



Respiratory Protection and Novel (H1N1) Virus - Cleaning Guidelines for Reusable Negative Pressure and Powered Air Purifying Respirators (PAPR)

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3M has received inquiries regarding the novel (H1N1) virus and cleaning instructions for reusable negative pressure and powered air purifying respirators (PAPR). The US Occupational Safety and Health Administration (OSHA) requires employers to provide respirators in a clean and sanitary condition (29CFR1910.134). At this time however, OSHA has not published any regulations or guidelines regarding cleaning of respirators specifically for novel H1N1 virus. Information is provided below to help 3M respirator users develop procedures for cleaning and sanitizing their respirator systems. The respirator user should review this information thoroughly in the context of their work environment and requirements to determine specific methods and materials to be used. The respirator user is ultimately responsible for determining the suitability of cleaning and sanitizing procedures for their workplace.

- **How can I clean and sanitize reusable respirators and PAPRs?**

Neither Centers for Disease Control and Prevention (CDC) nor the World Health Organization (WHO) have provided any recommendations for cleaning or sanitizing respirators used for novel H1N1 virus exposures. US OSHA requires respirator users to follow either the respirator manufacturer's instructions or OSHA's general procedures for cleaning respirators in 29CFR1910.134 Appendix B-2. As noted above, OSHA's procedures are not specific for novel H1N1 virus.

For 3M respirator systems, refer to the User Instructions for the specific elastomeric facepiece or Powered Air Purifying Respirator (PAPR) unit and headgear to identify the components that can be cleaned. For example, filters cannot be cleaned or sanitized and should be properly disposed of. Breathing tubes with internal noise dampening materials should not be immersed in any water or cleaning/sanitizing solutions.

The US Environmental Protection Agency has stated that "based on available scientific information, the currently registered influenza virus A products will be effective against the 2009-H1N1 flu strain, and other influenza A virus strains on hard, non-porous surfaces." They state that the product instructions must be followed carefully, particularly the dilution rate (if applicable) and contact time. The EPA's full statement can be reviewed at <http://www.epa.gov/oppad001/influenza-disinfectants.html>

In some parts of the world 3M offers a U.S. EPA registered disinfectant; the 3M™ Twist 'n Fill™ Neutral Quat Disinfectant #23. This is a low level hospital grade quaternary ammonium disinfectant cleaner that is effective against a broad spectrum of bacteria and is virucidal and fungicidal. This 3M disinfectant is EPA approved against influenza A or A2 and is listed in the US EPA publication "Antimicrobial Products Registered for Use Against Influenza A on Hard Surfaces" (updated

28 April 2009). Its efficacy, however, has not been demonstrated specifically against the novel H1N1 virus. A Material Safety Data Sheet (MSDS) and Technical Bulletin are available at www.3M.com.

With any disinfecting agent, follow the User Instructions in regards to usability, application and contact time, and ensure all components are thoroughly rinsed or wiped with fresh, warm water and thoroughly dried before use or storage. It is important to follow the User Instruction inspection procedures supplied with each facepiece or PAPR unit and headgear to identify any damage or deterioration of components and replace them as necessary.

- **Is the 3M™ Twist ‘n Fill™ Neutral Quat Disinfectant #23 an EPA registered disinfectant?**

Yes. U.S. Environmental Protection Agency (EPA) Registration number 47371-129-10350.

- **If I do not have 3M™ Twist ‘n Fill™ Neutral Quat Disinfectant #23 can I use another disinfectant?**

Consider an equivalent hospital grade quaternary ammonium disinfectant cleaner that has been tested for efficacy against influenza A or A2 virus.

- **Will 3M™ Twist ‘n Fill™ Neutral Quat Disinfectant #23 damage my respirators?**

3M treated a small number of 6000 and 7500 half facepiece reusable respirators and BE-10 Hood and BE-12 Headcovers for PAPR systems several times with 3M™ Twist ‘n Fill™ Neutral Quat Disinfectant #23 and then conducted a visual inspection. No physical damage was noted, however, a slight odor remained in some cases. Components of elastomeric or PAPR respiratory systems may become damaged or deteriorate over time with repeated use of cleaning and sanitizing products. Therefore, respirator systems must be inspected by the end user following each disinfection cycle and prior to re-use.

