

# MMR™ Air Mask Low/High Pressure

## OPERATION AND INSTRUCTIONS

### 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 MMR Air Masks 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.

This SCBA is certified by the National Institute of Occupational Safety and Health (NIOSH) and is specifically designed to comply with National Fire Protection Association (NFPA) standards for use in fire-fighting applications.

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.



For More Information: Call (1-800-MSA-2222) or Visit Our Website at ([www.MSAnet.com](http://www.MSAnet.com))

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

# INTRODUCTION

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## NIOSH APPROVAL INFORMATION CAUTIONS AND LIMITATIONS

- 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.
- I- Contains electrical parts which have not been evaluated as an ignition source in flammable or explosive atmospheres by NIOSH.
- 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 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 USER INSTRUCTIONS

Do not use the 816867 or 816868 Integrated PASS with the 7-944-1 cylinder.

Approved for use as a combination apparatus (only with 494964, 815198 dual purpose kit, or 806754 intermediate pressure kit installed) for respiratory protection during entry into and escape from oxygen deficient atmospheres, gases, and vapors when not more than 20 percent of the rated capacity of the self-contained air supply is used during entry.

When used as a combination apparatus, the device shall be supplied with respirable air through 8 to 300 feet of air supply hose within the pressure range of 85 to 90 pounds per square inch gauge. A maximum of 12 sections of air supply hose may be used in making up the maximum working length of hose. Each section of coiled hose is considered 50 feet in length (max.: 6 sections). With the 494964 or 815198 kit, the cylinder valve shall be open while in supplied-air mode. With 806754 intermediate

pressure kit the cylinder valve shall be closed while in supplied air mode.

If the supplied-air fails, disconnect air supply hose, open cylinder valve (if using 806754 kit), and proceed to fresh air immediately.

Approved for use at temperatures above -25oF. If using the 492488 second stage regulator at temperatures below 32oF, regulator retainer 809974 or 812697 must be installed to maintain approval. Approved only when the compressed-air container is fully charged with air meeting the requirements of the Compressed Gas Association Specification G-7 for quality verification level (grade) D air or equivalent specifications. The cylinder shall meet applicable DOT specifications.

When equipped with the cylinder charging system transfilling coupling on the 7-1215-1 pressure gage and hose assembly, the apparatus must also be equipped with the 803534 first stage regulator and Audi-Larm Assembly.

Approval is maintained while transfilling air only if MSA Quick-Fill Hose Assembly 485331 or 485332 is used. Include 488703 cylinder charging system hose if using with encapsulated suit. A Quick-Fill equipped apparatus is not approved for use with the 7-1008-1 cylinder and valve assembly, unless the apparatus has been converted with the 815200 quick fill kit with relief valve for 3000psig Composite III cylinder.

Do not attempt to transfill air (using Quick-Fill connectors) if donor's audible alarm is ringing.

Use with adequate skin protection when worn in gases and vapors that poison by skin absorption (for example: hydrocyanic-acid gas).

In making renewals or repairs, parts identical with those furnished by the manufacturer under the pertinent approval shall be maintained.

## IMPORTANT NOTICE FOR RESPIRATORY PROTECTION PROGRAM ADMINISTRATORS

1. An adequate respiratory protection program must include knowledge of hazards, hazard assessment, selection of proper respiratory protective equipment, instruction and

# INTRODUCTION

training in the use of equipment, inspection and maintenance of equipment, and medical surveillance. [See OSHA regulations, Title 29 CFR, Part 1910. 134, Subpart 1, Par. 1910. 134 (b).]2. This SCBA will perform as designed only if used and maintained according to the manufacturer's instructions. The Program Administrator and the users must read and understand these instructions before trying to use or service this product. We encourage our customers to write or call for information on this product before using it.

2. This SCBA may be used only after proper instruction and training in its use as specified in NFPA-1500 and OSHA regulations Title 29 CFR, Part 1910. 134, Subpart 1, Par. 1910. 134 (b) (3).
3. This SCBA must be secured by a positive mechanical means if stowed within an enclosed seating area of fire department vehicles, or in a compartment with a positive latching door. The method of holding the SCBA in place must be designed to minimize injury to persons in the vehicle in the event of accident, rapid deceleration, or acceleration.
4. Do not mark the SCBA, i.e., with stamps, labels, paint, or other method. Use of such markings may interfere with apparatus use or may constitute a flammability hazard.
5. Be sure that no other equipment interferes with the SCBA facial seal, or with the users hands, or other necessary means of mobility.

For more information on self-contained breathing apparatus use and performance standards, please consult the following publications: NFPA Standard 1500, Fire Department Occupational Safety and Health Programs (Chapter 5) and NFPA 1981 Standard, on Open-Circuit SCBA's for Fire Service.

Above publications are available from the following: National Fire Protection Association, Batterymarch Park, Quincy, MA 22269.

ANSI Standard Z88.5, Practices for Respiratory Protection for the Fire Service; and, ANSI Standard Z88.2, Practices for Respiratory Protection. American National Standards Institute, 1430 Broadway, New York, NY 10018.

OSHA Safety and Health Standards (29 CFR 1910) (see specifically Part 1910. 134), available from the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402.

Compressed Gas Association, Inc., 1725 Jefferson Davis Hwy., Suite 1004, Arlington, VA 22202.  
Redundant alarm is approved intrinsically safe per UL/ANSI 913 for use in Class I, Division I, Groups A thru D hazardous locations, temperature rating T4.

## WARNING

1. Read and observe all NIOSH approval limitations as they apply to using the breathing apparatus.
2. Do not use the air mask as an underwater device.

3. This system must be supplied with respirable [Quality Verification Level (Grade) D, see ANSI/CGA G-7.1-1989] or higher quality air; and a dew point not to exceed -65°F (24ppm v/v) [Compressed Gas Association Specification G-7.1 for Quality Verification Level (Grade) D Gaseous Air].
4. This device may not seal properly with your face if you have a beard, gross sideburns or similar physical characteristics (see NFPA-1500 and ANSI Z88.2). An improper facial seal may allow contaminants to leak into the facepiece, reducing or eliminating respiratory protection. Do not use this device if such conditions exist. The face-to-facepiece seal must be tested before each use. Never remove the facepiece except in a safe, non-hazardous, non-toxic atmosphere.
5. Return to a safe atmosphere immediately if discoloration, crazing, blistering, cracking, or other deterioration of the lens material is observed.
6. Users must wear suitable protective clothing and precautions must be taken so that the air mask is not exposed to atmospheres that may be harmful.
7. Take into account the following factors which may affect the duration or the service life.
  - a. the degree of physical activity of the user;
  - b. the physical condition of the user;
  - c. the degree that the user's breathing rate is increased by excitement, fear, or other emotional factors;
  - d. the degree of training or experience which the user has had with this or similar equipment;
  - e. whether or not the cylinder is fully charged;
  - f. the presence in the compressed air of carbon dioxide concentrations greater than the .04% level normally found in atmospheric air;
  - g. the atmospheric pressure; if used in a pressurized tunnel or caisson at 2 atmospheres (15psi gauge) the duration will be one-half as long as when used at 1 atmosphere; at 3 atmospheres the duration will be one-third as long;
  - h. the condition of the apparatus.

