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Technical Bulletin

September 2019

Inspection, Cleaning, and Storage Procedures for 3M™ Versaflo™ PAPR TR-300, TR-300+, and TR-600

Introduction

The 3M™ Versaflo™ TR-300, TR-300+, and TR-600 Powered Air Purifying Respirator (PAPR) assemblies are designed to be used with certain 3M breathing tubes and headgear to form a complete respirator system.

Occupational use of respirators must be in compliance with applicable health and safety standards. By United States regulation, employers must establish a written respirator 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 standard. OSHA 1910.134 states that employers shall ensure that respirators are inspected, cleaned, and properly stored.

This Technical Bulletin will review the 3M recommended cleaning procedures as well as inspection and storage guidelines for the 3M™ TR-300, TR-300+, and TR-600 PAPR assemblies. Refer to the TR-300, TR-300+, and TR-600 PAPR *User Instructions* as well as the *User Instructions* for your specific headgear for proper assembly, use and limitations of your specific respirator system.

Inspection

The 3M™ TR-300, TR-300+, and TR-600 PAPR must be inspected before each use to ensure good operating condition. Detach the belt, battery pack, breathing tube, headgear, filter cover, filter, and prefilter or spark arrestor/prefilter (if used) from the motor/blower. If any damage, non-functionality, or signal observations as noted below are discovered during the inspection, remove PAPR system from use and service or replace as appropriate. The 3M™ Versaflo™ TR-300, TR-300+, and TR-600 Series Parts and Accessories exploded view posters may be helpful for identifying components (3M.com/versaflo).

Motor/blower

IMPORTANT NOTE

Except for removing the filter cover, filter/cartridge, high efficiency filter, and prefilter or prefilter/spark arrestor and filter latch assembly, the main housing of the motor/blower cannot be opened and has no user serviceable parts.

- The filter cover must be intact with no cracks or other damage.
- The main housing or case of the motor/blower unit must be intact with no cracks, holes, or other damage. The plastic should not be discolored, chalky, or soft as these may be signs of deterioration of the housing.
- The area of the motor/blower unit under the filter or filter/cartridge should be clean and free of contaminants. Contamination noted here may indicate improper/lack of filter installation or damage to the filter or filter gasket.
- The user interface (motor blower display) should be clean. All LED segments should be lit and clearly visible during initial start-up of the motor/blower. Excessive build-up of materials on the display may mask a visual alarm from the wearer. The ON/OFF switch should be intact with no cuts, tears or holes.
- The filter release button should function smoothly and hold the filter or filter/cartridge securely onto the motor/blower.
- The filter cover should sit securely onto the filter or filter/cartridge (if used for TR-600).
- The outlet of the motor/blower (i.e. where the breathing tube attaches) should be inspected for any damage, dirt, debris, or other contamination which may interfere with proper attachment of the breathing tube.
- The belt attachment slots (TR-300 and TR-300+) or T-bars (TR-600) on the back of the motor/blower should be intact and undamaged.

- Check the airflow using the TR-970 (TR-300) or TR-971 (TR-300+ and TR-600) airflow indicators as described in the appropriate PAPR User Instructions or in Technical Data Bulletin #221 – Conducting Airflow Check on the 3M™ Versaflo™ PAPR TR-600.
- Check the low airflow alarm by fully covering the airflow outlet as described in the PAPR User Instructions or in Technical Data Bulletin #221 – Conducting Airflow Check on the 3M™ Versaflo™ PAPR TR-600.

