

Technical Data Bulletin



#170

Maximize PAPR Life in the Abatement Industry

Published: April, 2005

Introduction

Over the past few years the asbestos, lead, and mold abatement industry has steadily moved toward using Powered Air Purifying Respirators (PAPRs) for their respiratory protection. Due to the unique needs of the abatement industry, the following guidelines are provided to help extend product life of 3M PAPR components.

Background

Abatement generally refers to the removal of asbestos, mold or lead based paint. These substances are generally abated by removal, encapsulation, or a combination of both. Water and liquids are used to reduce airborne dust, to apply encapsulating agents, and to decontaminate people and equipment. Extensive use of water may lead to reduced battery and motor blower service life unless precautions are taken.

3M Abatement PAPRs

3M PAPRs are available in three basic designs: 1) helmet mounted, 2) belt mounted and 3) face mounted. The most common PAPRs used in the abatement industry are belt and face mounted. Basic components of all PAPR designs are a blower motor, filter or cartridges, breathing tube, and respiratory inlet cover (head gear).

3M offers a number of PAPR systems for a variety of applications. Those systems identified in the chart below are generally recognized for use in abatement.

For information on product selection, please contact your local 3M sales representative or call 3M Technical Service Phone Line at (800) 243-4630. The Phone Line is staffed Monday–Friday, 8:00 a.m.– 4:30 p.m. CST.

Unique Needs of Abatement Industry

Due to extensive use of water during abatement processes, components of the PAPR system are at risk of corrosion. This primarily involves the motor blowers and batteries. 3M offers general recommendations and PAPR accessories, which are intended to help prolong the product life.

Battery Maintenance for Abatement

3M PAPR systems listed in the table are equipped with a rechargeable nickel cadmium battery. These batteries should never be submerged in water. Submerging batteries will significantly shorten the life of the battery cells. Users should take precautions to prevent spray and mist from entering the battery during encapsulation, dust mitigation and decontamination showers. For 3M™ Powerflow™ Face-Mounted Powered Air Purifying Respirator (PAPR) users, 3M offers a water repellent battery cover (3M™ Battery Cover 529-01-56R01, Water Repellent). Technical Data Bulletin #144 offers additional information regarding charging and maintenance of NiCd batteries.

3M™ PAPR Model	Facepiece/Headgear	Cartridges
Powerflow™ Face-Mounted	6000DIN	HE only
Belt-Mounted GVP-Series	Various	Gas & Vapor/HE
Face-Mounted W-3265	7800	HE only
Breathe Easy™ Belt-Mounted	6000DIN	Gas & Vapor/HE

Technical Data Bulletin #170

Maximize PAPR Life in the Abatement Industry

Motor Blower Units

Over time, water can corrode components in the PAPR motor blower units. With the exception of the GVP, these units should never be submerged in water. The GVP blower unit comes equipped with two screw-in plugs (3M™ Blower Plugs GVP-115) which allow the unit to be submerged or placed in an industrial respirator washer. The Powerflow face-mounted powered air purifying respirator (PAPR), 3M™ Breathe Easy™ Belt-Mounted Powered Air Purifying Respirator (PAPR) and 3M™ Face-Mounted Powered Air Purifying Respirator (PAPR) System W-3265 should be cleaned as specified in the User Instructions. In the event that water does get into the motor blowers they should be connected to their power source without filters/cartridges attached and run for 30–45 minutes.

Filter/Cartridge Service Life

Most abatement applications require the use of high efficiency particulate (HE) filters exclusively. For these applications, filters should be changed when loading prevents

adequate airflow, when they become damaged, or as determined by the employer. Prior to each use, a performance check is required in order to verify that the PAPR is operating within the system specifications. Each PAPR includes an airflow meter or indicator that is used to check overall system airflow. Performance checks will help determine when the cartridge/filter needs to be changed due to reduced airflow, when the battery needs charging, or if there are other blockages, such as in the breathing tube. Refer to the system user instructions for information on completing the performance check.

Studies have demonstrated that efficiency of high efficiency (HE) respirator filters is not significantly affected by water mist or spray. Large amounts of water may increase resistance but efficiency of the HE filter material is not significantly affected.^{1,2} In addition, a study has shown that biological contaminants such as bacteria, do not grow in the filter media even under favorable conditions.³

Cartridge service life for gas and vapor exposures requires information on the specific conditions of use including contaminant concentration, relative humidity, temperature, and work activities. 3M offers a few resources for determining cartridge service life, including the 3M Respirator Service Life Software. This software will allow you to determine the service life of 3M chemical cartridges when exposed to organic and some inorganic compounds. It also allows calculations for mixtures. The software is available for free on our website, www.3M.com/occsafety, as a web-based version and downloadable version.

The following products may help reduce water entering filters/cartridges.

- 3M™ Filter Cover W-3271-5, Filter Cover for the Face Face-Mounted Powered Air Purifying Respirator (PAPR) W-3265
- 3M™ Filter Cover GVP-114 for the 3M™ GVP Powered Air Purifying Respirator (PAPR)

References

- 1 Vaughan, N. P., Brown, R. C., Evans, P. G., (1995). The Effects of Asbestos Wet-stripping Agents on Filters Used in Powered Respirators. *Annals of Occ Hyg* 40 (5), 539-553.
- 2 Ortiz, L. W., Soderholm, S. C., Valdez, F. O., (1988). Penetration of Respirator Filters by an Asbestos Aerosol. *Am. Ind. Hyg. Assoc. J.* 49(9):451-460.
- 3 Wang, K., Reponen, T. A., Willeke, K., Survival of Bacteria on Respirator Filters. *Aerosol Sci Tech* 1999;30:167-73.

Technical Data Bulletin #170

Maximize PAPR Life in the Abatement Industry

Recommended Technical Data Bulletins

The following publications provide excellent information that may be beneficial. All can be downloaded from our website, www.3M.com/occsafety, or by calling 3M Technical Service Help Line at (800) 243-4630.

- 143** – Maximizing PAPR Life in Primary Metal Industries
- 150** – Inspection, Cleaning, and Storage Procedures for 3M™ Reusable Respirators
- 144** – Maintenance & Management of Battery Packs for 3M™ Powered Air Purifying Respirators (PAPRs)
- 142** – Reuse of Organic Vapor Chemical Cartridges



Occupational Health and Environmental Safety Division
3M Center, Building 235-2E-91
St. Paul, MN 55144-1000

For more information, please contact:

3M Occupational Health and Environmental Safety Division (OH&ESD)

In the U.S., contact:

Sales Assistance
1-800-328-1667

Technical Assistance
1-800-243-4630

Fax On Demand
1-800-646-1655

Internet
www.3M.com/occsafety

For other 3M products
1-800-3M HELPS

In Canada, contact:

3M Canada Company, OH&ESD
P.O. Box 5757
London, Ontario N6A 4T1

Sales Assistance
1-800-265-1840, ext. 6137

Technical Assistance (Canada only)
1-800-267-4414

Fax On Demand
1-800-646-1655

Internet
www.3M.com/CA/occsafety

Technical Assistance In Mexico
01-800-712-0646
5270-2255, 5270-2119 (Mexico City only)

Technical Assistance In Brazil
0800-132333

Fax On Demand O.U.S. Locations
1-651-732-6530