**Failure to follow the above warnings can result in serious personal injury or death.**

## BEFORE USE

Thoroughly inspect this apparatus on receipt and before use.

This air mask is to be used only by trained and qualified personnel.

Read and understand these instructions before attempting to use this equipment. If you have any questions, call toll-free 1-800-MSA-2222.



# DESCRIPTION

## DESCRIPTION

The air masks from MSA are pressure-demand, self-contained breathing apparatus (SCBA) with Redundant Alarm/Pressure Gauge certified by the National Institute for Occupational Safety and Health (NIOSH) for use in atmospheres immediately dangerous to life or health:

“Immediately dangerous to life or health” means conditions that pose an immediate threat to life or health or conditions that pose an immediate threat of severe exposure to contaminants, such as radioactive materials, which are likely to have adverse cumulative or delayed effects on health” [Title 42 CFR, Part 84.2, (Q)]

Additionally, the air masks are designed to comply with the NFPA-1981 Standard. MMR breathing apparatus consists of the following seven major sub-assemblies.

- first stage regulator
- second stage regulator
- dual purpose
- air cylinder and valve
- Audi-Larm™ Audible Alarm
- carrier and harness
- facepieces
- redundant alarm

## FIRST STAGE REGULATOR

The first stage regulator is a "balanced-type" pressure reducer that keeps the pressure to the mask mounted regulator at approximately 80psig throughout the entire operating pressure range of the cylinder. The regulator has a redundancy feature to minimize the possibility of a first stage failure. The regulator uses a large sintered filter which is easy to replace. The filter captures particulates that may be in the air stream. The regulator also incorporates a pressure relief valve that vents first stage pressure automatically if the normal operating pressure range is exceeded.

## SECOND STAGE REGULATOR

This is a pressure-demand regulator, which keeps a positive pressure in the facepiece all the time. A shut-off button on one end of the regulator stops air flow when the facepiece or regulator is removed. To stop air flow, push the button IN. To restart the regulator, inhale sharply. The button automatically disengages the diaphragm, allowing air to flow to the facepiece. The regulator attaches to the facepiece with either a quick-connect connector, or a threaded connector. The regulator is a "pilot-valve" type device which delivers large flow rates accurately and quickly.

The second stage regulator attaches to the facepiece with a "quarter-turn" quick-connect. The quick-connect allows the regulator to swivel 70 degrees in the facepiece. The red bypass knob on the regulator can be oriented on either the right or left side of the user.

## DUAL PURPOSE

Dual-Purpose conversion kits allow the user to combine air masks with the capabilities of an air-line respirator, all in one unit. The NIOSH certifications for Dual-Purpose apparatus allow the wearer to:

- enter or exit a dangerous area (such as emergency rescue) using only the cylinder;
- work within an area for a limited time using cylinder air;
- work within an area for an extended time using air from the air-supply hose.

## AIR CYLINDER AND VALVE

Material	Capacity Cubic Ft.	Pressure psig	Rated Svc* Life (Min.)
Composite	45	4500	30
Composite	88	4500	60
Composite	45	2216	30
Aluminum	45	2216	30
Composite	60	3000	30
Composite	66	4500	45

\* as approved by NIOSH

The air cylinder and valve consists of a tank and a cylinder valve assembly. The cylinder valve includes a valve body, cylinder valve inlet tube, handwheel, safety disc (burst disc), and pressure gauge.

The pressure gauge shows the air pressure in the cylinder continuously. The gauge is calibrated in 100psig increments. For example, a gauge reading of 20 is read as 20 x100 or 2,000psig. A handwheel is used to open and close the cylinder valve.

## AUDI-LARM AUDIBLE ALARM

The Audi-Larm audible alarm rings when there is approximately 25% of the SCBA's rated service time remaining. The alarm also rings when the cylinder valve is first opened, providing an audible indication that the alarm is properly "cocked."

A high pressure hose delivers air at cylinder pressure from the alarm to the first stage regulator.

# DESCRIPTION

Cylinder	Approximate Remaining Service Time
30-min. 2216 psig	7 min.
30-min 4500 psig	7 min.
45-min. 4500 psig	11 min.
60-min. 4500 psig	14 min.
30-min. 3000 psig	7 min.

## CARRIER AND HARNESS

The carrier consists of a backplate, a cylinder band and latch to hold the cylinder, and a harness, consisting of shoulder pads, a chest strap (optional), adjustable pull-straps, and a waist-strap.

## FACEPIECES

The facepieces are available in three sizes.

The facepiece lens is super-hardcoated to meet the requirements of NFPA 1981. This process gives the clear polycarbonate lens superior abrasion and chemical protection.

The facepiece has a low-resistance, pressure-demand exhalation valve designed for easy cleaning. An inhalation check valve in the inlet housing keeps moisture out of the mask mounted regulator. The facepiece has a speaking diaphragm for clear, short range communication.

The facepiece is stocked with the standard five-point adjustment rubber head harness. A Speed-ON® Head Harness is also available. This harness is made of flame and heat resistant (FHR) materials and features a five-point suspension. Five "points" use adjustable, elasticized straps.

# REDUNDANT ALARM

## REDUNDANT ALARM/PRESSURE GAUGE

The Redundant Alarm/Pressure Gauge is a multi-mode, battery-powered, low pressure warning device which gives audible and visible warning that air cylinder pressure has reached a pre-set level (530psig on low pressure units, 1175psig on high pressure units). There are three warning indicators:

- Yellow and red LEDs wigwag on the pressure gauge face
- The pressure gauge face illuminates
- An audible alarm repeats single tone bursts

**Note:** The alarm is powered by two Lithium Batteries. A low battery warning sounds 2 rapid tones that repeat every 10 seconds.

### WARNING

**Use only high quality 3-volt Lithium Batteries (Panasonic or Sanyo, P/N: Cr2). Other batteries may void the intrinsic safety approval.**

## REDUNDANT ALARM OPERATIONS

Start-up	Light and tone indicators activate as pressure reaches 50 to 200 psig. This indicates that the alarm is functional and “cocked.”
Monitor Mode	This is the routine status mode once cylinder pressure exceeds 200psig.
Low Pressure Alarm	Activates when cylinder pressure drops below nominal values: 530psig for low pressure systems; 1175psig for high pressure systems. Continues until you turn it off below 200psig (press alarm switch 2 times in rapid succession).
Test Mode	Verifies functioning audible and visible alarm indicators. Also checks battery voltage. Accessed from Sleep Mode by pressing alarm switch 3 times in rapid succession. Switches to low battery alarm if battery voltage is low. Test mode is not available during low pressure alarm.
Low Battery Alarm	Entered from Monitor Mode if batteries are low. Entered from Sleep Mode via Test Mode if battery voltage is low. Sounds in 5 to 6 seconds after selecting Test Mode. Two rapid tones repeated every 10 seconds. Replace batteries as soon as possible.
Gauge Illumination	Automatically lights and flashes during a low pressure alarm. Manually lit by holding the alarm switch IN for at least 1 second. Shuts off in 5 seconds. Release and press button again to reactivate light (only in Monitor Mode.)
Sleep Mode	Routine mode if SCBA is off or not in use. Accepted by pressing alarm switch 2 times in rapid succession after cylinder pressure drops below 200psig.