- **Can I use other disinfectants registered by the EPA specifically against influenza A virus to clean my respirator?**

3M has done limited testing with products containing accelerated hydrogen peroxide (AHP). 6000 and 7500 series half facepiece respirators, Ultimate FX FF-400 full face respirator, BE-12 head cover, S-433L hood and the Air Mate PAPR motor blower housing and breathing tube were treated several times with AHP. No physical damage was noted upon visual inspection. Some hazing of the full facepiece, hood and head cover visor was noted. This was easily removed by rinsing with clean water.

The EPA lists more than five hundred other registered antimicrobial products specifically against influenza A virus. However, 3M has not evaluated if these products will damage the cleanable elements of the respirators. If you choose to use one of these cleaners to sanitize your respirator and its components, please be aware that it has not been evaluated with regard to compatibility with the respirator system and proceed accordingly.

- **Can disposable respirators, reusable facepieces and Powered Air Purifying Respirators (PAPRs) be sterilized prior to reuse?**

No sterilization processes such as ethylene oxide, radiation and steam sterilization will damage the components and should not be used.

- **How do I clean and sanitize my respirator?**

For all types of reusable respirators follow the hygiene and infection control practices established by your employer for the novel H1N1 virus; or follow the infection control procedures from the World Health Organization (WHO) at <http://www.who.int/csr/resources/publications/swineflu/swineinflcont/en/index.html>¹. Then follow the recommendations below for your specific type of respirator. Cleaning is recommended after each use. Nitrile or vinyl gloves and other personal protective equipment (PPE) should be worn during cleaning as needed. It is important to follow all steps. After cleaning and sanitizing, respirators should be rinsed with clean water and thoroughly dried before reuse or storage.

Reusable 6000, 7500, 7800 Series and FF-400 Ultimate FX respirators

1. Remove cartridges and/or filters
2. Clean facepiece (excluding filters and cartridges), with 3M™ Respirator Wipes 504 (not to be used as the only method of cleaning) or by immersing in a warm, mild pH neutral (pH 6-8) detergent cleaning solution. The water temperature should not exceed 120°F (49°C). Scrub with a soft brush until clean. Do not use detergents that contain lanolin or other oils, gasoline (petrol), chlorinated degreasing fluids (such as trichloroethylene), organic solvents or abrasive cleaning agents. Respirator washing machines may be utilized provided facepieces are held in a stationary position and temperatures do not exceed 120°F (49°C).
3. Sanitize facepiece by soaking in a solution of a pH neutral hospital grade hard surface disinfectant such as 3M™ Twist 'n Fill™ Neutral Quat Disinfectant #23. Follow the user instructions for the product selected.
4. Rinse in fresh, warm water and air dry in non-contaminated atmosphere.
5. The cleaned respirator should be stored away from contaminated areas when not in use.

3M™ GVP Powered Air Purifying Respirator (PAPR)

1. Disconnect breathing tube from any attached headgear.
2. Disconnect other end of breathing tube from GVP-100 PAPR assembly.
3. Remove the battery and blower assembly from the waist belt.

4. Tight fitting facepieces can be cleaned as noted above. For all other headgear, clean all parts of the headgear assembly with a sponge or soft cloth dampened with warm 120°F (49°C) water containing a mild pH neutral (pH 6-8) detergent. Do not use detergents that contain lanolin or other oils, gasoline (petrol), chlorinated degreasing fluids (such as trichloroethylene), organic solvents or abrasive cleaning agents. Refer to the headgear specific User Instructions for cleaning details. Do not soak hoods during cleaning.
5. Wipe components cleaned in Step 4 with a sponge or soft cloth dampened with clean warm 120°F (49°C) water.
6. Sanitize headgear components by wiping with a sponge or soft cloth dampened with a solution of a pH neutral hospital grade hard surface disinfectant such as 3M™ Twist 'n Fill™ Neutral Quat Disinfectant #23. Follow the user instructions for the product selected. While the Twist and Fill will not damage the headgear, its efficacy specifically against the novel H1N1 virus has not been demonstrated. Do not soak hoods in sanitizer. After sanitizing, wipe the headgear with a sponge or soft cloth dampened with clean warm water.

Clean the remaining parts of the system as follows. You should not use solvents to clean the motor/blower unit or battery case as they may chemically weaken the plastics. Do not use detergents that contain lanolin or other oils, gasoline (petrol), chlorinated degreasing fluids (such as trichloroethylene), organic solvents or abrasive cleaning agents.

