

Combination Breathing Apparatus

INSTRUCTIONS AND MAINTENANCE

Hip-Air™ Dual-Supply Hip-Air Combination Right-Side Combination Left-Side

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 Combination Breathing Apparatus 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.

NIOSH APPROVAL INFORMATION IS INCLUDED AS A SUPPLEMENT TO THESE INSTRUCTIONS.



Be Sure.
Choose MSA.

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

INTRODUCTION

TABLE OF CONTENTS

Introduction	2	Cleaning and Disinfecting	13
Niosh Approval Information	2	Inspection	15
Special Users Instructions	2	Function Test	16
Limitations for Use	2	Regulator Flow Testing.....	16
Description	3	Leak-Testing	16
Donning the Apparatus	7	Maintenance	19
Air-Tightness Test	7	General Notes	19
Final Hook-up	8	Repairs	21
Exit Operation	8	Regulator	21
Escape Operation	9	Cylinder	21
Doffing the Apparatus	9	Harness.....	22
Cold Weather Operation	11	Ultravue Facepiece	22
Refilling the Cylinder	11	UltraElite Facepiece.....	27

NIOSH 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 MSHA/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 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 Users Instructions, and/or maintenance manuals for information on use and maintenance of these respirators.

S- Special or critical Users Instructions and/or specific use limitations apply. Refer to user instructions before donning.

S - SPECIAL OR CRITICAL USER INSTRUCTIONS

1. Approved for respiratory protection during entry into and escape from oxygen deficient atmospheres, gases, and vapors when using the airline air supply.
2. Approved for escape only when using the self-contained air supply.
3. Approved for use at temperatures above -25°F. Below 32°F refer to the instructions for air-line disconnect dust cover use.
4. The cylinder shall meet applicable DOT specifications.
5. This approval applies only when the device is supplied with respirable air through 8 to 300 feet of air supply hose within the pressure range of 65 to 85 pounds per square inch gage or air from the self-contained air supply.

6. When using the air-line air supply, keep cylinder valve closed. If the supplied-air fails, open cylinder valve, disconnect air supply hose, and proceed to fresh air immediately.
7. Below 32°F add the nosecup to the facepiece.
8. 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, regardless of length, is considered 50 feet in length (max.: 6 sections)

LIMITATIONS FOR USE

WARNING

1. An adequate respiratory protection program must include knowledge of hazards, hazard assessment, selection of proper respiratory protective equipment, instruction and training in the use of equipment, inspection and maintenance of equipment, and medical surveillance. [See OSHA regulations, Title 29 CFR 1910.134, Subpart 1, Paragraph (b)(1)].
2. The program administrator and respirator users must read and understand these instructions before trying to use or service this product.
3. The combination breathing apparatus will perform as designed only if used and maintained according to these instructions.
4. This respirator may be used only after proper instruction and training in its use has been completed, as specified in OSHA regulations, Title 29 CFR 1910.134, Subpart 1, Paragraph (b) (3).
5. Unless equipped with the escape cylinder, the combination breathing apparatus **MUST NOT** be used and relied upon for respiratory protection when the atmosphere contains concentrations of contaminants which are unknown or IDLH.
6. Users must wear suitable protective clothing and take precautions so that the respirator is not worn in atmospheres that may be harmful to the device.
7. Do not alter, modify, or substitute any components

DESCRIPTION

without the approval of MSA. Such alterations may void the National Institute for Occupational Safety and Health (NIOSH) approval of the respirator.

8. Inspect the respirator regularly and maintain it according to the instructions. Repairs must be made only by properly trained personnel.
9. Use only with an air source that meets ANSI (Compressed Gas Association) specifications. The air delivered to the respirator's air-supply hose must be respirable and of a purity equal to at least Quality Verification Level (Grade) D Air of the Compressed Gas Association Commodity Specification for Air G-7.1-1989. Air pressure must be within the NIOSH approved ranges for the device.
10. Leave area immediately if: (a) breathing becomes difficult; (b) dizziness or other distress occurs; (c) you taste or smell contaminants.
11. Use strictly in accordance with instructions, labels and limitations pertaining to this device.
12. This device may not provide a satisfactory face seal with certain physical characteristics (such as beards or sideburns) as outlined in ANSI Z88.8 1969, resulting in leakage in connection with the facepiece, which voids or limits the protection. If such a condition exists, the user assumes all risks of death or serious bodily injury which may result.
13. Do not use the Combination breathing apparatus for firefighting.
14. Do not use the Combination breathing apparatus for underwater applications.
15. Thoroughly check out the respirator when received and before use.
16. Never alter or modify the respirator except as directed by MSA during installation of NIOSH approved kits. Use only MSA replacement parts. If other than the proper MSA parts are used, the NIOSH approval will be voided.
17. Do not use compressed oxygen with the Hip-Air breathing apparatus.
18. Use only the listed hose lengths and air-pressure range specified in these instructions.

DESCRIPTION

The Combination apparatus is a combination pressure-demand, air-line respirator and Escape type self-contained breathing apparatus (SCBA) certified by the National Institute for Occupational Safety and Health (NIOSH). NIOSH approval allows the wearer to:

- enter and work in an IDLH atmosphere using an air-line air source
- work within the area for an extended time using air from the air-supply hose;
- exit from the area using the air cylinder;
- escape from a dangerous area using the air cylinder.

The air cylinder is not approved for use as an entry device.

⚠ WARNING

Do not use the air cylinder for entry into the work area. This cylinder is designed for exiting an area or for escape only. The cylinder capacity is five minutes. Failure to follow this precaution can result in serious personal injury or death.

The Combination apparatus consists of the following sub-assemblies:

- facepiece and breathing tube
- carrier and harness
- pressure demand regulator
- air cylinder and valve
- appropriate section(s) of approved air-supply hose

Facepiece and Breathing Tube

The Combination apparatus is available with either the Ultra Elite or Ultravue pressure-demand facepieces. Facepieces materials available are rubber or silicone. Facepieces are available in small, medium, or large.

The breathing tube carries air from the regulator to the facepiece. The regulator end of the tube has a plastic nut and a black plastic insert to guide the coupling nut into the regulator outlet. The facepiece end of the breathing tube has a plastic threaded insert to match the facepiece coupling nut.

Facepiece Accessories

The following accessories are available for use with the UltraElite facepiece:

Nosecup Kit is used with the Ultra Elite facepiece to reduce lens fogging caused by high humidity or temperatures below 32°F. See the chart below for part numbers and sizes.

Ultra Elite Facepiece Nosecup Assemblies
495188 Medium, Black
495189 Large, Black

Ultra Elite Facepiece Air Baffle Assemblies
805018 Gray

Ultra Elite Facepiece Spectacle Kit

The spectacle kit is designed to be used by people who wear glasses. The temple bars of conventional glasses stick through the sealing edge of a full facepiece and prevent a proper seal. The kit includes the support assembly, a rubber block, and the spectacle frame. Prescription lenses can be obtained locally or through MSA.

DESCRIPTION

Ultra Elite Facepiece Speed-On™ Facepiece Harness Kit

The following accessories are available for use with the **Ultravue** facepiece:

Nosecup Kit is required if the apparatus is used in temperatures below 32 degrees to reduce lens fogging. The Nosecup Kit is available in three sizes. See the installation instructions.

Spectacle Kit (P/N 454819) includes the support assembly, frame guide, and the spectacle frame. Prescription lenses can be obtained locally or through MSA. See the installation instructions.

Speed-On Facepiece Harness Kit may be used in place of the standard rubber headstrap harness on the Ultravue facepiece. The harness is made of flame and heat resistant (FHR).

Carrier and Harness Assembly

The carrier consists of a backplate, a cylinder band and latch assembly to hold the cylinder, and a harness assembly, consisting of shoulder strap, and a waist-strap.

Pressure-Demand Regulator

A hose delivers air from the first stage regulator to the belt-mounted pressure-demand regulator. This regulator follows the user's demand for air. Air from the first stage provides a uniform pressure to the pressure demand regulator admission valve. The admission valve "senses" the user's respiration and opens and closes accordingly to supply breathable air at the user's flow rate.

First-Stage Regulator

A first-stage regulator reduces cylinder pressure to pressure suitable for the pressure demand regulator. This regulator mounts to the cylinder at the coupling air nut.

Air Cylinder and Valve

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

The cylinders are intended to be filled to 2216, 2310 and 3000 psig, depending on the label on the cylinder. Service life is rated at 5-minute service. The pressure gauge continuously shows the air pressure in the cylinder. A hand-wheel is used to open or close the cylinder valve.

Air-Line (approved air-supply hose)

The Combination apparatus can be used with a wide range of MSA air-supply hoses, which can be interconnected up to a maximum length of 300 feet. A maximum of 12 sections of air-supply hose may be used in making up the maximum working length of hose. The coiled hoses are considered to be the indicated length, although the useable lengths are indicated. (Maximum of one section of 8, 15, or 25 ft. of coiled hose or 6 sections of 50 ft. coiled hoses). MSA also offers an inlet pressure-gauge

assembly that enables a user to check pressure at the inlet of the MSA air-supply hose, thus assuring that the air pressure is within the NIOSH approved range. The gauge is supplied with quick-disconnect fittings to accommodate your particular air-line system.

