



# MSA Responder™ CBRN PAPR

## Bid Specifications

### COMPONENTS

The PAPR shall consist of the following:

1. C420 Motor / Blower Assembly (including choice of mission or rechargeable batteries)
2. Choice of Facepiece – MSA Millennium or Ultra Elite Facepieces
3. Choice of Cartridge – Responder Cartridge, PAPR GME Multi-gas HE, Optifilter XL HE

### GENERAL REQUIREMENTS

1. The Powered Air Purifying Respirator (PAPR) is a motor-blower assisted air purifying respirator. It shall be designed for individuals working in environments that are considered not Immediately Dangerous to Life and Health (non-IDLH), including atmospheres containing not less than 19.5% oxygen.
2. Ambient air shall be circulated through two (2) cartridges where airborne contaminants are captured by particulate filter and/or sorbent bed. The cleaned air is sent from the PAPR to the user through a breathing tube that is connected to the user's facepiece via a 40-mm adapter.

### OPERATIONAL REQUIREMENTS

#### PAPR Blower Unit Assembly

1. The PAPR blower unit with cartridges shall be approved for use against CBRN agents by the National Institute for Occupational Safety and Health (NIOSH).
2. The blower assembly shall be 'triangular' in shape and is made of a Polyphenylene oxide (PPO) Noryl plastic. The motor-blower unit housing shall be resistant to HD blister agent and G series nerve agent permeation for a minimum of 24 hours.
3. The motor-blower unit body shall consist of an upper and lower housing. A single EPDM/rubber gasket shall be centrally mounted to protect the internal motor-blower unit from dirt and fluids.
4. The motor-blower unit shall have a recessed On/Off toggle switch to reduce the possibility unintentionally turning the motor-blower unit on or off.
5. The bottom of the motor-blower unit shall have a cap on each end. One cap shall be a battery cover that unscrews to provide access to the cylindrical battery housing. One end of a polyester cord shall be attached to the battery cover and the other end of the cord attached to the motor-blower unit. The other cap is not to be removed.
6. The PAPR motor-blower unit shall have three 40-mm openings. Two of the openings shall have a 40-mm 'female' thread to accommodate a cartridge or cartridge. At the bottom of each of the female threaded openings shall be a black 40-mm EPDM gasket. At the top of the motor-blower unit there shall be a 40-mm 'male' threaded opening for use as a point of attachment for the breathing tube.
7. The PAPR motor-blower unit shall be designed for mounting on any surface that shall not affect performance. Examples include mounting upright on the waist or upside down on a vest. On either side of the motor-blower unit lower housing is a rectangular opening used for threading the waist belt.
8. The motor-blower unit shall have a proprietary motor fan technology with a RF shielded motor to protect it from radio interference.
9. The life expectancy of the motor-blower unit shall be a minimum of 1,000 hours.

## **Air Flow**

The PAPR motor-blower unit shall, with the power switch turned on and a new LiSO<sub>2</sub> battery installed, deliver a minimum of 115 liters per minute for 8 hours with 2 cartridges installed.

## **Cartridges**

### **The Responder CBRN cartridge shall be constructed as follows:**

1. The cartridge shall have a particulate filter internal to the cartridge assembly.
2. The cartridge must be a one-piece permanent assembly with protection for the particulate filter from punctures and/or sparks.
3. The cartridge shall utilize impregnated carbon to filter out the required gases and vapors.
4. The cartridge shall attach to the facepiece by hand (no tools), and use a threaded means of attachment.
5. The cartridge shall shall minimize interference with the overall facepiece vision. The cartridge external body components shall be black in color. Associated labels are to be located on the cartridge in such a manner as to limit light reflection during clandestine operations.
6. The cartridge must meet or exceed the NIOSH requirements for filtering Chemical, Biological, Radiological, and Nuclear (CBRN) agents.

