Science. Applied to Life.™

Technical Bulletin

April, 2020

Cleaning and Disinfecting 3M™ Powered Air Purifying Respirators following Potential Exposure to Coronaviruses

3M™ Jupiter PAPR Assemblies and 3M™ Scott™ Duraflow, Proflow and Tornado PAPR Assemblies

Description

During coronavirus outbreaks, some healthcare organizations may assign powered air purifying respirators (PAPRs) to workers providing care for patients with suspected or confirmed cases of coronavirus. This document contains considerations related to cleaning and disinfecting 3M PAPRs after potential exposure to coronaviruses.

The 2008 U.S. Centers for Disease Control and Prevention (CDC) publication Guideline for Disinfection and Sterilization in Healthcare Facilities [1] (updated May 2019) includes information on disinfecting equipment and surfaces potentially contaminated by coronaviruses. The U.S. CDC investigated many chemicals and cited several chemical germicides as being effective for coronaviruses, when used as indicated in the product user instructions. Of the chemicals listed by the CDC as being effective for destroying coronavirus, only sodium hypochlorite (at free chlorine concentration of 5,000 ppm) can be used with the 3M PAPRs listed above per the 3M product User Instructions and the guidelines included in this document.

More recently, the CDC has published Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19) in Healthcare Settings [2] indicating that EPA-registered, hospital-grade disinfectants are appropriate for SARS-CoV-2 in healthcare settings. Refer to List N on the EPA Website for EPA-registered disinfectants that can be considered for use against Novel Coronavirus SARS-CoV-2, the cause of COVID-19.

NOTE: 3M relies on the expertise of the CDC and EPA with respect to microbiological efficacy and has not evaluated the effectiveness of these agents with regards to inactivating viruses on 3M equipment.

Of the chemicals listed by the CDC as being appropriate for coronaviruses and those included on the EPA's registered list for use against SARS-CoV-2, only certain chemicals can be used with the 3M PAPR assemblies listed above per the 3M product *User Instructions* and the guidelines included in this document. Note that other disinfection products or solutions which may be recommended as effective for coronavirus have not been tested with 3M products. Using methods other than the disinfectants recommended below may degrade materials and shorten the lives of PAPR assemblies.

Possible disinfection methods:

3M™ Jupiter PAPR, 3M™ Scott™ Duraflow, Proflow and Tornado PAPRs

- Sodium hypochlorite solution (at a free chlorine concentration of 5,000 ppm) with a 1 minute contact time

3M™ Jupiter PAPR only

- ECOLAB® KLERCIDE™ 70/30 IPA (EPA Reg. No. 1677-249)

Follow the user instructions and/or EPA label for your selected disinfectant. 3M strongly recommends that a water rinse/wipe down occur after disinfection to thoroughly remove disinfection solution and reduce the possibility of user irritation and premature degradation of equipment.

Your facility should review this information thoroughly prior to selecting this disinfecting product for your equipment and specific application. Follow the hygiene and infection control practices established by your employer for the targeted organisms, including coronaviruses.

NOTE:3M relies on the expertise of the CDC and EPA with respect to microbiological efficacy and has not evaluated the effectiveness of these agents with regards to inactivating viruses on 3M equipment.

Please always refer to the latest information from trusted sources such as the World Health Organization (WHO), the US Centers for Disease Control and Prevention (US CDC), the US Occupational Safety and Health Administration (OSHA) and the European Centres for Disease Prevention and Control (ECDC) regarding selection, use, maintenance and cleaning of personal protective equipment.

Note that components of PAPR respiratory systems may become damaged over time with prolonged or extended use of disinfecting products. As discussed in the product *User Instructions*, users must inspect the components of their PAPR respiratory systems following each disinfecting cycle and prior to re-use. If you discover any signs of damage, remove the component from service and either discard and replace or repair as appropriate, following the guidance in the product *User Instructions*.

Cleaning, and disinfecting of Jupiter, Duraflow, Proflow and Tornado PAPR Assemblies

It is important to always read and follow the specific PAPR *User Instructions*. The following general guidelines can be utilized as an additional reference for cleaning, sanitizing, and/or disinfecting your Jupiter, Duraflow, Proflow or Tornado PAPR assembly.

General

1) Cleaning is recommended after each use. Nitrile or vinyl gloves should be worn during cleaning as well as other personal protective equipment (PPE) as indicated.
2) With any disinfecting agent, follow the User Instructions in regards to usability, application and contact time, and ensure all components are thoroughly rinsed with fresh, warm water and thoroughly dried before use or storage.

Initial Steps and Inspection

1) It is important to follow the User Instruction inspection procedures supplied with the Jupiter, Duraflow, Proflow or Tornado PAPR units and headcover or hood to identify any damage, excessive wear, or deterioration of components and replace them as necessary.
2) Detach the belt from the motor/blower and the headcover/hood from the breathing tube. Remove belt clips (if possible) from the belt.
3) Discard the breathing tube cover, if one is used.
4) Remove the filter from the PAPR blower assembly if a filter change is needed – see the filter change section below.