Note: All air-supply hoses listed below are 3/8" in diameter (hose ID).

The following air-supply hoses from MSA may be used:

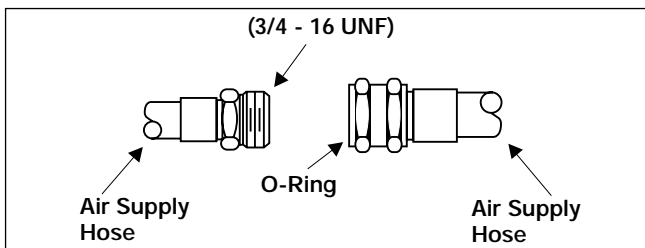
P/N 481051	.....8 ft.	.....Polyvinyl chloride (PVC)
P/N 481071	.....8 ft.	.....Neoprene
P/N 474043	.....50 ft.	.....Nylon (coiled)
P/N 471511	.....15 ft.	.....Polyvinyl chloride (PVC)
P/N 471512	.....25 ft.	.....Polyvinyl chloride (PVC)
P/N 471513	.....50 ft.	.....Polyvinyl chloride (PVC)
P/N 455020	.....15 ft.	.....Neoprene
P/N 455021	.....25 ft.	.....Neoprene
P/N 455022	.....50 ft.	.....Neoprene

⚠ CAUTION

MSA air-supply hoses have various temperature limitations. Do not use when inlet-air temperatures exceed the limits specified for each hose material.

HOSE MATERIAL	RECOMMENDED TEMP. LIMITS
Polyvinyl Chloride	32° F/120° F
Neoprene	-25° F/212° F
Nylon	0° F/160° F

The following threaded connector assembly can be used to interconnect sections of approved air-supply hose.



⚠ WARNING

Check all hose connections to be sure fittings are secure. This must be done to ensure a continuous flow of air. Failure to follow this precaution may result in serious personal injury or death.

⚠ CAUTION

Hoses must be interconnected only with either the threaded connector (3/4-16 UNF) or the locking-type quick-disconnects listed. Do not use non-locking quick-disconnects to interconnect air-supply hoses.

DESCRIPTION

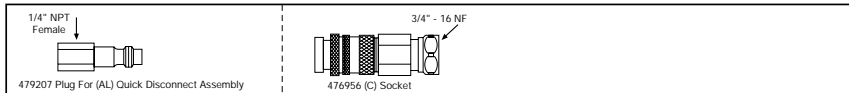
Quick-disconnects for Use with Combination Apparatus

Quick-disconnect assemblies that can be used with the apparatus are shown below. Quick-disconnects are required to connect air-supply hoses to the apparatus and to the air source.

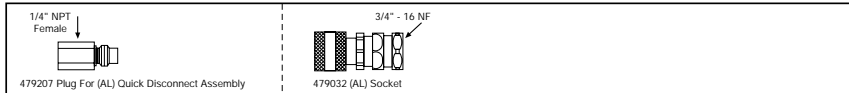
Locking quick-disconnect assemblies that can be used to interconnect air-supply hoses. To connect locking quick-disconnects, push the plug and socket together until they snap in place. To separate, first push the plug and socket together; then, retract the sleeve from the plug.

LOCKING TYPES

CEJN — Chrome (C)



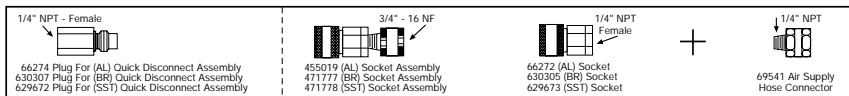
SNAP-TITE — Aluminum (AL)



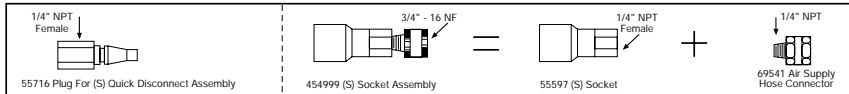
NON-LOCKING TYPES

SNAP-TITE — Aluminum (AL) Brass (BR)

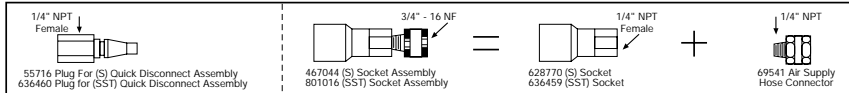
Stainless Steel (SST)



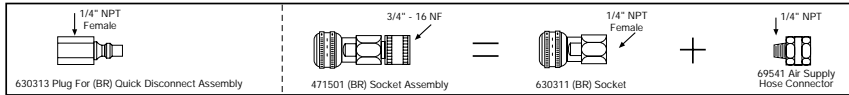
SCHRADER — Steel (S)



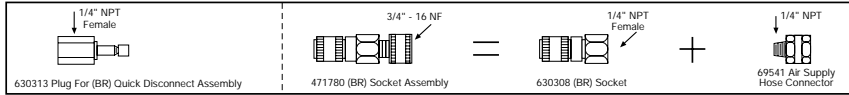
FOSTER — Steel (S) Stainless Steel (SST)



HANSEN — Brass (BR)

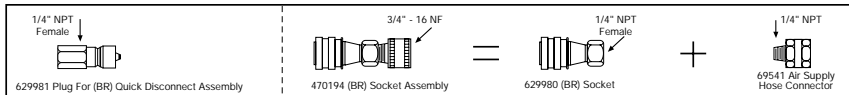


DUFF-NORTON — Brass (BR)

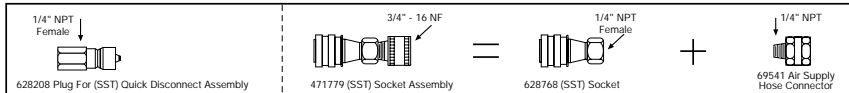


NON-LOCKING TYPES — WITH CHECK VALVE IN PLUG

FOSTER — Brass (BR)



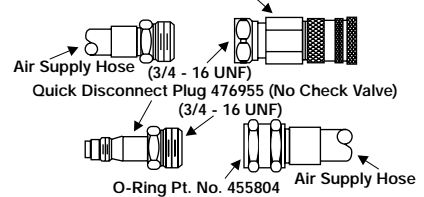
HANSEN — Stainless Steel (SST)



CEJN Chrome ©

Socket and Plug Assembly 479009

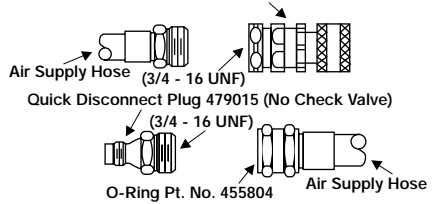
Quick Disconnect Socket with Check Valve 476956



SNAP-TITE Aluminum (AL)

Socket and Plug Assembly 479010

Quick Disconnect Socket with Check Valve 479032



Interconnecting Air-Supply Hoses

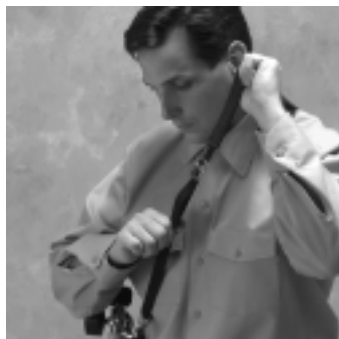
MSA air-supply hoses can be interconnected up to a maximum length of 300 feet without voiding the NIOSH approval of the device. Locking quick-disconnects easily connect by pushing the plug and socket together. To separate, the plug and socket must first be pushed together and then the sleeve retracted from the plug. Up to 12 sections of hose can be used to make up the maximum working length of hose. MSA offers both threaded and locking-type quick-disconnects to interconnect hoses.

DONNING THE APPARATUS

DONNING THE APPARATUS

1. Remove the apparatus from its carrying case or container. Place the facepiece and breathing tube out of the way to keep them clean.
2. Check the pressure reading on the cylinder gauge. The gauge should show the pressure listed on the cylinder label.
3. Don the cylinder, carrier, and harness:

- a. Grasp the shoulder harness and place it over your head and on your left shoulder.



- b. Fasten the seat-belt type buckle on the waist-strap and pull the waist-strap tight for a snug fit.
- c. Adjust the shoulder harness slide to the desired position.

4. Don 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.

- a. Attach the breathing tube to the facepiece coupling nut, hand-tighten.
- b. Loosen the harness head straps on the facepiece so the end-tabs are at the buckles.

- c. Hold the facepiece by the straps and put your chin in first.



- d. Then, pull the harness back over your head.



- e. 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.



- f. Push the headband pad towards the neck and repeat step. 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.

5. To Use the Speed-On Harness

- a. Loosen the neck straps so the end-tabs are at the buckles.
- b. Insert your chin into the facepiece.
- c. Pull the harness "net" over the crown of your head.
- d. Tighten the neck straps. There are no temple or front strap adjustments. Tuck in the straps so that they lay flat across the head.

FACEPIECE FIT CHECK

The Facepiece Fit Check must be performed each time the facepiece is donned. You must know the face-to-facepiece seal is good before you enter any hazardous area. To do this:

1. Block off the breathing tube with either the palm of your hand, or by placing your thumb over the opening inside the breathing tube coupling nut.