**Note:** The visual warning indicators in conjunction with the air mask audible alarm (ringing bell) provide compliance with the NFPA 1981 Standard. The audible alarm feature (repeated tones alarm) incorporated with the Redundant Alarm/Pressure Gauge provides additional user low pressure warning.





# DONNING

## DONNING THE APPARATUS

1. Remove the facepiece from the case.

### **▲ WARNING**

**Do not use a cover lens in a high-temperature environment, such as firefighting. High temperatures may distort the cover lens. Or, moisture trapped between a cover lens and the facepiece lens may condense and distort vision. Always remove the cover lens before donning the facepiece.**

2. Check that the cylinder is fully pressurized.

### **▲ CAUTION**

**If the cylinder is not full, the service time is reduced accordingly and should not be used.**

3. Reach inside the right shoulder straps and grasp the redundant alarm and pressure gauge, slide left arm through left shoulder straps.
4. Bend forward slightly, rest it on your back.
5. Attach the chest strap (optional).
6. Fasten the waist-strap and pull it tight for a snug fit.
7. As you straighten up, pull the shoulder strap tabs out. Hike the unit up for a comfortable fit.
8. The shoulder straps and waist-strap ends must be tucked in and lay flat across the body.

## REGULATOR AND ALARM CHECKS TESTING AND USING THE REDUNDANT ALARM & AUDI-LARM

1. Grasp the mask mounted regulator and push the shut-off button IN.



**Note:** Shut-off button may be stored IN.

2. Check that the red bypass knob is fully closed (clockwise).



3. To test the redundant alarm, press the alarm switch 3 times in rapid succession. The alarm should enter Test Mode.

4. Reach behind and open the cylinder valve fully. Listen for the Audi-Larm to ring briefly and redundant alarm tones as pressure in the system increases.



5. As the pressure rises from 50 to 200 psig, both visible and audible alarms activate automatically, indicating that the alarms are functional and "cocked." When the system is fully pressurized, the alarms enter the Monitor (normal) Mode.

### **▲ WARNING**

**If the alarm fails to ring, or redundant fails to light and tone, do not use the apparatus. The SCBA must be checked and corrected for proper operation by an MSA trained or certified repairperson before using. Failure to follow this precaution may result in serious personal injury or death.**

6. Press and hold the redundant alarm switch in for at least 1 second to be sure the Manual Illumination Mode functions properly.

7. No air should flow from the regulator. If it does, repeat steps 1 and 2.



## DONNING

8. Check the redundant alarm gauge. Gauges must be within 220psig for 2216psig; 300psig for 3000psig; 450psig for 4500psig.

### ⚠ CAUTION

If your readings do not agree with these values, return the SCBA to an MSA trained or certified repairperson.

9. Check for bypass operation. Grasp the red knob and turn it a 1/4 turn (counter-clockwise) until it locks in. Listen for air flow, then turn it OFF. Close cylinder valve fully.



### ⚠ WARNING

If the red knob (bypass) will not lock and continues to rotate, do not use the SCBA. The condition must be corrected by an MSA trained and certified repairperson before using the SCBA. Failure to follow this precaution may result in serious personal injury or death.

10. Crack the bypass valve slowly to bleed off pressure until the redundant alarm gauge needle drops below:  
530psig - nominal (low pressure system) or  
1175psig - nominal (high pressure system)  
The redundant alarm and audi-alarm will sound and the gauge will illuminate and continue until you turn the redundant alarm OFF.
11. When the pressure falls below 200psig, turn the alarm off (Sleep Mode) by pressing the alarm switch 2 times in rapid succession. An extended single tone will sound indicating the unit has been turned off. The Audi-Larm should continue to ring until pressure is less than 200psig.
12. Check for air leaks. Open cylinder valve fully to pressurize system, then close the cylinder valve and watch the harness pressure gauge.
13. If the needle drops more than 100psi in 10 seconds, there is a leak. Do not use the apparatus until the leak is found and corrected.

### ⚠ WARNING

If the Audi-Larm fails to ring, or redundant alarm fails to light and tone, or fails to continuously ring to 200psig, do not use the apparatus. The SCBA must be checked and corrected for proper operation by an MSA trained or certified repairperson before using. Failure to follow this precaution may result in serious personal injury or death.

**Note:** Before donning, check that the regulator quick-connect O-ring is seated properly in its groove, and that it is not torn, gouged, or nicked.

## DONNING THE FACEPIECE

### ⚠ WARNING

Do not wear eyeglasses under the facepiece. The temples or sidebars on eye glasses will prevent an airtight seal. If you must wear glasses, install the spectacle kit. Failure to follow this precaution may cause inhalation of contaminated air, resulting in serious respiratory injury or death.

1. Extend the facepiece straps fully. Place neckstrap around your neck and don the facepiece by inserting your chin first.



2. Pull the head harness completely over your head and tighten the lower (neck) straps.



3. Tighten the lower (neck) harness straps first, by pulling them straight back, **not out**. Tighten the temple straps the same way. Tuck in the ends of the straps so that they lay flat across the head.
4. Push headband pad towards neck and repeat step 5. If necessary, tighten the front strap for best visibility and fit. Tuck in the ends of the straps so they lay flat across the head.

## USING THE SPEED-ON HEAD HARNESS

1. Loosen the neck straps so the end-tabs are at the buckles.
2. Insert your chin into the facepiece.
3. Pull the harness "net" over the crown of your head.
4. Tighten the neck straps. If necessary, tighten the temple or front strap adjustments. Tuck in the straps so that they lay flat across the head.

# DONNING

## FACEPIECE FIT CHECK

1. To check the inhalation valve, inhale. If you do not receive sufficient flow of air, remove and replace the facepiece.
2. To check for facepiece fit, hold the palm of your hand over the inlet connection and inhale. Hold your breath at least 10 seconds. The facepiece should collapse and stay collapsed against your face. If it does not, readjust the facepiece and test again. **If this does not correct the leak, do not use the facepiece.**
3. Test the exhalation valve, take a deep breath and hold it. Block the inlet connection with the palm of your hand and exhale. If the exhalation valve is stuck, you may feel a heavy rush of air around the facepiece.



**Note:** You may need to exhale sharply to open the valve. If this does not release the valve, do not use the facepiece.

### **⚠ WARNING**

**This device may not seal properly with your face if you have a beard, gross sideburns, or similar physical characteristics (see NFPA-1500 and ANSI Z88.2). An improper facial seal may allow contaminants to leak into the facepiece, reducing or eliminating respiratory protection. Do not use this device if such conditions exist. The face-to-facepiece seal must be tested before each use. Never remove the facepiece except in a safe, non-hazardous, non-toxic atmosphere. Failure to follow this precaution can result in serious personal injury or death.**

4. Open the cylinder valve fully. Be sure that the shut-off button is pushed IN.



- a. To connect the Quick-Connect regulator to the facepiece, push the regulator into the facepiece adapter. Turn the regulator so that the red bypass knob is pointing upward.



- b. Rotate the regulator 1/4 turn. The regulator can be rotated in either direction to orient the bypass knob.



- c. Listen for the release tab to “click” as the regulator locks onto the facepiece.
- d. Verify proper engagement by rotating the regulator until it contacts the release tab and stops. The regulator must only swivel 70 degrees.
- e. Double check proper engagement by pulling on the regulator to ensure that the regulator is securely attached to the facepiece.