### **The PAPR GME Multi-gas HE shall be as follows:**

1. The PAPR Multi-gas HE shall be a combination cartridge that contains the P100 filter and also a bed of activated carbon to absorb poison gases and vapors.
2. The cartridge shall be designed to filter out a broad spectrum of agents such as: acid gases including chlorine, sulfur dioxide, and chlorine dioxide, as well as ammonia, formaldehyde, and organic vapors.
3. The cartridge life shall be determined by utilizing a website designed to help users determine cartridge life. <http://webapps.msanet.com/cartlife/>
4. This cartridge shall be used for OSHA regulated chemicals in the air above the TLV

### **The Optifilter XL HE shall be as follows:**

1. The Optifilter XL Type H filter shall be a HEPA P100 particulate filter determined to be 99.97% efficient against all aerosols, oily and non-oily
2. This filter shall be effective against particulates such as dusts and mists but not poison gases or vapors.
3. This cartridge shall be used for dust filled environments.

## **Facepiece**

The PAPR shall be available with the Millennium or Ultra Elite tight fitting full facepieces.

### **Millennium Facepiece**

1. The facepiece shall be available in three sizes. The standard or medium facepiece shall be designed to adequately fit a wide range of face sizes. Small and large facepiece sizes shall be available to adequately fit those individuals who will not achieve an adequate fit with the standard or medium size. A specific size indication is to be marked on the appropriate facepiece.
2. The facepiece shall have mounting locations for the cartridge, on both right and left sides. One side will be utilized as the cartridge attachment point. The other side will be sealed off in some way as to easily switch the cartridge attachment point. This flexibility will allow the user to sight and fire a hand-held riot-control gas launcher or other self-defense device if needed, from either the right or left side of the body.
3. The facepiece shall have cartridge-mounting points utilizing a threaded attachment. The threaded attachment shall be 40 mm thread and NATO-Cartridge compatible.
4. An adjustable head harness with 6 points of suspension shall be utilized. The harness shall be designed to adequately fit a wide range of head sizes: small, medium and large.
5. The facepiece lens shall be a monocular lens located on the unit so as to provide a satisfactory field of vision for persons of widely varying facial shapes and sizes. The lens shall provide 90% unimpeded vision. The lens shall be a flexible polyurethane material that has a high chemical resistance. The lens shall be permanently bonded to the facepiece blank to eliminate potential contaminant penetration. Air shall enter the

facepiece in a manner that will reduce the possibility of accumulation of moisture on the lens. An air deflection baffle located in the facepiece shall divert the dryer inhaled air over the lens before it enters the breathing zone.

6. The facepiece shall have an inhalation check valve to prevent exhaled air from entering the cartridge.
7. The facepiece will have a low-opening demand exhalation valve. The valve design will be of the umbrella type to limit the amount of back leakage. The valve assembly will be designed for easy cleaning.
8. A suitably protected speaking diaphragm shall be available. The diaphragm shall project the voice directly from the mouth in the normal direction the user is speaking.
9. The facepiece shall include a drinking tube to provide connection for fluid ingestion in contaminated atmospheres. The drinking tube shall incorporate a quick-disconnect compatible with the M1 Canteen Cap.
10. All replaceable parts are to be easily replaced when necessary, in the field.
11. A standard nose cup shall be packaged with each facepiece. Nose cups shall be available for use in reducing facepiece fogging in cold conditions. The nose cups shall fit a variety of face sizes and shapes.
12. A clear polycarbonate outsert lens shall be packaged with each facepiece. The standard outsert shall be made of clear polycarbonate. Optional outserts made of dark-tinted polycarbonate shall be available. Laser protection outserts in 2-band and 3-band shall be available.
13. A removable spectacle kit shall be available for mounting corrective lenses inside the facepiece.
14. The facepiece shall be available in Hycar rubber.