DONNING

2. Breathe in and hold your breath for 10 seconds. If the seal is good, the facepiece will collapse and remain collapsed against your face.



3. If the facepiece does not remain collapsed, or you notice any leakage, readjust the straps and test again. If this does not correct the leak, do not use the facepiece.
4. Test the exhalation valve by exhaling. If the valve is stuck, you will feel a heavy rush of air around the facepiece. You may need a sharp exhalation at first to "crack" 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. A facepiece that does not seal adequately may allow contaminated air to leak into the facepiece, reducing or eliminating respiratory protection. If such conditions exist the user assumes all risks of respiratory injury or death which may result. The face-to-facepiece seal must be tested before each use.

FINAL HOOK-UP

1. Turn the air source ON.

2. Connect the air-supply hose to the regulator quick-disconnect. Listen for the "click" as the quick-disconnect snaps in place.



Pull on the hose to be sure it is attached securely. Air should flow immediately from the regulator outlet. Check that the air-line operating pressure is within the NIOSH approved range of 65-85 psig.

3. Connect the breathing tube to the regulator. Air should flow through the pressure demand regulator, through the breathing tube and into the facepiece. You should be able to breathe normally. Pull firmly on the breathing tube to be sure the regulator connection is secure. The regulator should follow your breathing pattern and supply air only during inhalation.
4. If the unit checks out, you are ready to enter the work area connected to the air source. 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.

EXIT OPERATION

Return to an area which does not require respiratory protection before removing the respirator. The Hip-Air respirator may be used as an escape device when you want to leave the work area without using the air-supply hose.

WARNING

Remain connected to the air-supply hose until you are ready to return to an area which does not require respiratory protection. This cylinder is designed for exiting an area or for escape only. The cylinder capacity is five minutes. Failure to follow this precaution can result in serious personal injury or death.

1. Open the cylinder valve fully.
2. Disconnect the air-supply hose at the regulator quick-disconnect. Air flow from the cylinder will start immediately.

WARNING

Contaminants can enter an air-line respirator system when air-supply hoses are disconnected and/ or reconnected in a contaminated atmosphere. The user must determine the potential risk and take the necessary precautions, which may require that NO disconnection or reconnection of air-supply hoses is permitted in a contaminated atmosphere. If in doubt, DO NOT disconnect and/or reconnect. Failure to follow this precaution may result in serious personal injury or death.

3. Return immediately to an area which does not require respiratory protection.

ESCAPE OPERATION / DOFFING

ESCAPE OPERATION

You must know what to do automatically if the air-line air source fails. To switch from the air-line (air-supply hose) to the escape cylinder:

1. Open the cylinder valve fully.
2. Disconnect the air-line.
3. Return immediately to an area which does not require respiratory protection.

DOFFING THE APPARATUS

Return to an area which does not require respiratory protection before removing the respirator. Remain connected to the air-supply hose until you reach this area.

▲ CAUTION

If a decontamination procedure (created by a certified health and/or safety professional) has been established for the application in which this respirator is used, that procedure should take precedence.

▲ WARNING

If you are working in a contaminated atmosphere, or if you are exposed to contaminants while in the work area, take the proper precautions to decontaminate the facepiece and head area before doffing the facepiece. You must determine the potential risk and take the necessary precautions. Failure to follow this precaution can result in serious personal injury or death.

1. Disconnect the breathing tube from the regulator outlet.
2. To loosen the facepiece harness, insert your thumbs under each of the harness buckles.



3. Lift and pull the release tabs away from your face to fully extend the harness.



4. Pull the facepiece up and away from your face.

5. Turn the air source OFF.
6. Disconnect the air-line at the regulator quick-disconnect.
7. Disconnect the seat-belt type waist-strap buckle.
8. Grasp the shoulder harness and lift it over your head.
9. Follow the steps in ConfidencePlus® Cleaning Solution.
10. Follow the steps in Inspection.
11. Follow the appropriate storage instructions.

COLD WEATHER OPERATION

SUGGESTED PROCEDURES FOR COLD WEATHER OPERATION

Water can cause problems in breathing apparatus if it freezes. Although most likely to occur in cold weather, moisture can freeze even if the surrounding air is above freezing. Air pressure drops rapidly from cylinder pressure to nearly atmospheric as it flows from the cylinder through the regulator. As its pressure drops, the air expands and gets colder. The surrounding air may be above freezing, but the temperature inside the regulator may be lower. Moisture inside may freeze and reduce air flow.

1. To prevent moisture from entering the regulator, keep the breathing tube connected. If it is disconnected, cover the regulator immediately with a rubber outlet cover.
2. When the apparatus is away from heat, water spray can freeze on the regulator surface. Ice can build up and cover the cap vent holes. If they are completely blocked, the regulator will not operate. Before entering or re-entering a hazardous atmosphere, make sure the vent holes are open and that the regulator is ice-free and operating properly.
3. Water can collect on the cylinder valve and coupling nut when cylinders are changed. Water can contaminate the system or freeze the coupling nut to the cylinder valve. Remove ice on these fittings. Dry the coupling nut and cylinder valve before unthreading them.
4. CGA Specification G-7.1-1989 requires cylinder air to be a minimum of quality verification level (Grade D) gaseous air. This requires that the air must have a water vapor concentration of less than 25 ppm. Tests show that when air with a low moisture content (less than 25 ppm) is used, the apparatus performs well at the NIOSH approved - 25 degree F surrounding temperature. Low dew point air also prevents cylinder corrosion.
5. NIOSH certification requires a nosecup at temperatures below 32 degrees F. The nosecup reduces lens fogging and must be used whenever freezing conditions are encountered.
6. Thoroughly dry the facepiece and regulator after cleaning and disinfecting. The facepiece can trap water, which could enter the regulator.
7. During cleaning and disinfecting, disconnect the regulator from the facepiece before cleaning.

REFILLING THE CYLINDER

The cylinder is intended to be filled to 2216, 2310 psig or 3000 psig, on the cylinder label. The pressure gauge continuously shows the air pressure in the cylinder.

⚠ WARNING

Do not loosen the first-stage regulator coupling nut with the cylinder valve open. Close the cylinder valve. Disconnect the air-supply hose from the regulator quick-disconnect. Be sure nothing blocks the regulator outlet. Wait until all first-stage regulator and hose pressure is relieved. Failure to follow these precautions can result in serious personal injury or death.

1. To remove the cylinder for recharging, disconnect the regulator coupling nut from the cylinder valve using the open-end wrench provided with the apparatus and remove the regulator.



2. Recharge the cylinder to its specified service pressure and reassemble by attaching the regulator coupling nut to the cylinder valve and pulling up firmly with an even motion of the open-end wrench.
3. Insert full cylinder in its carrier and tighten the wing nut.

CLEANING AND DISINFECTING

CLEANING AND DISINFECTING

Depending on the cleaning policy adopted, either a designated person or the user should clean the apparatus after each use. ANSI standards suggest that users should be trained in the cleaning procedure. ConfidencePlus® Cleaning Solution (P/N 10009971) from MSA is recommended. It cleans and disinfects in one operation.

Note: If ConfidencePlus Cleaning Solution is not used, the parts should be washed in a mild cleaning solution and rinsed thoroughly. The facepiece is then submerged in a germicide solution for the time recommended by the manufacturer (usually about two minutes), and then thoroughly rinsed in clean water. Dry thoroughly.

CAUTION

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

1. Remove the breathing tube from the facepiece. DO NOT lose the gasket inside the breathing tube coupling nut.
2. Thoroughly wash the facepiece in the ConfidencePlus Cleaning Solution. A soft brush or sponge can be used to clean the soiled facepiece.
3. Rinse the facepiece thoroughly inside and out in plain warm water (Maximum 110° F). Thoroughly dry the facepiece.

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.

4. Use rubber stopper (P/N 50998) to close both ends of the breathing tube. Thoroughly wash the outside of the breathing tube in ConfidencePlus Cleaning Solution. Thoroughly rinse the outside of the breathing tube with plain warm water (Maximum 110° F).

Note: The inside of the breathing tube should be cleaned and disinfected annually or as needed to remove any contaminant from inside it. If washing the inside of breathing tube, use ConfidencePlus Cleaning Solution. Thoroughly rinse inside of breathing tube in plain warm water (Maximum 110° F). If not rinsed thoroughly, the residue of cleaning agents may irritate the wearer's skin.

5. Stretch the breathing tube slightly to remove water from the corrugations (inside or outside). Hang it up to dry thoroughly inside and outside.

Note: Do not force-dry the parts by placing them near a heater or in direct sunlight, the rubber will deteriorate.

6. To clean the pressure demand exhalation valve (long disc stem), open the valve by pressing in on the stem, and flush the valve with clean water. Air-dry the exhalation valve thoroughly. Do not exceed 120 degrees F.
7. Clean the harness assembly. A mild soap or commercial cleaning detergent should be used on the harness.
 - a. Wipe off all surface dirt with a sponge dampened (not soaking) with water.
 - b. Wipe dry with a clean cloth.
 - c. Let the harness air-dry.
8. The foam-lined carrying case should be cleaned. Wipe the inside of the case with solution.
9. Inspect the entire apparatus as you reassemble it. See Inspection Procedures.
10. Thoroughly dry the facepiece and regulator after cleaning and disinfecting.