7. Remove the filter/cartridge from the blower assembly. Properly dispose of the used filter/cartridge according to local regulations. Do not attempt to clean the filter/cartridge.
8. Wipe the battery pack with mild cleaning solution. Do not immerse the battery pack.
9. Clean the breathing tube by wiping down with a soft cloth dampened with a warm water and mild detergent solution followed by a wipe with a cloth dampened with clean water. Air dry in uncontaminated atmosphere, temperature not to exceed 120°F (49°C). Alternatively, the breathing tube can be immersed in the cleaning solution. If this is done, the breathing tube must be rinsed in clean water, hung vertically and allowed to completely air dry prior to reuse or storage. The breathing tube can also be connected to the motor blower and air forced through the breathing tube until dry.
10. Screw the blower plug and filter plug (GVP-115 consists of both plugs) into the motor blower unit.
11. With the plugs in place the unit can be rinsed with a mild cleaning solution or it can be placed in an equipment washer. Do not expose to cleaning or drying temperatures greater than 120° F (49° C).
12. Sanitize components by wiping with a sponge or soft cloth dampened with a solution of a pH neutral hospital grade hard surface disinfectant such as 3M™ Twist 'n Fill™ Neutral Quat Disinfectant #23. Follow the user instructions for the product selected. While the Twist and Fill will not damage the PAPR components, its efficacy specifically against the novel H1N1 virus has not been demonstrated. After sanitizing, wipe the components with a sponge or soft cloth dampened in warm, clean water.
13. Reassemble unit as described in the GVP User Instructions.
14. After cleaning, the PAPR unit and headgear should be inspected following the inspection procedures in the User Instructions for that item.

Cleaning and sanitizing the 3M™ Breathe Easy™ Turbo and 3M™ Jupiter™ Powered Air Blower/Filtration Unit

1. Disconnect breathing tube from any attached headgear.
2. Disconnect other end of breathing tube from PAPR assembly.
3. Remove the battery and blower assembly from the waist belt.
4. Tight fitting facepieces can be cleaned as noted above. For all other headgear, clean all parts of the headgear assembly with a sponge or soft cloth dampened with warm (up to 120°F (49°C)) water containing a mild pH neutral (pH 6-8) detergent. Do not use detergents that contain lanolin or other oils, gasoline (petrol), chlorinated degreasing fluids (such as trichloroethylene), organic solvents or abrasive cleaning agents. Refer to the headgear specific User Instructions for cleaning details. Do not soak hoods during cleaning.
5. Wipe components cleaned in Step 4 with a sponge or soft cloth dampened with clean warm (up to 120°F (49°C)) water.
6. Sanitize headgear components by wiping with a sponge or soft cloth dampened with a solution of a pH neutral hospital grade hard surface disinfectant such as 3M™ Twist 'n Fill™ Neutral Quat Disinfectant #23. Follow the user instructions for the product selected. While the Twist and Fill will not damage the headgear, its efficacy specifically against the novel H1N1 virus has not been demonstrated. Do not soak hoods in sanitizer. After sanitizing wipe the headgear with a sponge or soft cloth dampened in clean, warm water.

Clean the remaining parts of the system as follows. You should not use solvents to clean the motor/blower unit or battery case as they may chemically weaken the plastics. Do not use detergents that contain lanolin or other oils, gasoline (petrol), chlorinated degreasing fluids (such as trichloroethylene), organic solvents or abrasive cleaning agents.

7. Remove the filter cartridges from the Turbo PAPR blower assembly. Properly dispose of the used filter/cartridge according to local regulations. Do not attempt to clean the filter/cartridge.
8. Wipe the battery pack with mild cleaning solution. Do not immerse the battery pack.
9. Clean the breathing tube by wiping down with a soft cloth dampened with a warm water and mild detergent solution followed by a wipe with a cloth dampened with clean water. Air dry in uncontaminated atmosphere, temperature not to exceed 120°F (49°C). Alternatively, the breathing tube can be immersed in the cleaning solution. If this is done, the breathing tube must be rinsed in clean water, hung vertically and allowed to completely air dry prior to reuse or storage. The breathing tube can also be connected to the motor blower and air forced through the breathing tube until dry.
10. Clean the Turbo blower unit by wiping down with a soft cloth dampened with warm water and mild detergent solution followed by a wipe with a cloth dampened with clean water. Do not immerse the Turbo PAPR blower unit. Be careful not to let any of the cleaning solution enter into the Turbo PAPR blower unit. Air dry in uncontaminated atmosphere, temperature not to exceed 120°F (49°C).