# DONNING

## **⚠ WARNING**

Do not use the respirator unless the regulator is connected properly. The regulator must swivel approximately 70 degrees, but must NOT rotate beyond the tab stops. Do NOT use the respirator if the regulator does not swivel approximately 70 degrees or rotates beyond the tab stops. Return the respirator to an MSA trained or certified repairperson to correct the condition. A regulator that is not installed correctly can separate from the facepiece unexpectedly. Failure to follow this precaution can result in serious personal injury or death.

5. Inhale sharply to start the air flow. The shut-off button should pop out automatically.
  - a. Check the bypass again. Turn the red knob counter-clockwise until it locks in position.

## **⚠ WARNING**

There must be a continuous flow of air when the bypass knob is opened. If not, do not use the apparatus. The SCBA must be checked and corrected for proper operation by an MSA trained or certified repairperson before using it. Failure to follow this precaution may result in serious personal injury or death.

6. If the air mask passes all tests, the SCBA is ready to use. Remember, you must make these tests every time before you enter the hazardous atmosphere. If the unit fails to meet any of the tests, the condition(s) must be corrected before using the apparatus.

## PRECAUTIONS DURING USE

Periodically check the pressure indicated on the redundant alarm and remote pressure gauge. It continually displays the cylinder pressure. When the needle reaches the red zone, the Audi-Larm will begin ringing. When the bell starts ringing or when the pressure reaches approximately 25% of the rated service pressure, return to fresh air.

Redundant alarm Audi-Larm activates when cylinder pressure drops below nominal values:

530psig - low pressure

1175psig - high pressure

when the redundant alarm or Audi-Larm activates, **immediately** return to fresh air.

**Note:** Air mask service life is reduced greatly when the bypass is used.

- Reduced air flow to the facepiece: **Immediately** open the bypass valve and return to fresh air.
- Air mask free-flows: **Immediately** open the bypass valve and partially close cylinder valve to control airflow, and **immediately** return to fresh air.
- Hear first stage valve venting: **Immediately** close the cylinder valve venting valve to a “crack-open” position to conserve air. Open the bypass valve and control air flow with the cylinder valve. Return to fresh air **immediately**.
- Audi-Larm rings: **Immediately** return to fresh air.
- Redundant Alarm lights and flashes: **Immediately** return to fresh air.

# DOFFING

## REMOVING THE APPARATUS

1. To disconnect the regulator, pull the release tab away from the facepiece.



- a. Rotate the regulator 1/4 turn. Pull the regulator away from the facepiece as you turn it so that it slides out of the groove.



2. Close the cylinder valve fully. Press the shut-off to release system pressure.

3. When the pressure falls below 200psig, turn the redundant alarm off (Sleep Mode) by pressing the alarm switch 2 times in rapid succession. An extended single tone will sound indicating the unit has been turned off.
4. Press the shut-off button IN. Stow the regulator in the stand-by belt mount when it is not in use.

**Note:** Air will flow from the second stage briefly until system pressure is relieved.



5. To remove the facepiece, fully loosen the harness straps and pull the facepiece up and away from your face.



6. To remove the carrier harness, press the belt buckle release button IN.



7. Disconnect the chest strap (if used).

8. To loosen the shoulder straps, grasp the release loops. Push them out and away from your body.
9. Slip your right arm out of the shoulder pad first (to prevent damage to the regulator), then remove the harness.

**Note:** Be sure to replace the cylinder with a full one. Complete Inspection and Cleaning and Disinfecting Procedures outlined in this manual. Ensure complete apparatus is clean and dry. Ensure that facepiece head harness straps and harness adjustment straps are fully extended. Place the complete apparatus in the storage case or suitable storage location so it can be reached easily for emergency use.

## CHANGING THE CYLINDER WITH BAND AND LATCH

1. Be sure there is no pressure in the system before replacing a cylinder. Disconnect the Audi-Larm coupling nut.



## DOFFING

2. Lift and turn the latch wing to loosen the cylinder clamp.
3. Slide out the empty cylinder and install one that is fully charged. Be sure that the adjustable cylinder band and latch is in the proper slot before you insert a new cylinder: Make sure that the lock tab on the carrier is fully engaged in the appropriate cylinder band slot position.
4. Slide the fully-charged cylinder into the carrier, with gauge facing out, turn the latch wing clockwise to tighten fully. Push latch wing toward backplate locking latch wing in place.

**Note:** Be sure to tighten the latch wing fully each time a cylinder is installed.

5. To check that the cylinder is secure, place one hand on the triangular backpad and grasp the cylinder valve with the other. Try to pull the cylinder and valve down and out away from the carrier. Make sure that the band and latch holds the cylinder securely in the carrier.

**Note:** If the cylinder feels loose, re-check that the band and latch is in the proper slot; that the stainless-steel lock tab is fully engaged in the slot; and that the latch wing is fully tightened and flipped over with the label side OUT.

**Do not use the air mask** if the cylinder is not held securely in the carrier.

6. Check that the O-ring is inside the Audi-Larm coupling nut. If the O-ring is damaged it must be replaced before the alarm is used.

7. Thread the Audi-Larm coupling nut to the cylinder valve and hand-tighten (no tools).



### CHANGING THE CYLINDER WITH BUCKLE AND STRAP

#### **⚠ WARNING**

Be careful not to drop cylinder or bump valve knob. An unsecured cylinder can become an airborne projectile under its own pressure if the valve is opened even slightly.

1. Be sure there is no pressure in the system before replacing a cylinder. Disconnect the alarm with URC

Assembly coupling nut.

2. Lift over center buckle to loosen the cylinder strap.
3. Slide out the empty cylinder and install one that is fully charged. Be sure that the adjustable cylinder buckle is properly adjusted.
4. Slide the fully charged cylinder into the carrier, with gauge facing out, close the over center buckle to tighten the cylinder strap.
5. To check that the cylinder is secure, place one hand on the back plate and grasp the cylinder valve with the other. Try to pull the cylinder and valve down and out away from the carrier. Make sure that the strap and buckle hold the cylinder securely in the carrier.

**Note:** If the cylinder feels loose, re-check that the strap and buckle are properly adjusted. Open cylinder buckle. Tighten cylinder strap by pulling on top (outer) strap. It will be necessary to reposition the black plastic slide during adjustment. Tighten cylinder strap until cylinder buckle is approximately 45 degrees from vertical. Close the cylinder buckle. **Do not use** the air mask if the cylinder is not held securely in the carrier.

#### **⚠ CAUTION**

**Do NOT over-tighten the cylinder strap; otherwise it will damage the center buckle assembly.**

6. Check that the O-ring is inside the Alarm with URC Assembly coupling nut. If the O-ring is damaged it must be replaced before the alarm is used.
7. Thread the alarm with URC Assembly coupling nut to the cylinder valve and hand-tighten (no tools).

### CHARGING CYLINDERS

#### **⚠ WARNING**

Be careful not to drop cylinder or bump valve knob. An unsecured cylinder can become an airborne projectile under its own pressure if the valve is opened even slightly.