Filters and Filter Accessories

- The filter cover must be intact with no cracks or other damage.
- The filter or filter/cartridge should be intact with no cracks, tears or other damage. Closely inspect filter/cartridge plastic housing including the corners and latches, outer rectangular barrier, and inner circular filter seal gasket for cracks, tears, cuts, distortion, indentations or debris. If the filter or filter/cartridge has been mishandled or dropped, re-inspect fully. If you have any concerns, contact 3M Technical Service for guidance.
- If the filter is wet or appears heavily loaded with particulate or damaged, it should be replaced. Never attempt to clean the filter by any means as intentional manipulation can easily damage the filter media.
- The high efficiency (HE) filter should be intact with no cracks, tears or other damage noted. If the filter is wet or appears heavily loaded with particulate, it should be replaced. Never attempt to clean the filter by any means as intentional manipulation can easily damage the filter media
- The gasket on HE filter should be firmly attached, clean and intact. There should not be any indentations, tears, rips, or debris. Replace the filter immediately if any damage is noted.
- The prefilter (if used) should be intact with no tears or cuts. If the prefilter is wet or appears heavily loaded with particulate, it should be replaced. Use of the prefilter and frequent change out may help prolong the life of the HE filter and help maximize battery pack run time.
- The metal spark arrestor/prefilter (if used) should be clean and intact with no damage. Frequent cleaning or change out of the spark arrestor may help prolong the life of the HE filter and help maximize battery pack run time. The spark arrestor must be used during hot work, molten metal or spark creating operations.

IMPORTANT NOTE

The foam prefilter and the metal spark arrestor/prefilter should not be used simultaneously. Review the TR-300+ PAPR NIOSH approval label to determine which component is approved for use with your specific system configuration.

Battery Pack

- Inspect the battery pack for cracks, holes or other damage. The plastic case should not be discolored, chalky, or soft. These may be signs of deterioration of the battery housing.
- Battery pack electrical contacts should be clean and dry with no corrosion.
- Battery pack hinge should be intact with no damage or erosion.
- Battery pack release button should move freely and function properly.
- Attach the battery pack to the motor/blower and gently tug on the battery pack to confirm it properly attaches, and the battery pack is being held firmly in place.
- When pushing the “Test” button on a fully charged battery pack, on a new battery all five LEDs should light up. On an aged battery less than five LEDs may light up even if the battery is fully charged. At a certain point the battery may need to be replaced. For additional battery information, see Technical Data Bulletin #223 – Battery Maintenance for 3m™ Versaflo™ Respirator Systems.

Belt

- Inspect the belt buckle for damage such as breaks or cracks. Inspect the belt leads for cuts and tears. Inspect the hip belt for tears and integrity.

Battery Charger

- Inspect the power base and cradle for cracks or other damage.
- Inspect the power cord for frayed wires or other damage.
- Ensure the gold electrical contacts are clean, dry and free of debris.
- Gently push on each of the gold contact pins. They should easily push down and quickly pop back up.
- Ensure the charger tray is clean, dry and free of debris.

Headgear

- Inspect headgear based on the headgear specific *User Instructions*.

Cleaning

The TR-300, TR-300+, and TR-600 should be cleaned regularly. Follow the hygiene practices established for your worksite for the specific contaminants to which the respirator assembly has been exposed.

Motor/blower unit and battery pack

- Do not use organic solvents (i.e. toluene, paint thinner) or abrasive cleaners as they may weaken and damage the plastic.
- Do not use cleaners that leave a residue. Do not allow liquid to enter the air inlet port or breathing tube port.
- Do not use compressed air or a vacuum to clean the interior of the motor/blower. This can damage the motor/blower.
- Use caution when cleaning around the battery pack connector pins where the battery seats on the bottom of the motor/blower unit to avoid pins from bending, breaking, or introducing debris into the pin housing. Ensure this area and the pins are thoroughly dry before next use or storage.