INSPECTION

INSPECTION PROCEDURES

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.

⚠ WARNING

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

Do not loosen the first-stage regulator coupling nut with the cylinder valve open. Close the cylinder valve. Disconnect the air-supply hose from the regulator quick-disconnect. Be sure nothing blocks the regulator outlet. Wait until all first-stage regulator and hose pressure is relieved. Failure to follow these precautions can result in serious personal injury or death.

COMPONENTS AND INSPECTION CHECK POINTS (After each use and monthly)

Inspect the apparatus following the steps below:

Facepiece

1. Inspect the facepiece for rubber deterioration, dirt, cracks, tears, holes, or tackiness.
2. Check the harness headstraps for breaks, loss of elasticity, missing buckles or straps. Check the strap serrations for signs of wear.
3. Inspect the lens for cracks, scratches, and a tight seal with the facepiece rubber.
4. Check that the exhalation valve is clean and operates easily. Reach into the facepiece. Push and release the valve stem several times. The valve must move off the seat and return when released.
5. Inspect the exhalation valve spring. Make sure it is seated and centered in the exhalation valve.
6. Inspect the facepiece coupling nut for damaged threads.
7. Check that the gasket is present and not damaged. Look closely for tears, gouges, signs of wear or other damage).

Breathing Tube

1. Inspect the entire breathing tube closely for cracks, tears, cuts, perforations, and any deterioration or other signs of wear. If any of these conditions exist, the breathing tube must be removed from service and replaced.

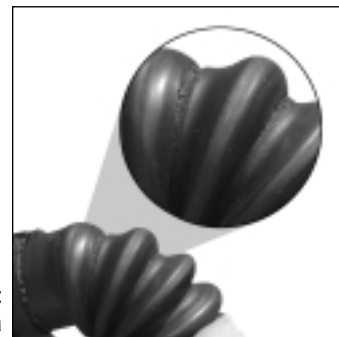
The following additional inspection points should be followed closely.

- a. Closely examine the base and crest of each corrugation, especially the first several corrugations at each end of the breathing tube. Due to the added flexing of the end corrugations, they can be exposed to more wear than the middle corrugations.

- b. The molding process used to make the breathing tube leaves a mark along the base of each corrugation. The marks are rough in appearance when compared to the smooth surface on the remainder of the tube. These marks are acceptable; however, examine them closely to make sure there are no cracks, tears, cuts, perforations, any deterioration or other signs of wear in the areas where these marks are located. See the figures for additional clarification.



Acceptable Breathing Tube



Deteriorating Breathing Tube

2. Check the breathing tube for leaks as follows:
 - Close one end with a solid rubber stopper (P/N 50998).
 - Close the other end with a rubber stopper which has a 1/8 inch hole in it (P/N 630386).
 - Stretch the breathing tube 10-12 inches beyond its normal length and cover the hole in the stopper with your finger.
 - With the hole still covered, release the tension on the breathing tube. The air inside the tube will compress to about 3 psi.
 - Submerge the breathing tube in water. Bubbles will indicate leaks.

Replace the breathing tube should it exhibit any of the above inspection conditions or if it leaks.

Cylinder and Gauge

Note: ANSI Z88.5 recommends checking cylinder pressure weekly. 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.

INSPECTION

1. Be sure that the gauge needle and the gauge face are visible and not bent.
2. Inspect the cylinder body for cracks, dents, weakened areas, or signs of chemical- or heat-related damage.
3. Inspect the cylinder valve for signs of damage. The valve may be opened slightly to be sure it operates properly. Be sure to close the valve fully.
4. Check the hydrostatic test date on the cylinder located on the cylinder neck:
 - a. Composite cylinders must be tested every three years
 - b. Steel cylinders must be tested every five years.
5. Check that the cylinder gauge reads full pressure.
6. Check that the regulator coupling nut is secure.

Second-Stage Regulator

1. Check the diaphragm cap:
 - a. Be sure that the diaphragm cap is hand-tight.
 - b. Check that the cap is not dented or deformed.
 - c. Be sure that the small air holes around the outer edge of the cap are not blocked.



2. Check the regulator outlet. Look for stripped or damaged threads.

Carrier

1. Inspect the harness straps, pads, brackets, buckles and tee-nuts. Check that they are secure and do not show signs of heat- or chemical-related damage.



2. Check that the cylinder band and clamp are not damaged and that they hold the cylinder securely.

3. Check the metal components and brackets. Look for cracks or splits which may indicate metal fatigue.
4. Check the straps and pads for cuts, tears, or abrasion. Work the straps through the buckles several times to be sure that they operate properly.

Hose and Fittings

1. Check the hose for cuts, severe abrasions, or damage. If present, replace the hose.
2. Check the fittings. They should be tight and not turn by hand.

Following inspection you should perform the apparatus Function Test below.

FUNCTION TEST

The steps below make up the apparatus Functional Test.

1. Don the apparatus following the Donning instructions.
2. Perform the Test for Tightness.
3. With the apparatus donned (facepiece; carrier, cylinder, and harness; and pressure-demand regulator):
 - a. Turn the air source ON.
 - b. Connect the air-supply hose to the pressure demand regulator. Air flow should start immediately.
 - c. Connect the breathing tube to the regulator outlet.
 - d. Breathe on the apparatus to be sure that the pressure-demand regulator supplies air to the facepiece, and that the air flow follows your breathing (flows when you inhale; stops when you hold your breath).
 - e. Check that the cylinder gauge reads the appropriate value for a full cylinder.

If the Function Test steps are performed successfully, the apparatus is ready for use.

REGULATOR FLOW TESTING

MSA recommends that you Flow Test the regulator annually. This must be done by a trained repair-person or a certified repair center.

LEAK-TESTING PROCEDURES

The apparatus must "hold" system pressure without leaks to provide adequate protection. Perform the apparatus Function Test (see Inspection Procedures) as a first step in trouble-shooting. Perform the following component leak-tests to be sure you do not have a slow leak. Leak-testing quickly identifies components which need repair or replacement. Use P/N 600920 leak-test solution, or prepare a soapy water solution. Be sure to use enough soap to produce bubbles.

Note: Many procedures include the statement "remove the component from service." This means that no further maintenance is possible. If a leak is detected, remove the unit from service and return the component to a repair-person, or to a certified service center for the appropriate repair.

INSPECTION

WARNING

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

Do not disconnect the coupling nut before relieving system pressure. Relieve all pressure by closing the cylinder valve and disconnecting the air-line source. Removing the coupling nut with the regulator pressurized may result in serious personnel injury or death or damage to equipment.

Do not tighten fittings or connectors when the system is pressurized; fittings or connectors can rupture. Close the cylinder valve, then disconnect the air-line source to relieve all pressure.

Failure to follow these precautions can result in serious personal injury or death.

LEAK-TESTING THE CYLINDER VALVE

Note: The cylinder must be disconnected from the apparatus to perform this test.

Outlet Port

1. Ensure that the cylinder valve handwheel is completely closed.

2. Draw a bubble of leak-test solution across the outlet port.



3. If the bubble expands, there is an air leak through the valve and the cylinder must be taken out of service.

Pressure Gauge

1. Remove the rubber gauge guard.
2. Apply leak-test solution to the pressure gauge stem, cover, and bezel.
3. If a bubble appears, remove the cylinder from service. The pressure gauge must be replaced.

Cylinder Neck

1. Apply leak-test solution to the cylinder neck.
2. If bubbles appear, remove the cylinder from service.

Cylinder Handwheel and Safety Plug

1. Apply leak-test solution to the cylinder handwheel and safety plug.



2. If bubbles appear, remove the cylinder from service. The valve must be repaired.

Leak-Testing the Complete Apparatus

1. Unscrew the regulator cap and remove the spring and diaphragm. Also, remove the breathing tube from the regulator.
2. Connect the coupling nut to the cylinder and tighten. Open the cylinder valve.
3. Coupling Nut Leak-Test

- a. Apply leak-test solution to the front and back of the coupling nut.



- b. If bubbles appear, relieve pressure and further tighten the air coupling nut.
- c. Re-apply leak-test solution.
- d. Continuation of bubbles indicates a leak. Close the cylinder valve, relieve the system pressure, and remove the apparatus from service.

Regulator Body (High Pressure Regulator) Leak-Test

1. Apply leak-test solution to the pipe threads on the other side of the coupling nut (the side that threads into the regulator housing).

2. Apply leak-test solution where the elbow threads into the regulator.



INSPECTION

3. Apply leak-test solution around the joint at the top of the regulator.
4. If leaks appear at any of these places, remove the regulator from service.

Hose Assembly Leak-Test

1. Apply leak-test solution to both hose end-fittings.
2. Apply leak test solution to all joints at the lateral pipe fitting, check valve, elbows, and quick-disconnect plugs.
3. If leaks appear at these places, remove the hose from service.

Regulator (Low Pressure) Admission Valve Leak-Test

1. Draw a bubble over the regulator outlet. Place a finger over the aspirator holes. Do not depress the lever arms.



2. The bubble must not expand or burst for at least 15 seconds. A leak indicates that the admission valve must be replaced. Remove the regulator from service.