#### **Ultra Elite Facepiece**

1. The facepiece shall be available in three sizes. The standard or medium facepiece shall be designed to adequately fit a wide range of face sizes. Small and large facepiece sizes shall be available to adequately fit those few individuals who will not achieve an adequate fit with the standard or medium size. A specific size indication is to be marked on the appropriate facepiece.
2. The facepiece shall have canister-mounting points utilizing a threaded attachment. The threaded attachment shall be 40 mm thread and NATO-Canister compatible.
3. Two types of head harnesses shall be available. An adjustable rubber head harness with 5 points of suspension shall be available. The harness shall be designed to adequately fit a wide range of head sizes: small, medium and large. A flame and heat-resistant Kevlar harness assembly featuring a four-point, adjustable suspension shall be available.
4. The facepiece lens shall be a monocular lens located on the unit so as to provide a satisfactory field of vision for persons of widely varying facial shapes and sizes. The lens shall be field-replaceable and of a non-shatter type and shall fit all three sizes of the facepiece. The lens shall provide 85% unimpeded vision.
5. Air shall enter the facepiece in a manner that will reduce the possibility of accumulation of moisture on the lens. An air deflection baffle located in the facepiece shall divert the dryer inhaled air over the lens before it enters the breathing zone.
6. The facepiece shall have an inhalation check valve to prevent exhaled air from entering the canister.
7. The facepiece will have a low-opening demand exhalation valve. The valve design will be of the umbrella type to limit the amount of back leakage. The valve assembly will be designed for easy cleaning.
8. The facepiece shall have a speaking diaphragm with aluminum-coated membrane suitably protected, and located centrally to the facepiece for optimal voice projection.
9. All replaceable parts are to be easily replaced when necessary, in the field.
10. A standard nose cup shall be packaged with each facepiece. Nose cups shall be available for use in reducing facepiece fogging in cold conditions. The nose cups shall fit a variety of face sizes and shapes and enhance unamplified speech transmission. .

11. A removable spectacle kit shall be available for mounting corrective lenses inside the facepiece.
12. The facepiece shall be available in Hycar rubber.

#### **40-mm Facepiece Adapter**

1. The 40-mm full facepiece adapter shall connect the PAPR breathing tube to the full facepiece.
2. The adapter shall be round and shall be made of a black Zytel® plastic.
3. The 40-mm full facepiece adapter shall attach to the full facepiece by rotating it a ¼ turn clockwise and will lock in place via a spring loaded clip.
4. The adapter shall have a 40-mm 'female' threaded opening to accommodate the 40-mm 'male' threaded end of the breathing tube.
5. The 'female' opening shall have a 40-mm EPDM/rubber gasket located at its base. The 'male' portion of the adapter shall have a Teflon® coated neoprene gasket that allows seating between the facepiece and the adapter.
6. The 40-mm adapter shall have a single inhalation valve and 3 exhalation valves. The inhalation valve shall have a single metal bar horizontally mounted to assist in the direction of the airflow.

#### **Battery Requirements**

The PAPR shall be available with a single lithium sulfur dioxide (LiSO<sub>2</sub>) primary battery system that shall have a minimum operational time of 8 hours or a nickel metal hydride (NiMH) rechargeable battery system.

#### **Breathing Tube**

The breathing tube shall be available in 30" or 36" lengths.

#### **Waist Belt**

The PAPR waist belt shall be made of a polyurethane coated nylon material. The surface shall be able to be decontaminated.

#### **Airflow Indicator**

1. The airflow indicator shall be a mechanical device used to periodically measure the airflow circulating through the blower unit.
2. It shall be made of clear plastic and be cylindrical in shape. It shall be hollow with a metal bar inserted at the top and have a ball on the inside that can move freely. The bottom portion shall have a gasket and shall fit in the opening at the top of the blower unit.
3. The airflow indicator shall have an external label containing a line and half-circle. This label shall designate the minimum 4-cfm airflow rate required.

#### **Accessories**

The respirator shall accommodate certain accessories for use in various situations.

1. The respirator shall have an Electronic Speech Amplifier that is mountable onto the facepiece. The unit will be powered by 2 standard alkaline batteries and have an on / off switch.
2. A removable spectacle kit shall be available for mounting corrective lenses inside the facepiece.
3. Polycarbonate outserts shall be available to provide additional lens impact protection. The outserts shall fasten to the facepiece without the use of special tools. Outserts shall be available in clear and dark-tinted polycarbonate Laser protection outserts in 2-band and 3-band shall be available.
4. A belt-mounted nylon fabric drop leg gas mask carrier shall be available. The carrier shall be made of 1000 denier NyTaneon™ Nylon lined with closed cell foam and be black in color. The carrier shall be 4 inches deep x 10 inches high x 6 ½ inches wide. The carrier shall have a double snap lid. The carrier shall have two leg straps. Both the belt hanger and the leg straps are fully adjustable and removable.
5. A butyl-coated nylon hood shall be available to provide additional protection for the head.