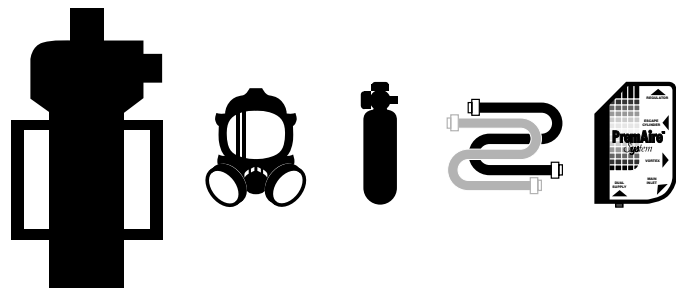


PremAire®

INSTRUCTIONS FOR VORTEX TUBE MODE OF OPERATION

System



MSA

⚠ WARNING

THIS MANUAL MUST BE READ CAREFULLY BY ALL PERSONS WHO HAVE OR WILL HAVE THE RESPONSIBILITY FOR USING OR SERVICING THE PRODUCT. Like any complex piece of equipment, the Vortex Tube from MSA will perform as designed only if used and serviced according to the instructions. OTHERWISE, THE PRODUCT COULD FAIL TO PERFORM AS DESIGNED, AND PERSONS WHO RELY ON THE PRODUCT COULD SUSTAIN SERIOUS PERSONAL INJURY OR DEATH.

The warranties made by MSA with respect to the product are voided if the product is not used and serviced according to the instructions in this manual. Please protect yourself and your employees by following the instructions. Please read and observe the WARNINGS and CAUTIONS inside. We encourage our customers to write or call for a demonstration of this equipment prior to use, or for any additional information relative to use or repairs. During regular working hours, call 1-800-MSA-2222.

See separate Inserts for NIOSH Approval information
(P/N 10032763 / 3094-50 / 10032761)



MSA

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MINE SAFETY APPLIANCES COMPANY
PITTSBURGH, PENNSYLVANIA, U.S.A. 15230

INTRODUCTION

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NIOSH APPROVAL CAUTIONS AND LIMITATIONS

- B- Not for use in atmospheres immediately dangerous to life or health.
- C- Do not exceed maximum use concentrations established by regulatory standards.
- D- Air-line respirators can be used only when the respirators are supplied with respirable air meeting the requirements of CGA G-7.1 Grade D or higher quality.
- E- Use only the pressure ranges and hose lengths specified in the User's Instructions.
- J- Failure to properly use and maintain this product could result in injury or death.
- 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.
- S- Special or critical User's Instructions and/or specific use limitations apply. Refer to User's Instructions before donning.

S - SPECIAL OR CRITICAL USER INSTRUCTIONS

1. Vortex Tube cooling is only one element of a heat-stress control program, which must be managed by the employer. All elements of an employers' heat-stress program must be known and followed or the user may suffer serious personal injury or death.
2. The Vortex Tube option is designed for use with chemical protective splash garments and coveralls. Whenever working with toxic liquids, gases or vapors, such clothing must be worn to help prevent poison by skin absorption. Failure to observe this precaution may result in serious personal injury or death.
3. The body-cooling capacity of the vortex tube will depend on the size of the individual, the work to be performed, the insulating properties of the suit and the ambient air temperature. Although the vortex tube provides body-cooling capability, it does not make a PremAire Respirator suitable for use in extreme-heat applications, such as blast-furnace work. The ability to

- use the respirator in a hot area depends largely on the heat-resistance properties and limits of the protective garment being worn. Be sure you know these limits before entering the work area. Failure to observe this precaution may result in serious personal injury or death.
4. Vortex tubes must be used with a source of air that conforms to the requirements of the Compressed Gas Association Specification G-7.1 for Quality Verification (Grade) D Breathable Air.
 5. PremAire Respirators equipped with a vortex tube do not remove carbon monoxide from the supplied air. A continuous carbon monoxide air-line monitor may be required for your applications (see Title 29 CFR Part 1910.134). Failure to follow this precaution may result in serious personal injury or death.
 6. The vortex tube does not supply breathing air to the user, nor is it designed as an emergency-escape device. Thus, PremAire Respirators equipped with a vortex tube must not be used in atmospheres classified as immediately dangerous to life or health (IDLH), or atmospheres containing less than 19.5 percent oxygen, unless the respirator is equipped with an emergency-escape air cylinder.
 7. Inlet air should have a dew point of less than 0°F a temperature between 60°F/140°F. High dew point or air temperatures below 60°F may cause moisture to freeze in the Vortex Tube and reduce air flow. Temperatures above 140°F may damage the Vortex Tube.