Air-Line Inlet Leak-Test (Quick-Disconnect Plug)

1. Apply leak-test solution across the ends of the quick-disconnect plugs. If bubbles appear, the quick-disconnect check valve is leaking. Remove the regulator from service.



Reassemble the regulator cap, spring and diaphragm

1. Check that the lever assembly is positioned correctly: Small arm on top.
2. Hold the regulator cap and place the spring in the hub. Place the diaphragm hub on top of the spring.
3. Press the diaphragm ring into the cap. Insert the assembly and screw the cap into the regulator body and hand-tighten.

Breathing Tube Leak-Test

1. Stretch the breathing tube 10-12 inches beyond its normal length.
2. Connect the ends of the tube and thread hand-tight.
3. Slowly release the tension on the breathing tube. The air inside the breathing tube will compress to about 3 psi.
4. Submerge the breathing tube in water. Bubbles will indicate leaks. If the breathing tube has a leak remove it from service.

Regulator Diaphragm Leak-Test

1. Check that the diaphragm works properly. The regulator outlet should be cleaned and disinfected before and after testing.
2. Check that the cylinder valve is closed, the air-line source disconnected, and that the unit is not pressurized.
3. Gently inhale through the regulator outlet and hold your breath for about 10 seconds. If a positive pressure is maintained, there is no leakage.
4. Gently exhale through the regulator outlet for about 10 seconds. If a positive pressure is maintained, there is no leakage.
5. Do not use the apparatus if air flow through the regulator is detected in either test. Return the regulator to a Certified repair person.
6. Thread the breathing tube on the regulator.

After all components have been leak-tested, use a clean, lint-free cloth to wipe the apparatus dry.

Following leak-testing, you should perform the apparatus Function Test (see Inspection Procedures).

MAINTENANCE

MAINTENANCE

The inspection and maintenance procedures authorized in this manual are classified limited maintenance, and includes the procedures necessary to conduct a general cleaning and inspection of the apparatus. All Maintenance procedures are included in this manual. No special training is required, although the user must have a thorough understanding of the apparatus. Additional training is available. Contact your MSA representative for details.

Maintenance requires training by an authorized MSA representative, along with some special tools and an MSA Tester. A certificate of instruction is issued upon successful completion of the program.

WARNING

Do not attempt repairs beyond those specified in this manual. Only trained or certified personnel, authorized by MSA, are permitted to maintain and repair this apparatus. Breathing apparatus must not be repaired beyond the manufacturer's recommendations. Regulators must be returned to MSA, or to a trained technician for adjustment or repair. Failure to follow this precaution can result in serious personal injury or death.

GENERAL NOTES

You must read and understand these General Notes, Warnings and Cautions before performing Disassembly and Repair. The General Notes is a collection of procedures common to many repairs. Details for each procedure are listed below. Details are not repeated each time the procedure is done. Instead, a reference to the General Note appears in the text. Part numbers are not always included in each procedural step. Refer to the appropriate Illustrated Parts List.

Note 1: Pipe-sealing tape is used on the threads of the following parts before they are reassembled:

- lateral pipe fitting
- air-supply hose quick-disconnect check valve (both ends)
- first-to-second-stage hose (both ends)
- 90 degree elbow (or pipe nipple, if present)
- air nose ball fitting (in first-stage regulator body)
- cylinder pressure gauge

Wrap 1 to 1-1/2 turns of tape in a clockwise direction (looking into the threaded end of the fitting). Start at the second thread. Do not put tape on the first thread. Pieces of tape can break off and reduce air flow. Apply a thin film of Christo-Lube to the outer surface of the tape before threading the part into another component.

CAUTION

Do not over-tighten parts or you may damage the part or the fitting threads.

Note 2: All repair procedures assume that the cylinder coupling nut is disconnected from the apparatus cylinder.

WARNING

Do not loosen the coupling nut with the cylinder valve open. Close the cylinder valve. Disconnect the air-supply hose from the regulator quick-disconnect. Be sure nothing blocks the regulator outlet. Wait until all first-stage regulator and hose pressure is relieved. Removing the coupling nut with the regulator pressurized may result in serious personal injury or death.

1. Be sure the cylinder valve is completely closed.
2. Be sure that nothing blocks the regulator outlet.
3. Disconnect the air-supply hose from the regulator quick-disconnect.
4. Unthread the cylinder coupling nut.

REPAIRS

REGULATOR REPAIR

1. Remove the regulator from the waist-strap.
2. Disconnect the breathing tube from the regulator outlet.

Diaphragm

1. If the regulator diaphragm is torn or has any visible damage, the diaphragm must be replaced, as follows:
 - a. Remove the regulator cap and spring.

- b. Lift out the diaphragm by grasping the ring.



2. If the tape holding the ring to the diaphragm is loose, frayed, or partially peeled away from the ring and diaphragm, the diaphragm must be replaced.
3. Using a new diaphragm, reassemble the regulator. Use a clean, lint-free cloth to wipe the regulator body dry.

- a. Check that the lever assembly is positioned correctly: Small arm on top.



- b. Hold the regulator cap and place the spring in the hub. Place the diaphragm hub on top of the spring.



- c. Press the diaphragm ring into the cap. Insert the assembly and screw the cap into the regulator body and hand-tighten.

First-to-Second-Stage Hose

1. Turn the regulator so that the 90 degree elbow is down.
 - a. Place a wrench on the 90 degree elbow flats. Place a second wrench on the hex hose fitting and unthread the hose.
 - b. Remove all tape debris from the threads inside the 90 degree elbow.
 - c. Turn the lateral pipe fitting so that the hose end is down.
 - d. Place a wrench on the lateral pipe fitting flats. Place a second wrench on the hose end-fitting hex flats and unthread the hose. Remove all tape debris from the threads inside the lateral pipe fitting.



2. To install a new hose, apply pipe-sealing tape to the threads of both hose end-fittings See General Note 1.
 - a. Thread the hose end-fittings into the lateral pipe fitting and 90 degree elbow and tighten, using one wrench on the hose hex flats and a second wrench on the lateral pipe fitting or elbow flats. Do not over-tighten or you may damage the fitting or the hex end-fitting threads.
 - b. Check that the assembly is lined-up properly.
 - c. Leak-Test to check all connections.

CYLINDER REPAIR

Cylinder Pressure Gauge

The pressure gauge has a male thread which is threaded into the cylinder valve body. The cylinder valve does not have to be disassembled.

⚠ WARNING

Before removing the cylinder gauge, all air must be bled from the cylinder. Open the cylinder valve handwheel 1/2 turn and leave it open until all air has been exhausted. Wear hearing protection if this is done in an enclosed area to avoid possible hearing damage. Do not attempt to replace the gauge if pressure is shown on the cylinder pressure gauge.

If pressure cannot be relieved by opening the cylinder valve handwheel, the cylinder valve must be repaired by a repair person. Failure to follow this precaution may result in severe personal injury or death.

Removing the Cylinder Pressure Gauge

REPAIRS

1. Remove the rubber gauge guard.

2. Position the cylinder valve so that the gauge is upside-down. Place a wrench on the gauge flats. Turn the gauge counter-clockwise and remove it from the cylinder valve body.



3. Clean out the threads in the cylinder valve body to be sure no tape residue remains.

Installing a New Pressure Gauge

1. Place pipe-sealing tape on the gauge threads. See General Note 1.
2. Place the gauge wrench on the gauge flats. Turn the gauge clockwise to tighten. Position the gauge so that it can be read in the "as-worn" position. Do not over-tighten.
3. Replace the rubber gauge guard.
4. Leak-Test all connections. This completes the cylinder gauge replacement procedure.

HARNESS REPAIR

The harness consists of shoulder-strap, waist-strap, and carrier. Refer to the illustrated parts list for part numbers and the location of parts.

Replacing the Shoulder Strap

1. Disconnect the shoulder harness snap-hooks from the carrier.
2. Install the new shoulder strap by attaching the two snap-hooks to the carrier. Check to ensure that the padded side is on the "inside" (toward the user).

Replacing the Waist-Strap

Note: Before starting, note the path the strap takes as it is routed through the carrier and regulator bracket.

1. Unsnap and remove the belt clip.
2. Unsnap the cover from the tongue.
3. Unthread the waist-strap from the tongue. Pull the strap through the carrier and regulator bracket slots.
4. Thread the new strap through the regulator and carrier brackets.
5. Thread the waist-strap through the front of the tongue, over the roll bar, and down through the back of the tongue.
6. To remove the push-button release, unthread and remove the two screws, washers, tee nuts, and the strap loop. Save the hardware for reassembly.

7. To reinstall the push-button release, line up the strap loop holes with the holes in the waist-strap. Be sure the push-button release faces away from the user.

Note: Apply one drop of Loctite #222 thread sealant to the threads of each screw before installing the washers and tee nuts.