Wipe Down Cleaning

- The outer surfaces of the TR-300, TR-300+, and TR-600 motor/blower assembly and battery pack (still attached) may be wiped with a soft cloth dampened in a solution of water and mild, pH neutral detergent. In general, many commonly used water-based hard-surface cleaners may also be used that will not damage the PAPR system. See Table A for a list of tested cleaners and their effects. **Do not attempt to clean the battery connection pins on the blower or the blower/charger connection pads on the battery – these are coated and direct cleaning with moist cloths or wipes should be avoided.**

Submersion Cleaning (TR-600 only)

With the blower inlet and outlet plugs installed the TR-600 PAPR has an International Protection or Ingress Protection (IP) rating of IP67 (EN 60529: 1992). The TR-600 batteries also have an IP67 rating. The IP67 rating indicates the unit is protected against infiltration of dusts and water that would interfere with normal operation when immersed in water up to 1 meter (3 feet) for up to 30 minutes. However, best practice would be to limit immersion to the shallowest depth and shortest time required for effective cleaning.

- If submersion cleaning is desired, remove the filter/cartridge and breathing tube. To minimize material falling onto the motor/blower, remove the filter/cartridge and breathing tube while each of those connections are facing downward. Attach the air inlet and air outlet cleaning and storage plugs (3M™ Cleaning and Storage Kit TR-653) into the TR-600 (see Fig 1). The TR-600 can now be rinsed under running water, submersed in water, or put in a respirator washer for further cleaning. Water temperature should not exceed 122°F (50°C). Blowers which have been dropped or damaged should not be immersed or put into a respirator washer due to potential water ingress, and subsequent damage to the system.

IMPORTANT NOTE

Gaskets should be replaced every 30 uses or yearly, whichever comes first, to minimize use of worn gaskets.

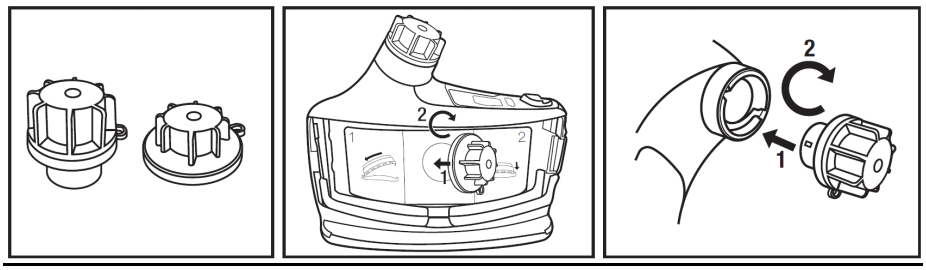

Figure 1. Installing the inlet and outlet plugs from the TR-653 Cleaning and Storage Kit

- While still on the blower, wipe the housing of the battery pack with a soft cloth dipped in mild cleaning solution. Then wipe with a soft cloth dipped in clean water. Wipe dry.
- Remove battery and wipe down top of battery pack, if needed, with a soft dry cloth. Avoid contact with the blower/charger connection pads; if they become damp, allow to dry before reinstalling on blower or charger.
- If needed, the battery strap included with the 3M™ Cleaning and Storage Kit TR-653 can be used to protect the pads during cleaning. With the strap in place, the battery can now be rinsed under running water, immersed, or put in a respirator washer for further cleaning.
- Momentary wetness of the electrical connectors will not damage the battery. Do not allow free liquid to reside on the connectors. Ensure the connectors are clean and dry prior to charging, installing on blower or for storage. Batteries which have been dropped or damaged should not be immersed or put into a respirator washer due to potential water ingress, and subsequent damage to the battery.