DESCRIPTION

The Vortex Tube option for PremAire Respirators helps improve worker comfort and productivity by providing temperature control for workers who must wear chemical splash suits in addition to their PremAire Respirator. The Vortex Tube option is designed for use with a wide range of chemical-resistant splash coveralls, including one- and two-piece garments available from MSA. It is not designed for use with total-encapsulating suits.

Depending on work requirements, users can choose between two vortex tube models: a "cool-only" version that reduces the temperature of air flowing into the protective garment by as much as 60°F; and a "warm/cool" model that provides the same cooling capability, but also allows workers in cold environments to increase the temperature of air flowing into the garment by as much as 60°F.

INTRODUCTION

Note: Vortex Tube Kits with a 6-inch connection hose are compatible with all PremAire Respirators configurations except those with an emergency-escape air cylinder positioned on the LEFT HIP. Vortex Tube Kits with 12-inch hose must be used when combined with the “Left Hip” emergency-escape cylinder option.

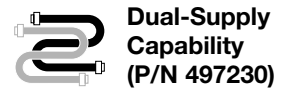
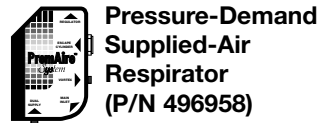
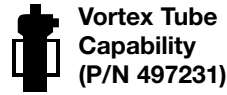
OPERATING PRINCIPLES

The Vortex Tube capability gives users a limited means of controlling body temperature when wearing protective clothing. In operation, the single air-supply hose feeds the “MAIN” inlet of the PremAire manifold, where the air path is then split in two: one path flows to the facepiece; a second path flows to the belt-mounted vortex tube. Inside the vortex tube, the rapid expansion of air produces both cool and warm air. With the “cool-only” version, hot air is vented through the vortex tube’s exhaust port while cool air is directed into the suit. With the “warm/cool” version, the worker can use either the cool or warm air for temperature control.

Note: When used with PremAire Respirators equipped with an emergency-escape air cylinder, air flow to the vortex tube will automatically shut off when the emergency-escape cylinder is used. This prevents loss of cylinder air through the vortex tube when exiting an IDLH atmosphere.

PREMAIRE RESPIRATOR SYSTEM SYMBOLS

Symbols are used to direct you to other instructions, warnings and guidelines that apply to the type of option(s). It is important that you familiarize yourself with these symbols, along with the corresponding instructions before attempting to operate the respirator.



PREMAIRE SYSTEM OPTIONS

The PremAire Respirator is a pressure-demand, Type C supplied-air respirator as de-fined by 42 CFR Part 84, Subpart J. The respirator’s unique waist-mounted manifold, which serves as the air distribution center for the system.

These options can be combined or used individually. A list of all possible respirator configurations can be found on the PremAire System Quick Reference Chart (P/N 802999).

INSPECTION

INSPECTING VORTEX TUBE COMPONENTS

Thoroughly check these components UPON RECEIPT. Return for replacement any damaged components.

Open and identify the following parts:

Vortex Tube
Bulkhead Adapter
Muffler Assembly
Support Bracket
Connection Hose
Instructions

INSPECTION OF MODIFIED CHEMICAL PROTECTIVE CLOTHING

PremAire Respirators equipped with a vortex tube can be used with a wide range of MSA splash-resistant coveralls.

Modified splash garment with the vortex tube

1. Temporarily don the protective suit.
2. Temporarily don the PremAire Respirator equipped with the vortex tube. Note where the vortex tube is positioned on the suit.
3. Ensure the vortex tube is on the wearer's left side and should be about waist-high. Remove the respirator and garment.
4. Ensure the muffler and bulkhead assembly is inside the suit.
5. Check that the inner washer is flat against the inner

suit material, and that no foreign objects are trapped between the washer and suit material.

6. Check the large washer and the adapter nut over the bulkhead assembly on the outside of the suit.
7. Check that the muffler is in the desired "air-flow" position. **Note:** the muffler assembly is used to direct the flow of air inside the suit. It also helps reduce the level of noise generated by air entering the garment.
8. Check the thread of the elbow male fitting into the female "pass-through".
9. Check the connection of the Vortex tube quick-disconnect plug to the blue connection hose. Depending on the length of connection hose used, the inlet pressure setting, and the vortex tube setting, air flow into the suit will be between 5 and 12 cubic-feet-per-minute (cfm).

Note: In addition to MSA splash clothing, the Vortex Tube option can be used with other manufacturers' garments that have "pass-through" fittings already installed.

10. Locate the "pass-through" assembly on the chemical protective garment you'll be using with the respirator. Note the type and size of fitting used. **NOTE:** To maintain NIOSH approval of the respirator, the "pass-through" fitting must have a 1/4" or 3/8" NPT female thread to accept the male fitting of the connecting hose or elbow fitting.

(See users maintenance manual P/N 10017251.)