8. Insert the screws into the tee nuts and tighten.

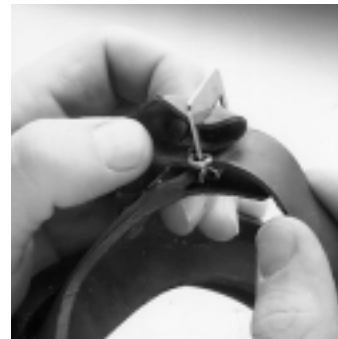
Note: Tee nuts face away from the user.

ULTRAVUE FACEPIECE REPAIRS FACEPIECE FIT CHECK

RUBBER HEAD HARNESS

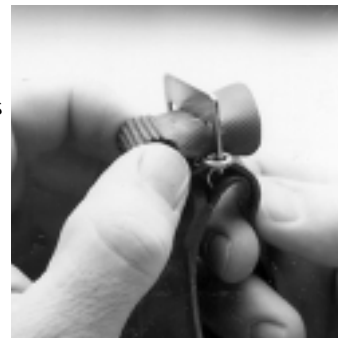
1. To remove a damaged headstrap from the facepiece, lay the facepiece on a table or other flat surface.
 - a. Pull the back of each buckle away from the head-strap, then pull slightly so the headstrap end-tab is at the buckle.

- b. Fold the end-tab sides together, then pull each end-tab through its buckle.



2. To install a new rubber headstrap, lay the new headstrap flat. The MSA logo should be right-side up. Each strap is labeled. Pick the headstrap up by the strap labeled "FRONT."
 - a. Fold the end-tab sides together.
 - b. Push the headstrap end-tab under the wire roller.
 - c. Pull the wire roller down against the strap.

- d. Re-fold the end-tab and push it through the buckle again, this time passing over the wire roller.



REPAIRS

- e. Repeat steps a through d for each remaining strap. Check that the head-strap is not twisted.

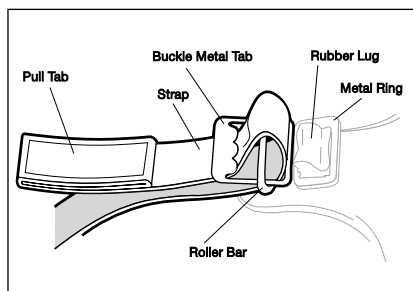


3. Don the facepiece and check the face-to-facepiece seal. Follow the steps in the Facepiece Fit Check.

SPEED-ON HARNESS

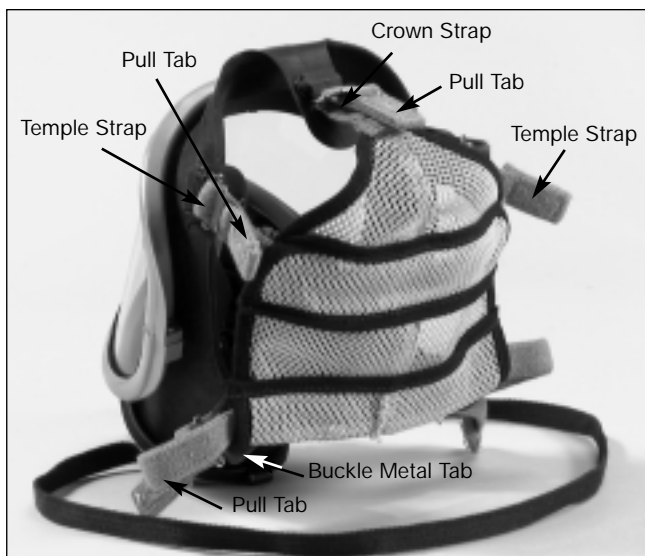
1. Thread the crown, temple, and neck straps into the buckles as follows:
 - a. With folded side down, thread the strap into the bottom section of the buckle under the roller bar.
 - b. Push roller bar down and thread the end through the top section of the buckle.
 - c. Adjust so that the pull tab extends beyond the buckle metal tab.

Note: It is important to have the folded side of the elastic strap face up, in order for the strap to lay flush against the head when it is pulled tight.



- d. Check that the installed harness straps are not twisted.

Note: Neck location buckles have an extra D-ring which is not involved in installation.



CLEANING THE SPEED-ON HARNESS:

Machine wash in warm water (maximum 120 degrees F) with a mild detergent. Dry by squeezing excess water from harness and hanging in open air. Do not dry clean. Do not bleach or use abrasive cleaners. Do not fold or store when wet.

REPLACING LENS AND RING

1. Remove the facepiece lens.
 - a. Loosen and remove the screw from each side of the retaining ring.



- b. Remove both retaining ring halves.

- c. Fold the facepiece flange rubber back and pull the lens out of the groove.



REPAIRS

2. Installing the new facepiece lens.

- a. Remove any dirt, lens fragments, or other debris from the groove. Line up the new lens center-line marks (top and bottom) with the facepiece centerline mark.



Note: The protective papers on the lens should not be taken off until the lens is completely assembled in the facepiece.

Then insert the lens into the groove. Work the facepiece flange around the lens to seat the lens fully in the groove.

- b. Press the ring halves together at the top and bottom of the facepiece so that the ends mate.
- c. Install a screw on each side.
- d. Start the screws. They should thread easily. If not, remove and reinstall the screws to avoid cross-threading. Maintain hand pressure on both ring halves.
- e. As the ring halves come together, alternate tightening the left and right screws to be sure the ring seats thoroughly on the flange.

CAUTION

Do not over-tighten. Rubber must not show between the lens ring ends at the joint. If this happens, reassemble.

- f. Remove all lens protective papers from the new lens.
- g. Don the facepiece and check the face-to-facepiece seal. Follow the steps in the Facepiece Fit Check.
- h. Install a cover lens to protect the facepiece polycarbonate lens during storage.

CAUTION

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.

SPEAKING DIAPHRAGM HOUSING

1. Loosen the band clamp screw to remove the entire Inlet. Remove the clamp and pull the assembly out of the facepiece.



2. To reassemble the entire speaking diaphragm housing in the facepiece:
 - a. Slide the band clamp over the inlet.

- b. Slide the assembly into the facepiece. Check that the air ducts in the housing are lined up with the ducts in the facepiece.



- c. Be sure that the assembly is pressed completely into the facepiece.
 - d. The band clamp must be positioned so that the screw is at the 5 or 7 o'clock position. The screw head must be to the left so that it will not rub the facepiece rubber.
 - e. Tighten the band clamp until the inlet is secured. Be sure that the band clamp will not pull the facepiece rubber away from the assembly. Do not over-tighten. If the facepiece rubber "bulges" out through the slots in the clamp, the clamp is too tight and must be loosened and re-tightened.
3. Don the facepiece and check the face-to-facepiece seal. Follow the steps in the Facepiece Fit Check.

SPEAKING DIAPHRAGM

1. Unscrew the retainer ring, using the facepiece spanner wrench.



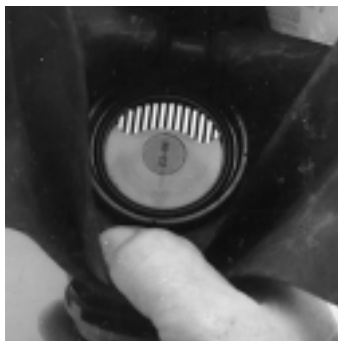
REPAIRS

2. Turn the facepiece upside down and shake out the metal speaking diaphragm.
3. Check the speaking diaphragm for damage. Replace it if it is worn or damaged.
4. Check the speaking diaphragm gasket or o-ring. Replace the gasket or o-ring if either is worn or damaged.

WARNING

The flat gasket (used on old-style facepieces) and the o-ring (used on the new design) are not interchangeable. Replace the gasket with the P/N 83630 gasket only. Replace the o-ring with the P/N 629935 o-ring only. Failure to follow this warning may cause inhalation of contaminant and result in serious respiratory injury or death.

5. To reassemble the speaking diaphragm, place the gasket or o-ring in the groove of the speaking diaphragm housing.



6. Place the speaking diaphragm in the housing so that the rolled lip rests on the gasket or o-ring.

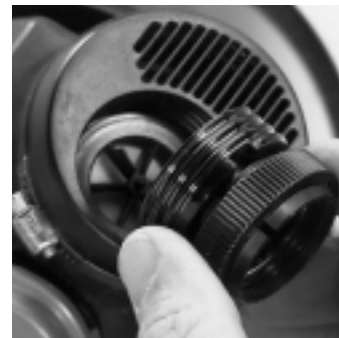


Be sure that the crimped side of the speaking diaphragm is facing up (away from the gasket or o-ring).

7. Replace the retainer ring and tighten, using the spanner wrench.
8. Don the facepiece and check the face-to-facepiece seal. Follow the steps in the Facepiece Fit Check.

INHALATION DISC VALVE

1. Push in on the facepiece coupling nut and turn it until its tabs fit into the slots in the adapter.



2. Twist the coupling nut counter-clockwise (left) to unscrew the adapter assembly.

3. Lift the spider gasket out of the coupling nut housing by its tab.



4. Remove the valve disc from the coupling nut housing. If you cannot grasp the disc with your fingers, use a blunt object, such as a ballpoint pen to lift one edge, then remove the disc. Be careful not to tear the soft disc.
5. Inspect the disc for tears or punctures. The disc should be very soft and pliable. Install a new disc if it is damaged or hardened.
6. To install the inhalation disc valve:
 - a. Press the valve disc on the pin in the coupling nut housing.