#### **⚠ WARNING**

1. Remove from service if cylinder shows evidence of exposure to high heat or flame: e.g., paint turned to a brown or black color, decals charred or missing, gauge lens melted, or elastomeric materials distorted.
2. Use this device only after receiving proper training in its use. Use in accordance with this label and MSA apparatus instructions.
3. To maintain NIOSH approval, container must be fully charged with respirable air meeting the requirements of the Compressed Gas Association specification G-7.1 1989 for Quality Verification Level (grade) D air or equivalent specification.

## DOFFING

4. **Do not use unless the cylinder is filled to the full pressure approved.**
5. **Do not alter, modify, or substitute any components without approval of the manufacturer.**
6. **Inspect frequently. Maintain according to manufacturer's instructions. Repair only by properly trained personnel.**

**Failure to comply with these warnings can result in serious personal injury or death.**

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### SAFETY PRECAUTIONS FOR MSA SELF-CONTAINED BREATHING APPARATUS CYLINDERS

Breathing apparatus cylinders should be fully recharged as soon as practicable after use. Cylinders should not be stored partially charged for two reasons:

1. If used partially charged, the duration of the apparatus is reduced.
2. The pressure relief device is only designed to protect a fully charged cylinder from the effects of a fire.

For maximum safety, the cylinders should be stored full or at a pressure above ambient but less than 100psig.

Prior to recharged, cylinders must be examined externally for evidence of high heat exposure, corrosion, or other evidence of significant damage.

Additional information of value when performing external and internal inspections of cylinders may be found in the latest editions of CGA Publication C-6: "Standards for Visual Inspection of Steel Compressed Gas Cylinders", CGA Publication C-6.1: "Standards for Visual Inspection of High Pressure Aluminum Compressed Gas Cylinders", and/or CGA Publication C-6.2: "Guidelines for Visual Inspection and Requalification of Fiber Reinforced High Pressure Cylinders" available from the Compressed Gas Association, Inc., 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102.

If there is any doubt about the suitability of the cylinder for recharge, it should be returned to a certified hydrostatic test facility for expert examination and testing.

Always check to be sure the retest date is within the prescribed period and that the cylinder is properly labeled to indicate its gaseous service. New labels are restricted items which are not available except through certified hydrostatic test facilities. When replacing cylinder valves or after the retesting of cylinders, make sure the proper cylinder valve, burst disc, and O-ring are installed prior to cylinder recharging.

Establish the service pressure of the cylinder. Type 3 AA (steel) cylinders that bear a plus (+) sign after the latest retest date may be recharged to a pressure, i.e. a cylinder stamped 3AA2015 with a plus (+) sign after the test date may be recharged to 2216psig. (this applies to steel cylinders only). Steel cylinders without the plus (+) sign stamped after the latest test date must be removed from service. All other cylinders which are not 3AA type shall be filled to the designated service pressure only (as found on the DOT approval or stamping). For cylinders manufactured under a U.S. DOT exemption (i.e., DOT-E-#####), the exemption should be consulted and is available from the Associate Administrator for Hazardous Materials Safety, Research and Special Programs Administration, U.S. Department of Transportation, 400 7th Street, SW, Washington, D.C. 20590-0001.

Appropriately connect the cylinder to the filling system and refill. Terminate the filling when the pressure reaches the service pressure and allow the cylinder to cool to room temperature. If necessary, top-off the cylinder such that the service pressure is attained with the cylinder at a temperature of 70°F. Close the valves on the cylinder and the filling system and remove the cylinder. Apply a leak solution to determine if there is any leakage between the cylinder and the valve. If there is no leakage, the cylinder is ready for use.

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### STORAGE

Do not store the apparatus or spare cylinders within or near an area where the apparatus can or might be exposed to any substances that will or might attach any part of the apparatus, causing the apparatus NOT to perform as designed and approved.

Do not store the alarm for extended periods with the batteries installed.

Do not store the apparatus with an empty or partly-filled cylinder. Always install a fully-charged cylinder so that the apparatus is ready for use.

Complete Inspection and Cleaning and Disinfecting Procedures outlined in this manual. Ensure complete apparatus is clean and dry. Ensure facepiece head harness straps and harness adjustment straps are fully extended. Place the complete apparatus in the storage case or suitable storage location so it can be easily reached for emergency use.





# COLD WEATHER OPERATION

## SUGGESTED PROCEDURES FOR COLD WEATHER OPERATION

Moisture can cause problems in air masks if it freezes. However, moisture can cause freezing problems even if the surrounding air is above freezing. This is because air flowing from the cylinder through the regulator drops from cylinder pressure to close to atmospheric pressure very quickly. As it does so it expands, causing the air and the regulator to become colder. Although the surrounding temperature may be warmer than 32°F, the temperature inside the regulator may be lower. Any water inside could turn to ice and restrict air flow.

1. To keep moisture from entering the mask mounted regulator. Stow the regulator in the stand-by belt mount (P/N 812837).
2. Use the lock ring (P/N 813154) and neck strap (P/N 481256). The neck strap keeps the facepiece upside down on the user's neck. Water does not collect in the facepiece. If not used correctly, the facepiece can act as a funnel, catching and directing water into the regulator.
3. When the air mask is away from heat, water spray can freeze on the regulator surface. Ice can build up and freeze the shut-off button, bypass valve, and the quick-connect release tabs. Before entering or re-

entering a hazardous atmosphere, make sure the shut-off button, quick-connect release tabs, and bypass valve are ice-free and operating properly. Periodically, check the bypass to be sure it is ice-free.

4. Moisture can enter through the cylinder valve or coupling nut when cylinders are replaced on the air mask. When replacing cylinders, be careful to prevent moisture or contamination from entering the system. Remove any ice from these fittings. Wipe the coupling nut threads and cylinder valve threads dry before disconnecting the cylinder. Water can contaminate the system or freeze.
5. NIOSH certification requires a noseclip at temperatures below 32°F. The noseclip reduces lens fogging and must be used whenever freezing conditions are encountered.
6. During cleanup at the station, be careful to keep water from entering the facepiece or mask mounted regulator when washing fire trucks.
7. Thoroughly dry the facepiece **and** mask mounted regulator after cleaning and disinfecting.



# QUICK-FILL SYSTEM OPERATION

## QUICK-FILL SYSTEM OPERATION

The Quick-Fill System should be used only by qualified, trained personnel who have carefully read and understood these instructions, cautions, and warnings.

NIOSH approvals of air masks from MSA are maintained while transfilling air ONLY if appropriate Quick-Fill hose assemblies from MSA are used.

### **▲ WARNING**

**Do not use any transfilling hose assembly or fittings other than those supplied by MSA specifically for the Quick-Fill System. Use of any other transfilling hose assembly and/or fitting may result in serious personal injury or death, and will void NIOSH approval. Quick-Fill hose assemblies and fittings are rated for a maximum working pressure of 4500psig.**

**Do not lubricate the Quick-Fill fittings. Do not permit oil, grease, or other contaminants to come in contact with the Quick-Fill fittings. The Quick-Fill hose assemblies and fittings are designed to be used with Quality Verification Level (Grade D) or better air as defined by ANSI/CGA G-7.1.**

## TRANSFILLING AIR FROM A SECONDARY AIR SOURCE

**Note:** A secondary air source stores compressed breathing air until needed to refill SCBA air cylinders. Secondary air source pressure must be greater than air mask cylinder pressure.