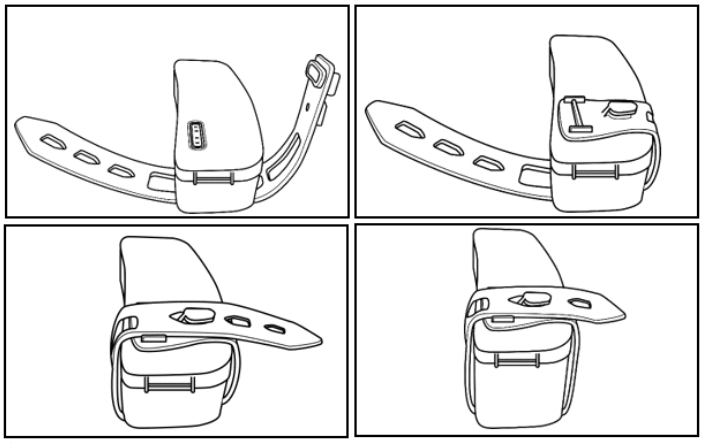

Figure 2. Installing the battery strap from the TR-653 Cleaning and Storage Kit

- The plug gaskets and battery strap should be inspected for damage and wear prior to each use. Worn or damaged gaskets must be replaced. Washing the TR-600 while using damaged plug gaskets may cause damage to the TR-600 and void the warranty. Plug gaskets should be replaced every 30 uses or yearly, whichever comes first, to minimize use of worn gaskets.

Filter and Filter Accessories

- **The HE filter and foam prefilter (if used) cannot be cleaned.** Attempts to clean the filters may damage them and in the case of the HE filter allow particulates to enter the respirator and the user's breathing zone. Damaged filters or filters beyond their useful life should be replaced.
- The metal spark arrestor/prefilter may be cleaned with a mild, pH neutral cleaner. Dry thoroughly before next use or storage. If the spark arrestor/prefilter cannot be cleaned, it should be replaced.

Breathing Tube

- Clean the connection sites on the breathing tube with the water and detergent solution. The breathing tube can be immersed in water for cleaning if required. The inside of the tube must be completely dried prior to use or storage.

- Air dry, or dry by connecting to the motor/blower unit and use it to force air through the tube until dry. Orient tube to prevent water from running into blower.
- Optional plastic breathing tube covers (BT-922) may also be used to facilitate cleaning.

Headgear

- Clean headgear based on the headgear specific User Instruction and cleaning guides.

Belt

- Remove the belt from the motor/blower by either sliding the belt through the belt slots (TR-300 and TR-300+) or lifting the bottom of the belt over the belt locking tabs and sliding the belt down (TR-600).
- The 3M™ Easy Clean Belt TR-327/TR-627 is made of plastic buckles, vinyl urethane leads, and a hip belt with a non-porous outer material and closed cell foam inner material that can be wiped down or submersed in a soapy water solution.
- The 3M™ High Durability Belt TR-326/TR-626 is made of metal buckles, and leather leads. The TR-626 hip belt has a durable rubber outer material and closed cell foam inner. The leather portions can be cleaned with a leather cleaner. The hip belt can be cleaned with a soapy water solution.
- Wipe or rinse all belts thoroughly and dry completely before next use.
- To prevent damage to the belt (such as delamination) do not clean or dry the belt at temperatures above 122° F (50° C). It is not recommended to clean the belts in mechanically agitating washing machines or tumble dryers as damage may occur.

Battery Charger

- If the charger pins are dirty, gently remove the debris with a clean, dry, lint-free cloth, carefully avoiding the charging pins.
- If the charger pins become wet, dry quickly and ensure they are dry prior to installing a battery.

Wearing in Decontamination Shower

The TR-300, TR-300+, and TR-600 PAPR when assembled as a system with cartridge/filter in place along with the filter cover, headgear and a breathing tube can be worn through a decontamination shower.

While in use the TR-300 and TR-300+ PAPR have an International Protection or Ingress Protection (IP) rating of IP53 (EN 60529: 1992). The IP53 rating indicators the unit is protected against infiltration of dusts and water splash up to 60 degrees from vertical that would interfere with normal operation.

While in use the TR-600 PAPR (with filter cover installed) has an International Protection or Ingress Protection (IP) rating of IP54 (EN 60529: 1992). The IP54 rating indicates the unit is protected against infiltration of dusts and water splash from all directions that would interfere with normal operation.