- b. Carefully tuck all edges of the disc under the housing lip.



- c. Replace the spider gasket (tab up) and press it on the pin.
- d. Thread the coupling nut adapter into the coupling nut housing and hand-tighten.
- e. Remove the gasket from the coupling nut and check it for tears or cuts. Replace it with a new gasket if it

REPAIRS

is damaged. Press the gasket in place in the coupling nut.

PRESSURE DEMAND EXHALATION VALVE

1. Temporarily fold the headstraps back over the front of the facepiece lens.
2. Pull the facepiece chin cup out so that you can see the inside of the exhalation valve.



3. Use the facepiece spanner wrench to loosen the valve retaining nut.

4. Unscrew and remove the retaining nut. Then, grasp the valve cover and gently pull the valve out from the underside of the facepiece.

Note: The pressure demand exhalation valve is replaced as a unit. No replacement parts are available. All components of each valve must be maintained as a unit. When cleaning the valve, do not interchange parts.

5. Installing the pressure demand exhalation valve in the facepiece:
 - a. Inspect the facepiece rubber for tears or cracks. Replace the facepiece if it is damaged. Clean the area around the facepiece mounting hole if necessary.

Note: Rub a small amount of Never-Seez on the valve threads.

- b. Line up the exhalation valve threads with the facepiece mounting hole. Place one hand inside the facepiece and stretch the hole slightly.
- c. Push the valve threads into the facepiece. Use a "threading" motion to insert the valve until the valve body rests against the facepiece rubber.

Note: The "MSA" logo on the exhalation valve cover does not have to be aligned to any special position.

- d. Pull the facepiece chin cup back so that you can see the valve, then thread the retaining nut on.
 - e. Tighten the retaining nut, using the spanner wrench. Reposition the facepiece headstrap.
6. Inspect the exhalation valve.

7. Visually inspect the spring to see that it is located properly in its socket.

⚠ CAUTION

Do not store the facepiece with the headstraps stretched over the lens. Doing so may distort the sealing surface and affect the facepiece seal.

8. Don the facepiece and check the face-to-facepiece seal. Follow the steps in the Facepiece Fit Check.

BREATHING TUBE OR INSERTS

1. Place a small screwdriver under the clamp and twist it to pry the clamp off.



2. Remove the threaded insert, breathing tube insert, and coupling nut.

THREADED INSERT ON THE FACEPIECE END OF THE BREATHING TUBE

1. Slide an open clamp over the cuff of the breathing tube.
2. Moisten the insert and push it into the breathing tube.

Note: The coupling nut must be placed on the breathing tube insert before the insert is installed in the breathing tube.

3. Position the clamp and tighten it using pliers. Close the clamp as tightly as possible and be sure that the locking tongue is aligned and engaged.



4. Hold the fitting and firmly pull on the tube to be sure that the connection is tight. Use the same procedures on the opposite end of the tube.
5. Check the breathing tube for leaks.

REPAIRS

ULTRALITE FACEPIECE REPAIRS REPLACING THE RUBBER HEADSTRAP

Note: To replace the standard rubber headstrap (the one with rollers and end-tabs), see Ultravue Facepiece Repair.

To replace the standard rubber headstrap if the buckle assemblies are damaged, or to install the Speed-ON Harness, follow the steps below.

1. To remove a damaged rubber head strap from the facepiece, lay the facepiece on a table or other flat surface.
 - a. Grasp the facepiece lug with the thumb and forefinger of one hand. Grasp the headstrap metal buckle with the thumb and forefinger of the other hand.



- b. Lift the metal buckle up with your thumb as you stretch the facepiece lug.

- c. Turn the facepiece and switch hands to pry up on the other side of the metal buckle.
 - d. Pull the facepiece lug out of the metal buckle.
 - e. Repeat steps a through d for each remaining strap.
 - f. If you removed the headstrap to install the Speed-ON Harness, go to column 2, Installing the Speed-ON Harness.
2. To install a new rubber headstrap, lay the new headstrap flat. The MSA logo should be right-side up. Each strap is labeled. Pick the headstrap up by the strap labeled "Front".
 - a. Insert the facepiece lug into the metal buckle.
 - b. Hold the buckle down against the facepiece lug with the thumb and forefinger of one hand while gripping the end of the lug with the thumb and forefinger of the other hand.



- c. Pull the buckle and lug in opposite directions while twisting them from side to side to work the buckle down until it snaps in place over the lug.

- d. Repeat steps a through d for each remaining strap. Check that the installed headstrap is not twisted.
3. Don the facepiece and check the face-to-facepiece seal. Follow the Facepiece Fit Check.

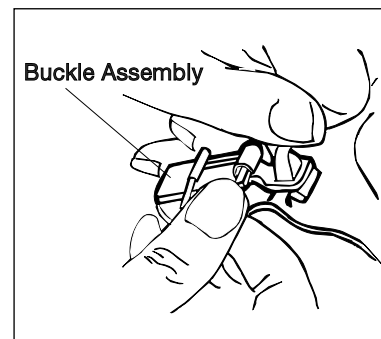
REMOVING THE SPEED-ON HARNESS

1. To remove a damaged Speed-ON harness from the facepiece, lay the facepiece on a table or other flat surface.
2. Follow Replacing the Rubber Headstrap, steps 1a-d for each of the top three straps.
3. To remove the bottom buckles, pull the back of the buckle away from the rubber strap and pull slightly so the rubber harness end-tab is at the buckle.
4. Fold the end-tab sides together, then slide each tab through its buckle.
5. Repeat steps 3 and 4 for the other buckle.

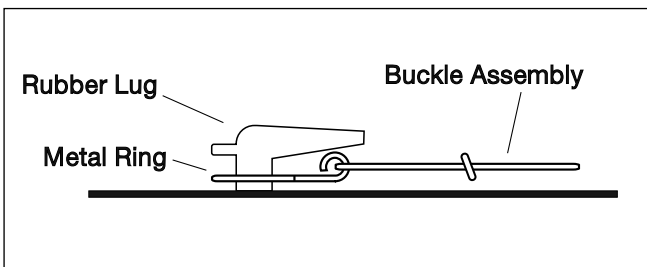
INSTALLING THE SPEED-ON HARNESS

1. Install the harness strap buckles to the facepiece rubber lug at the crown and temple locations.

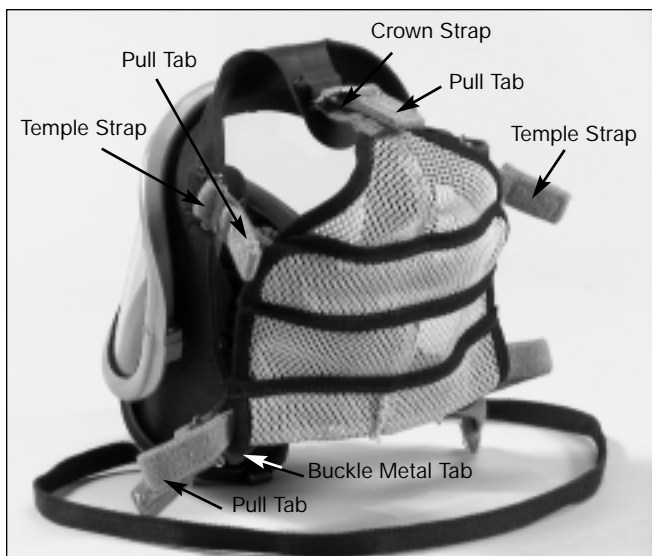
- a. Insert the long tab end of the rubber lug into the metal ring.
- b. Pull the entire rubber lug through the metal ring.



2. Refer to Kit 817088 Head Harness Installation instructions to attach the harness.



REPAIRS



CLEANING SPEED-ON HARNESS

Machine wash in warm water (maximum 120 degrees F) with a mild detergent. Hang the harness in an open area to air-dry. **Do not dry clean.** Do not bleach or use abrasive cleaners. Do not fold or store when wet.

REMOVING THE COMPONENT HOUSING COVER

1. Unthread and remove the adapter assembly.



2. Remove the two component housing cover screws and the neckstrap.



3. Lift up on the cover release hook, located forward of the adapter assembly opening. Once the release is lifted, you can remove the cover by pulling it away from the housing.



CAUTION

Be careful that you do not damage internal parts of the component housing assembly (exhalation valve, spring, retainer, or speaking dia-phragm) once the cover is removed.

TO INSTALL THE COMPONENT HOUSING COVER

1. Place the component housing cover over the housing.
2. Insert the tab on the top of the cover into the slot in the bottom of the lens ring.
3. Press in on the front of the cover until the cover hook snaps in place.
4. Line up the screw holes in the cover with the threaded inserts in the housing.
5. Place the neckstrap retaining brackets in the component housing cover sockets. Install the Phillips screws and tighten to secure the housing and neckstrap.
6. Insert the adapter assembly in the facepiece and hand-tighten.
7. Don the facepiece and check the face-to-facepiece seal. Follow the Facepiece Fit Check.

REMOVING THE FACEPIECE LENS AND RING

CAUTION

The protective papers on the lens should not be taken off until the lens is completely assembled in the facepiece.