Examples of air sources include: cascade air cylinder refilling systems; high pressure compressor systems with a fixed reservoir; and an SCBA air cylinder which is not installed on an air mask.

### **▲ WARNING**

**Do not use the Quick-Fill System with 3000psig cylinders because the pressure relief valve on the Quick-Fill System vents at approximately 2350psig.**

**Do not connect a Quick-Fill equipped low pressure air mask to a secondary air source (not gauged) with a pressure greater than 2216psig. The Quick-Fill equipped low pressure air mask is rated for a maximum working pressure of 2216psig. As an additional safety feature, the black inlet fitting has a relief valve which automatically vents at 2350psig.**

**Do not connect a high pressure air mask to a secondary air source with a pressure greater than 4500psig. The High Pressure is rated for a maximum working pressure of 4500psig. Failure to follow the**

**above warnings may result in serious personal injury or death.**

The user is responsible for the air source, which must meet the requirements of Compressed Gas Association Specification ANSI/G-7.1, Quality Verification Level (Grade D) Gaseous Air or better, with a moisture dew point of not greater than -65°F (24ppm water vapor, normal). Pressures at the inlet of the Quick-Fill hose must not exceed that of the SCBA (2216psig or 4500psig).

The user also is responsible for connecting the Quick-Fill hose to an appropriate secondary air source.

1. To connect the Quick-Fill hose (P/N 485391 Quick-Fill fitting installed on the air source):
  - a. Push the female fitting on the male fitting until it snaps in place. Pull on the hose to be sure the fitting snapped into place.
  - b. Turn the air source on.

### **▲ CAUTION**

**If there are serious leaks from either female fitting, or along the hose, de-pressurize the hose and correct the problem. Slight leakage from the unconnected female fitting is acceptable.**

2. To attach the Quick-Fill hose to the SCBA regulator:
  - a. Remove the rubber dust cap from the male inlet fitting on the regulator. Be sure that the cylinder valve is fully opened.

**Note:** The shut-off button may be either open or closed, depending on whether the air mask is donned.

- b. Remove the rubber dust cap from the female fitting on the Quick-Fill hose.
- c. Push the female fitting on the male fitting until it snaps in place. Pull on the hose to be sure the fitting snapped into place.

Transfilling begins when the female fitting is snapped on the regulator's male fitting.

**Note:** If the secondary air source does not have a sufficient volume of air, the air mask cylinder will not reach full service pressure.

After approximately 45-60 seconds, pressure between the secondary air source and the air mask cylinder will be equal.

### **▲ CAUTION**

**Cylinder temperature will increase by approximately 45°F. The pressure gauge may show FULL immediately after transfilling, but cylinder pressure may decrease by as much as 190psig after the cylinder cools to room temperature. Actual service time may be reduced accordingly.**

# QUICK-FILL SYSTEM OPERATION

3. Compare the air mask pressure gauge reading to the secondary air source pressure gauge reading. If the readings are the same, pressure is equal.
4. To disconnect the Quick-Fill hose after transfilling, pull the gray sleeve back. The hose fitting and the regulator will separate. A hiss or pop may be heard as the fittings separate and the high pressure air is sealed off.
5. Immediately install the dust cover on the male fitting.
6. The air mask cylinder is ready for service if the cylinder pressure gauge is on the corresponding color band.

## EMERGENCY OPERATIONS

1. If you are transfilling in fresh air and the dust cover will not stay on the regulator male fitting because air is leaking, correct the condition before using the air mask.
2. If you are transfilling in a contaminated atmosphere and the dust cover will not stay on the regulator male fitting because air is leaking:
  - a. Immediately reconnect the Quick-Fill hose to seal off the leak and return to fresh air.
  - b. If you can not reconnect the hose, reach behind and close the cylinder valve. Air pressure in the regulator will drop and the leak will slow down.
  - c. Quickly replace the protective dust cap on the male regulator fitting. This will form a redundant seal.
  - d. Open the cylinder valve and return to fresh air immediately. The dust cover prevents dirt, water, and debris from entering the fitting and acts as a redundant seal.

## TRANSFILLING BETWEEN SCBA FROM MSA (EMERGENCY ESCAPE BREATHING SUPPORT SYSTEM)

**Note:** The SCBA with the higher pressure reading is the donor. The SCBA with the lower pressure is the receiver.

Transfilling between users of SCBA should be performed only during life-threatening emergencies, or simulated training exercises. Both **donor** and **receiver** must return to fresh air immediately following the procedure.

### **WARNING**

**Do not transfill if the donor's audible alarm is ringing. Failure to follow this warning may result in shorter escape time to return to fresh air, causing serious personal injury or death.**

The audible alarm begins ringing to indicate that the pressure in the cylinder has been reduced to 25% of its rated working pressure. Remaining service time must be used

for escape to fresh air. If the donor's audible alarm begins ringing during transfilling, the **donor** should disconnect and preserve his escape time.

1. If the **donor's** alarm is not ringing and you have sufficient air to transfill air to a **receiver**, (greater than 1000psig for low pressure air masks and greater than 2000psig for high pressure air masks):
  - a. Remove the 3 foot emergency transfill hose from its protective pouch.
  - b. Remove the rubber dust cover from both female fittings on the Quick-Fill hose assembly.
  - c. Remove the rubber dust cover from the male fitting on each pressure-demand regulator Quick-Fill fitting.
  - d. Push the female fittings on to the male fittings until they click in place. Pull on the hose to be sure it snapped in place.

**If serious leakage is noticed from either of the two female fittings, or anywhere along the hose, disconnect the female fittings and return to fresh air immediately. Failure to follow this warning may result in serious personal injury or death.**

- e. After approximately 30-60 seconds, pressure between the SCBA cylinders will be equal.
- f. Disconnect the Quick-Fill hose from both regulators by pulling the gray sleeve back on both ends. A hiss or pop may be heard as the fittings separate and the high pressure air is sealed off.
- g. Immediately install the dust cover on the regulator male fitting. The dust cover prevents dirt, water, and debris from entering the fitting and acts as a redundant seal.

## EMERGENCY OPERATIONS

1. If the dust cover will not stay on the regulator male fitting because air is leaking:
  - a. Immediately reconnect the Quick-Fill hose to seal off the leak and return to fresh air.
  - b. If you can not reconnect the hose, reach behind and close the cylinder valve. Air pressure in the regulator will drop and the leak will slow down.
  - c. Quickly replace the protective dust cap on the male regulator fitting. This will form a redundant seal.
  - d. Open the cylinder valve and return to fresh air immediately.
2. Preparing the Quick-Fill System for Storage:
  - a. Press in on the center of the quick-disconnect dust cap to release any pressure in the Quick-Fill hose.
  - b. Roll up the hose and place it in its protective pouch.

**Note:** Only persons trained in MSA Maintenance are authorized to repair or disassemble the Quick-Fill System. If repairs are required, contact your nearest MSA office. Call 1-800-MSA-2222.

# CLEANING AND DISINFECTING

## CLEANING AND DISINFECTING

Depending on the cleaning policy adopted, either a designated person or the user should clean each device after each use. ANSI standards suggest that users should be trained in the cleaning procedure.

