mounted and locked in position on the charging port during use and at all times except when recharging the battery. Failure to follow these instructions could result in death or serious injury.

### NOTE

The standard charger will not automatically terminate charging!



Figure 1

## Initial Charging Procedure with Quick Charger

To ensure a full charge on a new blower unit being charged with a Quick Charger or Gang Charger, follow these important guidelines. These guidelines also apply to blower units that have been in storage for extended periods of time.

For new blower units or blower units that have been in storage for extended periods of time, follow the directions above under "Battery Pack", and when the light begins to flash on the Quick Charger do the following:

- Unplug the charger power cord. Wait 15 seconds. Plug the charger in again. The charger light will now remain on.
- When the light begins flashing again, unplug the charger power cord. Wait 15 seconds. Plug the charger in again. The charger light will now remain on.

The charger light will flash a third time, indicating that the battery is fully charged.

This procedure should also be followed after periods of prolonged storage. Without periodic charging, the nickel metal hydride batteries will lose up to 1% of their charge per day. Allowing a battery to self-discharge during periods of prolonged storage will not damage the battery.

## Pre-Operational Inspection

Prior to each work shift, perform the following Pre-Operational Inspection to ensure proper operation and that you have the following items.

### 1. Belt Mounted Blower Unit, Part No. PA1BU/PA2BU (with on board battery)

- Check that the unit is clean and undamaged.
- Inspect for deterioration, physical damage, and improper assembly.
- Ensure that a PAIFG high efficiency filter and gasket are properly mounted and seated inside the blower unit.

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.

### 2. Hood with Suspension or Hard Hat, or Loose Fitting Facepiece

- The hood is constructed of either Tychem® QC or Tychem SL. Depending on the model ordered, it may be used with either a headband suspension or a hard hat. The loose fitting facepiece is constructed of Tychem QC and features an internal suspension
- All hoods are approved for use with the PA1BU/PA2BU Blower Units.
- Inspect the hood for any physical damage.

# PA20 Series Powered Air-Purifying Respirator PA1/PA2 Blower Assembly User Manual

## Mounting the Breathing Tube on the PA1BU/PA2BU Blower

Ensure that a gray rubber gasket is in place in the breathing tube coupler on the blower unit.

Screw one end of the breathing tube into the blower unit (hand tight is sufficient) (see Figure 2).

Ensure that the ON/OFF Switch is in the OFF position.

Ensure that neither the breathing tube nor the filter is blocked.

Switch on the blower. For the PA1BU blower, if the Low Battery Alarm sounds at this time, the battery needs to be recharged. See notes on previous page regarding properly charging the battery.



Figure 2

## Checking Airflow with the Airflow Indicator (PA1AFI)

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 3).



Figure 3

Ensure that the air outlet holes in the Airflow Indicator tube are not blocked.

Apply a light downward pressure to the Airflow Indicator to get a reasonable seal at the breathing tube end. 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:

- Clogged or damaged air-purifying filter element. See “Replacing the PA1FG High Efficiency Filter” on the next page for filter mounting instructions.
- Low battery charge or battery malfunction.
- Blower malfunction.

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

### NOTE

Due to the back-pressure of the ball, the Low Battery Alarm may sound when a reading is being taken. If the ball bounces, let it stabilize, and then read the lowest point.

When the blower passes the flow test, it is ready to use. Turn off the blower, remove the flow indicator and store the air flow indicator safely for future use.

### NOTE

Use ONLY Bullard High Efficiency Filter No. PA1FG, which complies with and has the NIOSH approval label.

### WARNING

If the blower malfunctions during use in a hazardous area:

**DO NOT** remove the respiratory inlet covering, blower or waist-belt while in the hazardous area.

**DO** remain calm and **LEAVE** the hazardous area immediately.

After reaching a hazard-free area, immediately remove the hood and respirator.

**DO NOT** use a blower that fails the flow test.

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

## PA1FG High Efficiency Filter Air-Purifying Element

### Principle of Operation

The PA1FG high efficiency filter element is NIOSH approved when used in the PA20 PAPR for respiratory protection subject to the limitations of the NIOSH approval.

HE particulate filters are 99.97% effective against all particulate aerosols.

Filters are supplied in quantities of 3 filters and gaskets per box.