When going through a decontamination shower, the TR-300, TR-300+, and TR-600 PAPR should be in the vertical (upright) position as worn around the waist. **3M does not recommend a TR-600 PAPR mounted on the BPK-01 backpack be worn through a decontamination shower.** It is preferred the unit remain running during the decontamination shower, however, it can be turned off if required. The motor/blower unit without a breathing tube attached cannot be taken through a decontamination shower as water may enter the motor/blower unit through the air outlet. If the user removes their headgear, ensure the breathing tube remains attached and allowed to dangle towards the floor to ensure water does not enter the breathing tube or the motor/blower unit. After going through the shower ensure all outer surfaces are wiped off before disassembling the system. All system components should be thoroughly dry before storage or next use.

Storage

Motor/Blower

Store in a clean, contaminant free environment, protected from prolonged exposure to heat, sunlight, radiation and chemicals.

For prolonged storage, the motor/blower should be run at least once per year for 5 minutes to ensure continued proper lubrication of the motor.

IMPORTANT NOTE

Respirators used for emergency purposes must be inspected monthly per OSHA 29CFR1910.134. This should include running the motor/blower.

Filters and Filter Accessories

HE filter, prefilter, and spark arrestor/prefilter should be stored at temperatures and conditions similar to the motor/blower. Store the filter and spark arrestors in the original 3M packaging until ready for installation in the motor/blower. HE filters should not be stored long-term on the motor/blower as this may damage the filter gasket. HE filters have a shelf life of 5 years when stored in their original packaging.

Battery Pack

Refer to the appropriate Chargers and Battery Packs User Instructions and Technical Data Bulletin 223 Battery Maintenance for 3M™ Versaflo™ Respirators for additional information.

Battery packs should be charged immediately and fully upon receipt. The battery should be fully recharged after each use and at least every 9-12 months depending on the battery.

Recommended storage conditions: -22° F (-30° C) to 122° F (50° C); Optimal: 59° F (15° C). Dry conditions, relative humidity < 85%.

The battery pack may be stored indefinitely on the charger. The battery pack should be disconnected from the motor/blower during storage.

Table A. Acceptable Cleaners for Wiping Down TR-300, TR-300+ and TR-600

10% detergent and distilled water
70% IPA
0.5% bleach
3M™ 504 Clean Cloth
3M™ Respirator Washer (Georgia Steel Respirator washer and chemicals)
3% hydrogen peroxide
3M™ Neutral Cleaner
3M™ C diff Cleaner
Clorox HC Cleaner
Sani-Cloth® AF3 Germicidal Disposable Wipe (product of PDI Inc.)

Table B. Cleaners Not Acceptable for Wiping Down TR-300, TR-300+, and TR-600

Windex® (product of S.C. Johnson & Son inc.)
GOJO® branded products
3M™ TB Quat Disinfectant
3M™ HB Quat Disinfectant
3M™ Sanitizer #16 Disinfectant
10% Ammonia
100% Ethanol
Acetone
Toluene

n-hexane
Mineral Spirits
Lacquer Thinner
MEK
Heptane
NAPTHA

Cleaning Chemical Evaluation Test Method

Many different chemicals and families of chemicals have been tested on the TR-300, TR-300+, and TR-600 systems by 3M, the results of which are listed in Table A and Table B – acceptable and non-acceptable cleaners used to wipe down the TR-300, TR-300+ and TR-600 PAPR motor/blowers. The test results are based on physical damage to the unit. Additional cleaners can be tested using the method described below while observing for damage to the system.

- Test every unique material of the system which will be cleaned by the chemical.
- Apply a sufficient amount of the chemical to saturate a clean, soft, white, cleaning cloth.
- While ensuring the cleaning cloth remains saturated, repeatedly wipe the same location 200 times, checking for damage every 50 wipes. Also observe the cloth for evidence of degradation of the unit, such as discoloration or material buildup on the cloth.
- Completing this test with no evidence of degradation to the unit supports its use as a cleaner.

3M recommends against using organic solvents, cleaners that leave a residue or objectionable odor, or materials the remnants of which may result in harm to the wearer.

It is the responsibility of the employer to ensure appropriate cleaning chemicals are used which do not damage the TR-300, TR-300+ and TR-600 system or cause harm to the wearer.

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