RESPIRATOR USE

PREPARING RESPIRATOR FOR USE

Checking the Vortex Tube Connection

1. Pressurize the respirator from an approved air source.
2. Check to be sure air flows from both the mask-mounted regulator and vortex tube.

Checking the Inlet Pressure

Like all PremAire Respirators, units equipped with the Vortex Tube option require an inlet pressure of 60 to 100 psig. Before use, it is important to check the inlet pressure to see that it is within the NIOSH-approved range. For this step, an inlet pressure-gauge assembly, which connects to the air source, must be used.

Adjusting Inlet Pressure

Adjust the inlet pressure at the air source so that the system pressure is between 60-100 psig. If the reading changes, adjust the pressure until the pressure gauge reads within this range.

CAUTION

Stop operation immediately if the system pressure cannot be brought within this range. Inspect the system for restrictions, such as a partially-closed valve or a clogged air-line filter.

USING THE RESPIRATOR

USING THE RESPIRATOR

Before proceeding with the instructions below, thoroughly read and understand the instructions on using the respirator in the supplied-air mode of operation.

Activating Vortex Tube Capability

1. Attach the vortex tube assembly to the “pass-through” fitting located in the wall of the protective garment.



Be sure the quick-disconnect fitting and plug snap into place. Gently tug on the connection to ensure it's tight. Cool (or warm) air should begin to flow into the protective suit immediately. Enter the work area.

Note: During use, check the inlet pressure gauge periodically to ensure that system pressure remains within the NIOSH-approved range of 60-100 psig.

Adjusting Cool-Only Vortex Tube

1. To reduce cooling, turn the adjusting knob (located at the bottom of the vortex tube) clockwise until it stops.



2. To increase cooling, turn the adjusting knob counter-clockwise until it stops (approximately 1-1/2 turns).
3. The adjusting knob can be stopped at any point between the extreme settings to attain a temperature that is comfortable to the user. **Note:** The adjusting knob will vary air flow into the suit, but will not affect air flow to the facepiece.

Adjusting Warm/Cool Vortex Tube

1. To adjust air temperature, rotate the shaft on the side of the vortex tube left or right to control air temperature.



Refer to the label on the vortex tube to determine the shaft position for warm and cool air.

Note: The adjustment will vary the flow of the air into the suit but will not affect air flow to the facepiece.

CLEANING AND DISINFECTING

CLEANING AND DISINFECTING

Respirators should be cleaned and disinfected after each use. If the facepiece is to be cleaned, remove the canister or cartridges (if used). The facepiece should be cleaned and disinfected after every use. MSA recommends using ConfidencePlus® Cleaner Solution (P/N 10009971). Refer to the label for user instructions. ANSI suggests that users be trained in cleaning procedure.

⚠ CAUTION

Cleaning and disinfecting at or below 110°F temperature will avoid possible overheating and distortion of parts which would require replacement.

⚠ CAUTION

DO NOT use any cleaning substances that can or might attach any part of the apparatus.

⚠ CAUTION

Alcohol should not be used as a germicide because it may deteriorate rubber parts.

⚠ CAUTION

If not rinsed thoroughly, cleaning agent residue may irritate the wearer's skin.

Note: Do not force-dry the parts by placing them in a heater or in direct sunlight. The rubber will deteriorate. When the facepiece is thoroughly dry, store the facepiece in the plastic bag that it was shipped in.

INSPECTION

INSPECTION

WARNING

DO NOT inspect the respirator before cleaning if there is danger of contacting hazardous contaminants. Clean and disinfect first, then inspect. Failure to follow this precaution may result in inhalation or skin absorption of the contaminant and cause serious personal injury or death.

Inspect the respirator by sight and sound for normal operations after it has been cleaned and disinfected. When any part shows evidence of damage, wear, or any other adverse condition explained in this section, it must be replaced and the condition corrected before the respirator can be used again.

Note: Replacement or repairs shall be done only by qualified persons, using only MSA parts designed for the respirator. No attempt shall be made to make adjustments or repairs beyond the manufacturer's recommendations. Parts shall not be interchanged among devices of different manufacturers. MSA authorizes levels of maintenance and repair for the PremAire Respirator System. (See users maintenance manual P/N 10017251.)

If there is no MSA Service Center in your area, return the unit to MSA for service. Call 1-800-MSA-2222 for instructions.

Inspect the entire apparatus after it is cleaned and disinfected. ANSI Standards Z88.2 and Z88.5, describe three levels of inspection procedures which are to be performed. Refer to these documents, or to an inspection program prepared by a health professional in establishing an inspection program. Detailed repair procedures are located in PremAire Users Maintenance Instructions.

WARNING

If any of the inspections do not function properly, the apparatus must be removed from service.



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