### NOTE

The following abbreviation is approved by NIOSH to indicate the particulate filter approval for PAPRs:

**HE = High Efficiency Particulate Air Filter for Powered Air-Purifying Respirators**

## Replacing the PA1FG High Efficiency Filter

The high efficiency filter and gasket must be replaced when:

1. An airflow check with the airflow indicator shows that any part of the ball is below the PASS line (see instructions on page 4);
2. When the high efficiency filter has been damaged; or
3. In compliance with any applicable administrative procedures.

Carefully remove a new HE filter from its packaging.

### NOTE

Care must be taken to avoid touching or allowing any objects to contact the exposed filter pleat. Hold the filter only by its edges.



Figure 4

Check that the filter has a filter gasket and that it is positioned flat behind the filter lip.

### NOTE

Always use a new filter gasket when refitting or changing a filter. Unclip the blower latches and remove the back cover and belt assembly from the blower unit (**see Figure 4**).

Check that the mating faces of blower unit body and the back cover are free from debris or any deep scratches.

Remove the old filter and gasket and discard in accordance to local, state and federal guidelines..

Slide the filter and filter gasket into the blower unit (**see Figure 5**).

Check that the filter gasket is positioned flat on the rear of the blower.

Refit the back cover and belt, ensuring that the lip of the cover fits over the blower edges and the male and female locking latches are located together and lined up properly. The back cover will fit on the unit in only one direction. The latches will not line up properly if the back cover is put on the wrong way.

Snap shut the blower latches once the back cover is oriented properly, and check to make sure that the latches are secure.

Refer to the "Checking Air Flow with the Airflow Indicator" section on the previous page for instructions on checking the filter for clogging.



Figure 5

# PA20 Series Powered Air-Purifying Respirator PA1/PA2 Blower Assembly User Manual

## Donning the Blower and Respirator

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

Check that the blower unit is securely clamped closed.

Prior to assembling the system, fit the blower and belt around the user's waist. With the blower at the rear of the user, adjust the belt for a comfortable fit.

Remove the belt and blower.

Ensure that the filter is an approved filter suitable for the challenge being applied and is compatible with the PAPR.

### ⚠ WARNING

The use of any filter not approved with the PA1BU and PA2BU units may put the user at risk and could result in death or serious injury.

## For Respirator Hoods:

Insert the breathing tube 5 inches into the air entry sleeve at the rear of the hood being used (see Figure 6).

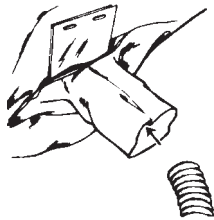


Figure 6



Figure 7

Install nylon clamp over air entry sleeve and breathing tube, inserting clamp locks through two holes in plastic anchorplate that is sewn into hood. Locks should face away from user's neck (see Figure 7).

Engage clamp locks and squeeze together until tight.

## For Loose-Fitting Facepiece Hoods:

The 20LFM and 20LFL hoods 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.

Insert the bayonet connector of the PA20LFBT breathing tube in the hood connector and turn clockwise until it locks in place (see Figure 8).



Figure 8

## For PA20 Powered Air-Purifying Respirators:

For PA20 powered air-purifying respirators, attach other end of breathing tube to PA1BU or PA2BU by screwing the adapters together.

Remove any protective film covering the visor of the hood.

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.

Switch on the blower.

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. See the CC20/PA20 Series Tychem Hood User Manual.

### ⚠ 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 PA1 Low Battery Alarm should sound, or if the user experiences any laboring of breath, any grittiness between the teeth or any odors from the hazard, he/she should leave the hazardous area immediately. Failure to observe these warnings could result in death or serious injury.

## PA1BU Low Battery Alarm

The PA1BU Blower unit is fitted with a Low Battery Alarm. This device will activate if the battery power is below acceptable levels. The device is indicating that insufficient airflow is imminent. The user should do the following:

Leave the hazard area, remove the headpiece, disconnect the breathing tube from the hood and check the airflow with the airflow indicator (see page 5).

If the airflow indicator indicates insufficient airflow, the battery should be fully charged (see "Battery Pack" on page 4).

The PA1BU Low Battery Alarm should not be relied upon as an indication of a low air flow condition. Only the Air Flow Indicator should be utilized for checking for adequate air flow.



### NOTE

The PA1BU and PA2BU blowers are 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 Low Battery Alarm sounds (PA1BU blower only) and the filter is 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 may need to be changed.