Note: Remove the adapter assembly and component housing cover.

1. Using a Phillips screwdriver, loosen and remove the screw from each side of the facepiece lens retaining ring.



REPAIRS

2. Remove the upper and lower lens retaining rings.



3. Fold the facepiece flange rubber back and pull the lens out of the groove.

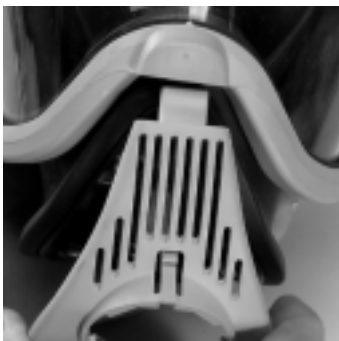
INSTALLING THE FACEPIECE LENS AND RING

1. Remove any dirt, lens fragments, or other debris from the groove. Line up the new lens center-line marks (top and bottom) with the facepiece center-line mark. Insert the top of the lens into the groove. Work the facepiece rubber flange around the lens to fully seat the lens in the groove. When installed correctly, the bottom lens center-line mark lines up with the bottom facepiece center-line mark.



2. Moisten the facepiece lens groove and the inside of the housing ring.

3. Install the bottom ring. Insert the tab at the top of the component housing into the slot at the bottom center of the lower lens ring. The tab should snap into place.



4. Line up the top lens ring center-line with the facepiece rubber flange center-line mark. Press the ring into place.
5. Press the ring halves together at the top and bottom of the facepiece so that the ends mate.
6. Install a screw on each side. Start the screws. They should thread easily. If not, remove and re-install the screws to avoid cross-threading. Keep hand pressure on both ring halves.
7. As the ring halves come together, alternate tightening the left and right screws to be sure the rings seat completely on the rubber flange.

⚠ CAUTION

Do not overtighten. Rubber must not show between the lens ring ends at the joint. If this happens, reassemble.

8. Remove all lens protective papers from the new lens.
9. Re-install the component housing and the adapter assembly.
10. Don the facepiece and check the face-to-facepiece seal. Follow the Facepiece Fit Check.
11. Install a cover lens to protect the facepiece polycarbonate lens during storage.

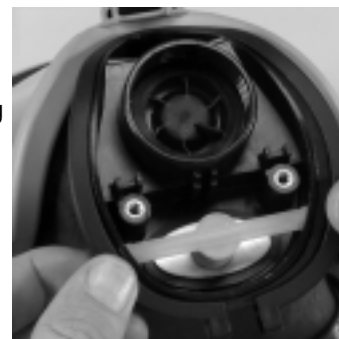
⚠ CAUTION

Do not use a cover lens in a high-temperature environment. 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.

REMOVING THE COMPONENT HOUSING ASSEMBLY

Note: Remove the adapter assembly and the component housing cover.

1. Using a small Phillips screwdriver, remove the component housing ring screw. Grasp the ring with the thumb and forefinger of each hand. Gently spread the ring halves apart at the bottom.



2. When the facepiece rubber is out of the ring groove, lift the ring up away from the facepiece. You may need to pull the housing down slightly to allow enough room to remove the ring from between the housing and the lower lens ring.



3. Remove the facepiece rubber from the component housing and pull the housing and nose cup (if installed) out of the facepiece.

REPAIRS

INSTALLING THE COMPONENT HOUSING ASSEMBLY

1. Slide the housing into the front of the facepiece.

2. Starting at the top (narrow end) of the housing, place the housing in the facepiece groove. Work the rubber all the way around the housing. Check that the housing is completely captured inside the groove and the centerlines are lined up.



3. Moisten the facepiece housing area and the inside of the housing ring.
4. Insert the narrow end of the ring into the space between the lower lens ring and the facepiece housing area.



5. Line up the component housing ring mark with the facepiece centerline.



6. Starting at the top, work the housing ring down on the facepiece to capture the facepiece rubber in the ring groove. Work your way down each side of the ring until the facepiece rubber is completely captured inside the ring.

7. Gently squeeze the ring halves together at the bottom of the housing. Watch the facepiece rubber at the top as you do this. If you see any bulges or wrinkles in the facepiece rubber, it is not captured in the groove. Rework the ring around the facepiece rubber until there are no bulges or wrinkles.

⚠ WARNING

Bulges or wrinkles mean that the facepiece rubber is not seated correctly in the ring. Re-install the ring to seat it correctly. Failure to follow this precaution may

cause the facepiece to leak and result in serious personal injury or death.

8. When the housing ring appears to be seated, grasp the outside of the ring and the inside of the housing at the top between your thumb and forefinger and squeeze them together. Then do the same with the ring halves at the bottom.

9. Install the screw and tighten using a small Phillips screwdriver.



⚠ CAUTION

Rubber must not extrude between the component housing ring ends at the joint. If this happens, reassemble.

10. Re-install the nosecup or air baffle (if used) in the facepiece.
11. Re-install the component housing cover and adapter assembly.
12. Don the facepiece and check the face-to-facepiece seal. Follow the Facepiece Fit Check.

REPLACING THE INLET GASKET AND DISC VALVE

1. Push in on the facepiece coupling nut and turn it until its tabs fit into the slots in the adapter.
2. Twist the coupling nut counter-clockwise (left) to unscrew the adapter assembly.
3. Remove the inlet gasket and disc valve by pulling on the gasket pull-tab.
4. Remove the disc from the gasket and inspect both for wear. The disc should be very soft and pliable. Install a new disc valve if it is damaged or hardened.
5. To install the inhalation disc valve:
 - a. *Gently*, stretch the hole in the center of the disc valve over the gasket stem.
 - b. Note that the inlet gasket has a groove around its inside.

REPAIRS

- c. With the pull-tab facing you, insert the gasket into the facepiece at an angle so that its groove captures the housing rim.



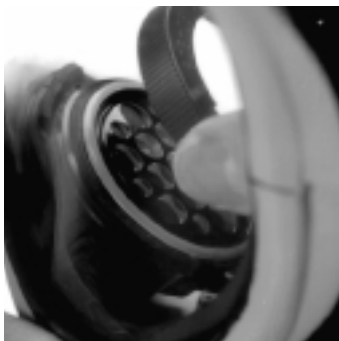
Note: You may have to bend the gasket slightly to work the groove under the rim all the way around. When installed correctly, the gasket will lay flat in the housing, and none of the spokes will be bent.

- d. Thread the coupling nut adapter into the component housing and hand-tighten.
e. Don the facepiece and check the face-to-facepiece seal. Follow the Facepiece Fit Check.

REPLACING THE SPEAKING DIAPHRAGM

1. Remove the nosecup or air baffle (if installed) from inside the facepiece.

2. Unscrew and remove the speaking diaphragm retaining ring.



3. Turn the facepiece upside down and shake out the metal speaking diaphragm and gasket assembly.
4. Check the speaking diaphragm and gasket assembly for damage. Replace it if it is worn or damaged.
5. Be sure that the gasket is on the diaphragm assembly. Place the diaphragm in the retaining ring. Be sure that the gasket side of the speaking diaphragm will be facing the component housing.
6. Replace the retaining ring and hand-tighten.
7. Re-install the nosecup (if used) in the facepiece.
8. Don the facepiece and check the face-to-facepiece seal. Follow the Facepiece Fit Check.

SPECTACLE KIT

The spectacle kit is designed to be used by people who wear glasses. The temple bars of conventional glasses extend beyond the sealing edge of a full facepiece and prevent a proper seal. The kit includes the support assembly, a rubber block, and the spectacle frame. Prescription lenses can be obtained locally or through MSA. To install the kit:

1. Temporarily, stretch the head harness over the facepiece lens.
2. Hold the support assembly so that the "coated" arms are up and the rubber block is toward the facepiece lens.
3. Squeeze the arms together and insert the kit into the facepiece.
4. Place the arms against the lens and release them. The ends of the arms also must be against the lens.
5. Adjust the wire frame so it lines up with the small rubber lugs at the top of the lens.
6. To move the spectacles closer to your face, pull the frame prongs out of the rubber block.
7. To move the spectacles farther from your face, push the frame prongs into the rubber block.
8. To move the spectacles up or down, slide the rubber block up or down on the support arms.
9. Return the head harness to its normal position.

NOSECUP OR AIR BAFFLE

Note: If you are going to install the spectacle kit as well, do it first. This makes both kits easier to install.

The nosecup is used with the Ultra Elite facepiece to reduce lens fogging caused by high humidity or temperatures below 32° F.

1. Temporarily, stretch the head harness over the facepiece lens.
2. Pull the facepiece chin seal back.
3. Place the nosecup (or air baffle) into the facepiece so the groove on the large round hole is toward the speaking diaphragm. The smaller egg-shaped hole should be down, toward the exhalation valve.
4. Stretch the groove over the speaking diaphragm retainer. Be sure the retainer is captured in the groove all the way around.
5. Look into the lens to be sure the nosecup is lined up so that the narrow bridge is centered and points up.
6. Run your forefinger around the exhalation valve to work the egg-shaped hole around the exhalation valve groove.
7. On the nosecup only, be sure that the nosecup chin seal is folded down so the facepiece chin seal lays on top.
8. Return the head harness to its normal position.



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