Cleaner-Disinfectant from MSA is recommended. It cleans and disinfects in one operation. It retains its germicidal efficiency in hard water to inhibit the growth of bacteria. It will not deteriorate rubber, plastic, glass, or metal parts. Refer to label for user instructions.

### ⚠ 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.**

1. Preparing Solution
    - a. Follow the instructions with the Cleaner-Disinfectant.
    - b. If the Cleaner-Disinfectant Liquid is not used, wash in a mild cleaning solution, rinse thoroughly, and submerge in a germicide solution for the manufacturer's recommended time.
  2. Clean and Disinfect the Facepiece
    - a. Remove the mask mounted regulator from the facepiece.
    - b. Thoroughly wash the facepiece (and nose cup) in the cleaning solution. A soft brush or sponge can be used to scrub the soiled facepiece.
    - c. Rinse the facepiece thoroughly inside and out in plain water (120°F maximum).
  - d. Clean the pressure demand exhalation valve by pressing in on the stem with a blunt object and flushing with clean water.
  - e. Allow the facepiece to air dry. Do not dry the parts by placing them near a heater or in direct sunlight. The rubber will deteriorate.
  - f. Operate the exhalation valve by hand to be sure it works properly.
- 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.
3. In general, only the facepiece requires cleaning and disinfecting after each use. If the apparatus is soiled (i.e. heavy smoke residue or dirt accumulation) use a sponge damp with mild soap solution or use a soft/medium bristle brush to remove deposits that may interfere with normal operation of:
    - a. Harness (straps and buckles)
    - b. Cylinder carrier (band and latch assembly)
    - c. Cylinder (hand-wheel, gauge, outlet connection)
    - d. Audi-Larm (bell or coupling nut connection)
    - e. Redundant alarm/pressure gauge
    - f. MMR remote gauge lens
    - g. First stage regulator (relief valve and swivel)
    - h. MMR second stage regulator (bypass, shut-off button, or quick-connect buttons). Use a #4 rubber stopper (P/N 60380) in the outlet of the MMR second stage regulator to prevent water, dirt, or debris from entering.
  4. Inspect the entire apparatus as you reassemble it. Follow the Inspection Instructions.
  5. Thoroughly dry the facepiece and regulator after cleaning and disinfecting. The facepiece can trap water, which could enter the regulator.



# INSPECTION

## INSPECTION

Inspect the entire SCBA after it is cleaned and disinfected. NFPA-1500, as well as 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 MMR User's Maintenance Instructions P/N 817372.

### WARNING

**If any of the following inspections do not function properly, the apparatus must be removed from service. Failure to follow this precaution can result in serious personal injury or death.**

### WARNING

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

### Component Inspection (After Each Use and Monthly)

1. Don the air mask following the instruction procedures. These steps make up the Air Mask Functional Test.
  2. If all steps are performed successfully, remove the air mask and inspect it following the steps below.
  3. Facepiece
    - a. Inspect the facepiece for rubber deterioration, dirt, cracks, tears, holes, or tackiness.
    - b. Check the harness headstraps for breaks, loss of elasticity, or missing buckles or straps. Check the strap serrations for signs of wear.
    - c. Inspect the lens for cracks, scratches, and a tight seal with the facepiece rubber.
    - d. The exhalation valve must be clean and operate easily. The valve must move off the seat and return when released.
    - e. Inspect the facepiece coupling for damage. Also check to be sure the spider gasket, O-ring, and valve disc are present.
  4. Cylinder and Redundant Alarm Gauges
    - a. Be sure you can see both gauge needles and face clearly through the lens. Also be sure the gauge stem is not bent.
    - b. Inspect the gauge hose for any visible damage.
  5. Audible Alarm
    - a. Check that the bell is in the proper alignment and on tightly.
    - b. If the bell is loose, remove the alarm from service.
    - c. Unscrew the Audi-Larm coupling nut from the cylinder valve. Inspect the coupling nut for thread damage. Also be sure there is an O-ring, and that it is not damaged. It is hand-tightened and should not require tools. Replace the insert O-ring if it is damaged.
  6. Redundant Alarm/Pressure Gauge
    - a. Inspect alarm for deterioration, dirt, or cracks in lens or case.
  7. High Pressure Hose  
Check the high pressure hose between the alarm and the first stage regulator. Look for cuts or severe abrasions. If present, replace the hose. The hose fitting should be tight.
  8. Cylinder  
Breathing apparatus cylinders should be recharged as soon as possible after use. Cylinders should not be stored partially charged for two reasons:
    - If used without recharge, the service life of the apparatus is reduced.
    - The cylinder burst disc vents excess pressure if a full cylinder is over exposed to fire or heat. If the cylinder is not full, it may be damaged before the burst disc vents.
- Note:** ANSI Z88.5 recommends checking cylinder pressure weekly. For maximum safety the cylinders should be stored full or empty (pressure above ambient but less than 100psig).
- a. If the cylinder is less than FULL, recharge it before storing it. Cylinder air must be at least CGA quality (Grade D) respirable air.
  - b. Inspect the cylinder valve for signs of damage. The valve may be opened slightly to be sure it operates properly. Be sure to fully close the valve.
  - c. Inspect the cylinder body for cracks, dents, weakened areas, corrosive agents causing the fibers to break or peel, or signs of heat-related damage. If the cylinder is damaged return it to an MSA Service Center. Call 1-800-MSA-2222 for instructions.
  - d. Check the hydrostatic test date on the cylinder approval sticker located on the cylinder neck. Composite cylinders must be tested every three years. Steel cylinders must be tested every five years.
9. Harness
    - a. Inspect all harness components for cuts, tears, abrasions, or signs of heat or chemical-related damage. Check that the tee nuts, washers, and screws, if any, are secure.
  10. Carrier
    - b. Inspect the cylinder band and latch to be sure it holds the cylinder securely. Operate the latch wing to be sure that it opens and closes properly and that it holds the cylinder securely. If the cylinder band and latch is locked, the latch wing should not turn.
    - c. Inspect back plate for cracks, weakened areas, or signs of heat or chemical-related damage.

# INSPECTION

## 11. Record Keeping

Following inspection, the date and initials of the designated person should be recorded on an inspection tag. A more detailed record of the operations performed can be noted on an inspection and maintenance log. Inspection tags and inspection and maintenance logs are available from MSA. When the inspection data has been recorded, the breathing apparatus is stored in a ready position.