Cleaning

If cleaning to remove gross soil before disinfection, clean all parts of the PAPR assembly with a clean soft cloth dampened with warm water containing a mild pH neutral (pH 6-8) detergent (refer to specific product *User Instructions* for water temperature guidance).

While the breathing tube is still attached to the blower, begin cleaning with the exterior of the breathing tube, then the exterior of the filters and blower/battery. Avoid allowing liquid to enter the filters and breathing tube.

Remove the battery (Jupiter, Duraflow and Tornado) and wipe the battery making sure to avoid the battery contacts. Wipe the blower section where the battery connects (Duraflow and Tornado) making sure to avoid the blower pins.

Wipe the belt and headcover or hood, taking care to clean underneath belt loops (if present). Refer to the User Instructions for each component for cleaning details. Do not soak the headcover/hood during cleaning. Replace the cloth if it becomes visibly dirty.

Note: The battery for the Proflow is internal and so does not require removal or cleaning.

Disinfecting

Disinfect the PAPR assembly with the disinfectant cleaner. Follow the user instructions and/or EPA label for the selected disinfectant. Surfaces must be visibly wet with disinfectant for the full specified contact time.

With breathing tube attached, start by wiping exterior of the breathing tube and the top of the blower outlet. Remove the breathing tube. If outlet plug is available for your blower model (Duraflow, Proflow), secure the plug in place. Then, taking care not to allow liquid to drip into the blower, disinfect the rest of the blower body, battery (does not apply to Proflow), belt and headcover or hood. Avoid contact with the blower pins (Duraflow and Tornado) and battery contacts (Jupiter, Duraflow and Tornado).

Rinse

Remove disinfection solution from the PAPR assembly by wiping with a clean cloth dampened with fresh water. Rinse the cloth often to help ensure effective removal of the disinfectant solution. Do not allow liquid to enter the air outlet port.

Alternatively, certain components may be submerged in a tub of fresh water: unpadded belts and the breathing tube. If removing the filter for replacement, the Duraflow and Proflow blowers may be fitted with the appropriate filter port and outlet plugs so that they may be sprayed with fresh water for cleaning.

All components should be dried allowed to air-dry completely prior to reuse or storage. Air dry in an uncontaminated atmosphere, temperature not to exceed 49 °C (120 °F). Breathing tube drying can be accelerated by connecting it to the motor/blower unit and using it to force air through the tube until dry. If using this method, orient the blower and breathing tube in such a way that prevents liquid from entering the blower.

After Cleaning and Drying

1) Reassemble unit as described in the *User Instructions*.
2) Inspect the PAPR unit and headcover/hood following the inspection procedures in the *User Instructions* for that item.

The 3M™ Versaflo™ Storage Plug BT-957 is an optional breathing tube accessory that can be used during storage of BT-Series breathing tubes.

Disinfection and Reuse of PAPR Headcovers and/or Hoods

Disinfection of the exterior of PAPR headcovers/hoods for reuse can be considered as outlined in this bulletin, taking into consideration your facility's infection control policy and the user instructions and/or EPA label for your selected disinfectant. Disinfection of the interior of the PAPR headcover/hood has not been evaluated, in part because these are commonly individually assigned and not expected to be shared among workers. If disinfection of product interior is required at your facility, ensure thorough inspection as outlined by your specific product *User Instruction*, paying special attention to the

condition of the uncoated fabric on the headcover/hood interior. Some cleaning and/or sanitizing products can pose health risks if they come into contact with a user's skin. Customers must ensure that their PPE cleaning and sanitization procedures and within established safe levels and do not result in exposures to cleaning/sanitizing chemicals at levels capable of causing adverse health effects.

The "in-use" life of headcovers/hoods will vary with frequency and conditions of use. Determination for reuse of PAPR headcovers/hoods will be dependent on product condition and as indicated in the User Instructions and your facility's infection control policy.

To determine product condition, follow the inspection guidance located within the *User Instructions* before and after each use. These instructions may vary slightly depending on the headcover/hood being used. The inspection instructions for the 3M™ Versaflo™ S-Series Hoods and Headcovers, as well as BT-Series Breathing tubes, are as follows:

Carefully:

- Examine the condition of the fabric, head suspension, visor, outer shroud and as applicable, inner shroud, collar or elasticized faceseal. Check that there are no cracks, rips, dents, holes, tears, or other damage.
- Look closely at the stitching. Ensure stitching is intact and there is no unraveling or gaps in the seams. There should be no tears or holes that could permit contaminated air to enter the hood or headcover.
- If using the S-800 series hood, closely inspect the sealed seams for rips, holes, tears, or other damage. Ensure side ties are present and undamaged.
- Look for scratches or other visual distortions that could make it difficult to see through the visor.
- Examine the head suspension for cracks or other damage.
- Examine the entire breathing tube. Look for tears, holes, cracks, distortions, or any other sign of wear or damage. Bend the tube to verify that it is flexible. Ensure the gasket located in the QRS (i.e. the end connection to headgear) is present and not damaged. If using a BT-Series breathing tube, inspect the gasket located on the bayonet end of the breathing tube (i.e. the end that connects to the air source) for signs of damage. The breathing tube should fit firmly into the air source connection.