Clean off the outside of the unit to prevent contaminated material falling into the blower unit when it is opened and then change the filter.

## Troubleshooting

The following guide will enable you to locate and correct malfunctions:

| Malfunction  | Possible Cause   | Solution   |
|--|--|--|
| <b>No power</b><br><b>PA1BU Low Battery Alarm is sounding, but Airflow Indicator shows adequate air flow</b> | Battery charging port plug not in position<br>Low Battery<br>Air inlet to hood is twisted  | Install charging port plug.<br>Re-charge battery.<br>Remove and reinsert PA1BT breathing tube 5" into hood inlet.  |
| <b>No/low airflow into covering (Alarm sounding for low battery in PA1BU unit)</b>                           | Clogged/damaged air-purifying filter element<br>Battery low<br>Blower malfunction<br>Breathing tube or hood damaged<br>Shipping card not removed | Replace the filter and gasket.<br>Re-charge battery.<br>Replace blower.<br>Replace breathing tube and/or hood.<br>Remove card and install filter & gasket.       |
| <b>Smell or taste contaminant</b>  | Equipment damaged or filter needs to be replaced<br><br>Low airflow  | Leave hazardous area immediately and check equipment. Replace filter. If the problem persists and no damage is found, return equipment for repair.<br>See above. |
| <b>Blower Unit does not run for full service life (10 hours - PA1, 6 hours - PA2)</b>                        | Improper initial charge<br>Prolonged storage of unit not on charger  | Review "Initial Charging Procedure" on page 4.   |

## 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. Replace wet filter.

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.

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.

Use a lint-free cloth moistened in a mild solution of soap and warm water to clean the outer surface of the equipment.

Consult the CC20/PA20 Series Tychem Hood User Manual for cleaning instructions for the hood components. Remove filter and discard (if it has reached the end of its useful life) in accordance with federal, state and local guidelines and in conformance with plant safety regulations.

Re-charge the battery pack (see instructions on page 3).

### Storage

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

The storage temperature should be between 32° F to 90° F (0° C to 32° C) with humidity less than 90% RH.

Consult the CC20/PA20 Series Tychem Hood User Manual for storage instructions on hood components.

# PA20 Series Powered Air-Purifying Respirator PA1/PA2 Blower Assembly User Manual

## Ordering Information

| CATALOG NUMBER | DESCRIPTION |
|----------------|-------------|
|----------------|-------------|

### Blower Assembly for PA20

|     |   |
|-----|---|
| PA1 | Blower with 10 hour battery and low voltage alarm Includes filter, gasket, belt assembly and air flow indicator |
| PA2 | Blower with 6 hour battery Includes filter, gasket, belt assembly and air flow indicator                        |

### Battery Chargers for PA1BU Blower Unit

|        |                            |
|--------|----------------------------|
| PA1SMC | Quick charger for PA1BU    |
| PA1GC  | 5-Unit Gang Charger        |
| PA1STC | Standard charger for PA1BU |

### Battery Chargers for PA2BU Blower Unit

|        |                            |
|--------|----------------------------|
| PA2SMC | Quick charger for PA2BU    |
| PA2STC | Standard charger for PA2BU |

### Replacement Filter/Gasket

|         |                                     |
|---------|-------------------------------------|
| PA1FG3  | Filter/gasket assembly (3 per box)  |
| PA1FGBP | Filter/gasket assembly (36 per box) |

### Replacement Parts and Accessories

|            |   |
|------------|---|
| PA1SB      | Standard belt   |
| PA1DB      | Decon belt  |
| PA1EB      | Extension belt kit  |
| PA1DEB     | Extension decon belt kit  |
| PA1LSK     | Blower latch and screw kit (4 latches, 16 screws)                       |
| PA1AFI     | Air Flow Indicator  |
| PA1BU      | PA1 Blower housing unit, motor, and impeller                            |
| PA2BU      | PA2 Blower housing unit, motor, and impeller                            |
| PA1BT      | Breathing tube assembly (tube/clamp)                                    |
| PA1BTXS    | Short breathing tube assembly (tube/clamp)                              |
| PA20LFBT   | Breathing tube (lightweight) for 20LFM and 20LFL hoods, standard length |
| PA20LFBTXS | Breathing tube (lightweight) for 20LFM and 20LFL hoods, short length    |
| PA1BTS     | Breathing tube seal   |





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