# FUNCTIONAL CHECKS

## PERFORM THE FOLLOWING FUNCTIONAL CHECKS AFTER EACH USE AND MONTHLY

### **▲ WARNING**

**If the SCBA fails to perform properly when conducting any of the following Functional Checks, do not use it. The condition must be corrected by an MSA trained and certified repairperson. The SCBA must perform for all functional checks before using it. Failure to follow this precaution may result in serious personal injury or death.**

1. Check that the regulator works properly. The regulator outlet should be sanitized before and after testing.
  - a. Check that the cylinder valve and shut-off button are closed and that the system is not pressurized.
  - b. Gently inhale through the regulator outlet and hold your breath for about 10 seconds. If the negative pressure is maintained, there is no leakage.
  - c. Gently exhale through the regulator outlet for about 10 seconds. If the positive pressure is maintained, there is no leakage.
  - d. Do not use the apparatus if air flow through the regulator is detected in either test. Return the regulator to a certified repairperson.
2. Inspect the shut-off button and bypass valve.
  - a. With the regulator pressurized, operate each valve to be sure it operates. Venting of pressure relief valves (or a continuing flow of air through the regulator when the user is not inhaling) indicates that the regulator needs to be repaired.
  - b. Listen to the regulator. Any unusual sounds, such as whistling, chattering, clicking, or rattling mean that the regulator should be checked further.
  - c. If any of these symptoms occur, the apparatus must be removed from service. Return the regulator to a certified repairperson.
3. Redundant Alarm and Audible Alarm
  - a. MSA recommends that the function of the Audi-Larm and Redundant Alarm warning device be checked by observing the regulator gauge pressure at which the alarms ring and tone. This test should be performed with a minimum cylinder pressure of 1,200psig for the low pressure air mask and 2,000psig for the high pressure air mask.
  - b. Pressurize the system by opening the cylinder valve for a moment, then close it. The alarms should ring and tone, indicating they are "cocked."

- c. Open bypass slowly.
- d. Watch the drop in pressure on the redundant alarm gauge and the point at which the Audi-Larm begins to ring and the redundant alarm begins to tone. Nominal gauge readings at which the alarm should start to ring and tone are:

530psig - nominal (low pressure system)

1175psig - nominal (high pressure system)

- e. The alarm should continue until the air pressure is approximately 200psig or less. If the Audi-Larm or Redundant Alarm does not function properly, the apparatus must be removed from service.
4. Test Mode of Redundant Alarm only verifies functioning audible and visible alarm indicators. Also checks battery voltage. Accessed from Sleep Mode by pressing alarm switch 3 times in rapid succession. Switches to low battery alarm if battery voltage is low. Test Mode is not available during a low pressure alarm. See Redundant Alarm Operations Chart.
  5. Audi-Larm Body
    - a. Check that the bell is on tightly and is in the proper alignment.
    - b. Close the cylinder valve completely. Be sure that nothing blocks the regulator outlet.

### **▲ WARNING**

**Do not disconnect the Audi-Larm coupling nut when pressure is shown on the regulator gauge. Release all pressure from the regulator by opening the bypass valve. Removing the coupling nut with the regulator pressurized may result in serious personal injury, death, or damage to equipment.**

- c. Open the bypass valve slowly to release trapped air. Close bypass valve.
- d. Unscrew the Audi-Larm coupling nut from the cylinder valve. It is hand-tight and should not require tools.
- e. Inspect the coupling nut for thread. Also be sure there is an O-ring and that it is not damaged.
- f. Replace the O-ring if it is damaged.

### **Monthly Inspection**

Check the hydrostatic test date on the cylinder approval sticker located on the cylinder neck. The cylinder must be tested every 3 years for composite or carbon fiber cylinders; 5 years for steel and aluminum cylinders.



# FLOW TEST AND OVERHAUL REQUIREMENTS

## FLOW TEST AND OVERHAUL REQUIREMENTS

Your SCBA Regulator and Audi-Larm Alarm Assembly must be flow tested and overhauled at specific time intervals. These Maintenance Procedures must be performed by a trained repairperson or at a Certified Service Center. Contact your MSA sales representative or call the MSA Customer Service Center at 1-877-MSA-3473. They will supply the information you need to meet these requirements.

The required replacement/overhaul schedule for self-contained breathing apparatus from MSA is based on apparatus usage on an individual basis. The frequency required for SCBA overhaul depends upon how often the apparatus is used. MSA breathing apparatus must be overhauled based on the actual level of usage of the SCBA, rather than on time alone.

Overhaul is covered in the Regulator and Audi-Larm Disassembly and Repair sections and includes installation of the Regulator and Audi-Larm overhaul kits.

MSA breathing apparatus must be flow tested every year using an MSA approved flow test device. The following table summarizes MSA's required frequency for overhaul and flow testing:

Average SCBA Usage*	Recommended Overhaul Frequency	Recommended Flow Test Frequency
1 cylinder per day or greater	Every 3 years	Every year
1 cylinder every other day	Every 8 years	Every year
1 cylinder per week or less	Every 15 years	Every year

A decision to retire apparatus should be based on a SCBA's performance data and whether that data meets the specified level of performance as defined in maintenance requirements from MSA.

\*The unit of SCBA use is defined as the consumption of one 30 min. cylinder of air. Example: If three cylinders of air are used, the SCBA would be considered to have been used three times.

If an assessment of the SCBA's usage can not be estimated or determined, then the SCBA shall be overhauled every three years.

Mine Safety Appliances Company

# SCBA Lifetime Warranty and Terms of Sale

1. **Express Warranty**—SCBA and/or components furnished under this order carry a Lifetime Warranty against material defects and/or faulty workmanship, with the exception of those components specifically identified herein. MSA shall be released from all obligations under this warranty in the event repairs or modifications are made by persons other than its own or authorized service personnel or if the warranty claim results from abuse, misuse, or normal wear and tear of the product. No agent, employee or representative of MSA may bind MSA to any

affirmation, representation or modification of the warranty concerning the goods sold under this contract. MSA makes no warranty concerning components or accessories not manufactured by MSA, but will pass on to the Purchaser all warranties of manufacturers of such components. *THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AND IS STRICTLY LIMITED TO THE TERMS HEREOF. MSA SPECIFICALLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.*

Product Description	Warranty Period	Routine Air Mask Maintenance
SCBA (less Cylinder)	Lifetime	MSA requires that the SCBA be maintained as specified in the Operations and Instructions Manual; however, the warranty coverage is for material defects and/or faulty workmanship only, and is not dependent on performing routine maintenance. The material and labor costs of overhaul procedures and other routine maintenance are the responsibility of the purchaser and are not covered by the warranty.
SCBA Cylinder	Until end of service life as controlled by gov't. reg/DOT	
SCBA Replacement Parts	Lifetime	
SCBA Critical Repair Parts	Lifetime	

2. **Exceptions**—The products below are excluded from MSA's Lifetime Warranty:

Product Description	Exception	Warranty Period
Facemask Blank, Breathing Tube, Harness, & Nose Cup	Rubber Product	5 Year Limited/Age Deterioration
Electronic Speech Communication	Manufacturer's Warranty	1 Year
ICM Unit		
Non-Rechargeable Batteries	Expendable and/or Consumable Parts	N/A

3. **Exclusive Remedy**—It is expressly agreed that the Purchaser's sole and exclusive remedy for breach of the above warranty, for any tortious conduct of MSA, or for any other cause of action, shall be the repair and/or replacement, at MSA's option, of any equipment or parts thereof, that after examination by MSA are

proven to be defective. Replacement equipment and/or parts will be provided at no cost to the Purchaser, F.O.B. Purchaser's named place of destination. Failure of MSA to successfully repair any nonconforming product shall not cause the remedy established hereby to fail of its essential purpose.

4. **Exclusion of Consequential Damages**—Purchaser specifically understands and agrees that under no circumstances will MSA be liable to Purchaser for economic, special, incidental, or consequential damages or losses of any kind whatsoever,

including but not limited to, loss of anticipated profits and any other loss caused by reason of the non-operation of the goods. This exclusion is applicable to claims for breach of warranty, tortious conduct or any other cause of action against MSA.



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