If you discover any signs of wear and/or damage, discard the component and replace it with a new one. Failure to do so may affect respirator performance and reduce the degree of protection provided, and may result in sickness or death.

If you currently use an alternate headcover/hood product, please refer to the product specific *User Instructions* for applicable guidance.

When to Change PAPR Filters Used to Help Reduce Exposure to Airborne Biological Aerosols

Particulate filter change schedules for PAPRs are determined by two main considerations: filter loading (clogging of the filter from captured particulates) and a facility's infection control policy.

If the PAPR system is being used to reduce exposure to airborne biological aerosols such as droplets containing viruses or bacteria, the filter will not typically load from these particles to the point that they will affect the airflow for the PAPR as determined by the airflow indicator or the PAPR airflow indicator alarm. As a result, loading or clogging of PAPR filters is typically not an issue when used for biological aerosols.

In healthcare facilities, PAPR filter change schedules for airborne biological aerosols are primarily determined by the facility's infection control policy. The infection control policy should be developed based on applicable national, state, and local guidelines. Most healthcare organizations develop their filter use and reuse policy based on the biological agent of concern, likelihood of the filter becoming contaminated, and potential for patient-to-patient and patient-to-worker cross-contamination. While the outside filter body can be wiped down for cleaning, do not attempt to clean the filter media inside the filter body. When changing the PAPR filter, follow the hygiene and infection control practices established by your

employer based on the specific contaminants to which the respirator assembly has been exposed and the cleaning agent used. Dispose of the filter according to your infection control policy and all applicable requirements.

Close consideration needs to be given to the policies and practices used for cleaning the PAPR. It is important to remember that a PAPR is used to filter out contaminants from the air, and therefore contaminants are concentrated on the filter/cartridge itself, and potentially on other surfaces of the PAPR system. Proper cleaning and maintenance instructions and considerations for PAPR systems can be found in the specific *User Instructions* for the product.

Glossary of Terms

Below is a glossary of terms used in this document[4, 5]:

Cleaning: Removal of all soil (organic and inorganic) and foreign material from objects and surfaces. This is typically accomplished with water and mechanical action. Detergents may be used to assist the process.

NOTE: Failure to remove foreign material (soil, face oils, etc.) from an object can adversely affect the disinfecting process.

Disinfecting: A process of inhibiting or destroying disease-producing microorganisms (but may not kill bacterial spores). It usually involves the use of chemicals, heat, and/or ultraviolet light and is divided into three categories: high, intermediate and low-level disinfection.

NOTE: Items must be thoroughly cleaned before effective sterilization can occur.

Before using any of the products or information detailed herein, you must evaluate it and determine if it is suitable for your intended use. You assume all risks and liability associated with such use. 3M makes no warranties relating to the efficacy of any of the products detailed herein in preventing the spread and/or contraction of coronavirus. 3M will not be liable for any loss or damage arising from any information contained herein, whether direct, indirect, special, incidental or consequential, regardless of the legal or equitable theory asserted, including warranty, contract, negligence or strict liability.

Technical information provided by 3M is based on experience and/or test data believed to be reliable, but the results may not be relevant to every user's application. For this reason, 3M does not accept any responsibility or liability, direct or consequential, arising from reliance upon any information provided. The user should determine the suitability of any disinfectant product for compatibility for use with 3M products.

If you have any questions or concerns, please contact your local 3M representative.

References

1) Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008; updated 2019. United States Centers for Disease Control. William A. Rutala, Ph.D., M.P.H., David J. Weber, M.D., M.P.H. and the Healthcare Infection Control Practices Advisory Committee (HICPAC). 2008. https://www.cdc.gov/infectioncontrol/pdf/guidelines/disinfection-guidelines-H.pdf
2) Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease (COVID-19) in Healthcare Settings. Coronvirus Disease (COVID-19). https://www.cdc.gov/coronavirus/2019-ncov/infection-control/control-recommendations.html
3) List N. EPA's Registered Antimicrobial Products for Use Against Novel Coronavirus SARS-CoV-2, the Cause of COVID-19. United States Environmental Protection Agency. 03/03/2020. https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2
4) Rutala, WA. American Journal of Infection Control. APIC Guideline for Selection and Use of Disinfectants. Vol. 24, No. 4, pp. 313-342, August 1996.
5) Rutala, WA. CDC. Guideline for Disinfection and Sterilization in Healthcare Facilities. 2008.