11. Sanitize components by wiping with a sponge or soft cloth dampened with a solution of a pH neutral hospital grade hard surface disinfectant such as 3M™ Twist 'n Fill™ Neutral Quat Disinfectant #23. Follow the user instructions for the product selected. While the Twist and Fill will not damage the PAPR components, its efficacy specifically against the novel H1N1 virus has not been demonstrated. After sanitizing, wipe the components with a sponge or soft cloth dampened in clean, warm water.
12. Reassemble unit as described in the user instructions.
13. After cleaning the PAPR unit and headgear should be inspected following the inspection procedures in the User Instructions for that item.

Cleaning and sanitizing the 3M™ Air-Mate™ and 3M™ Dustmaster™ Powered Air Blower/Filtration Unit:

1. Disassemble the breathing tube from the headgear. From the inside of the headgear push the breathing tube connector out of the head gear receiver. Twist the end of the breathing tube (that is attached to the unit) counterclockwise to separate the breathing tube from the unit.
2. Remove blower assembly from the waist belt.
3. Clean all parts of the headgear assembly with a sponge or soft cloth dampened with warm (up to 120°F (49°C)) water containing a mild pH neutral (pH 6-8) detergent. Do not use detergents that contain lanolin or other oils, gasoline (petrol), chlorinated degreasing fluids (such as trichloroethylene), organic solvents or abrasive cleaning agents. Refer to the headgear specific User Instructions for cleaning details. Do not soak the headgear during cleaning.
4. Wipe components cleaned in Step 3 with a sponge or soft cloth dampened with clean warm (up to 120°F (49°C)) water.
5. Sanitize the headgear by wiping with a sponge or soft cloth dampened with a solution of a pH neutral hospital grade hard surface disinfectant such as 3M™ Twist 'n Fill™ Neutral Quat Disinfectant #23. Follow the user instructions for the product selected. While the Twist and Fill will not damage the PAPR components, its efficacy specifically against the novel H1N1 virus has not been demonstrated. Do not soak the headgear. After sanitizing, wipe the headgear with a sponge or soft cloth dampened in clean, warm water.

Clean the remaining parts of the system as follows. You should not use solvents to clean the motor/blower unit or battery case as they may chemically weaken the plastics. Do not use detergents that contain lanolin or other oils, gasoline (petrol), chlorinated degreasing fluids (such as trichloroethylene), organic solvents or abrasive cleaning agents.

6. Clean the breathing tube by wiping down with a soft cloth dampened with a warm water and mild detergent solution followed by a wipe with a cloth dampened with clean water. Air dry in uncontaminated atmosphere, temperature not to exceed 120°F (49°C). Alternatively, the breathing tube can be immersed in the cleaning solution. If this is done, the breathing tube must be rinsed in clean water, hung vertically and allowed to completely air dry prior to reuse or storage. The breathing tube can also be connected to the motor blower and air forced through the breathing tube until dry.
7. Clean the Air-Mate or Dustmaster PAPR blower unit by wiping down with a soft cloth dampened with a warm water and mild pH neutral detergent solution followed by a wipe with a cloth dampened with clean water. Do not immerse the Air-Mate or Dustmaster PAPR blower unit. Be careful not to let any of the cleaning solution enter into the Air-Mate or Dustmaster PAPR blower unit. Air dry in uncontaminated atmosphere, temperature not to exceed 120°F (49°C).
8. Sanitize components by wiping with a sponge or soft cloth dampened with a solution of a pH neutral hospital grade hard surface disinfectant such as 3M™ Twist 'n Fill™ Neutral Quat Disinfectant #23. Follow the user instructions for the product selected. While the Twist and Fill will not damage the PAPR components, its efficacy specifically against the novel H1N1 virus has not been demonstrated. After sanitizing, wipe the components with a sponge or soft cloth dampened in clean, warm water.
9. If necessary, open the Air Mate blower unit and remove the filter from the blower assembly. Properly dispose of the used filter according to local regulations. Do not attempt to clean the filter.
10. Wipe the battery pack with mild cleaning solution, if necessary (battery is enclosed in the unit and protected by the filter). Do not immerse the battery pack.
11. Reassemble unit as described in the Air-Mate or Dustmaster unit User Instructions.
12. After cleaning, the PAPR unit and headgear should be inspected following the inspection procedures in the User Instructions for that item.