

**CLEMCO SUPPLIED AIR RESPIRATOR
MODEL 20 LP
O.M. 21991**

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 **WARNING**

Do not proceed with these instructions until you have READ the orange cover of this MANUAL and YOU UNDERSTAND its content.* These WARNINGS are included for the health and safety of the operator and those in the immediate vicinity.



***If you are using a Clemco Distributor Parts and Maintenance Guide refer to the orange warnings insert preceding the Index before continuing with the following instructions.**

NOTICE

This supplied air respirator conforms to all NIOSH specifications and standards and carries NIOSH approval. As manufactured, this respirator complies only with those foreign approvals that accept NIOSH certification. Specifically, it has not been manufactured to European CE standards and does not carry the European CE-mark.

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 <p>Clemco Industries Corp. Washington, Missouri USA (636) 239-0300</p>							
<p>TYPE C AND CE CONTINUOUS FLOW SUPPLIED-AIR RESPIRATOR IS APPROVED ONLY IN THE FOLLOWING CONFIGURATIONS:</p>							
TC#	PROTECTION ¹	MODEL	Respirator Components				Cautions & Limitations ²
			Helmet	Constant Flow connector with belt	Hose Air Line 100 Ft.	Hose Air Line 50 Ft.	
19C-339	SA/CF	APL	21302	21777	21413	22510	B C D E J M N O S
			x	x	x	x	
<p>1 PROTECTION CF-Continuous Flow SA-Supplied Air</p> <p>2 CAUTIONS AND LIMITATIONS B-Not for use in atmospheres immediately dangerous to life or health. C-Do not exceed maximum use concentrations established by regulatory standards. D-Air-line respirators can be used only when the respirators are supplied with respirable air meeting the requirements of CGA G-7.1 Grade D or higher quality. E-Use only the pressure ranges and hose lengths specified in the user's instructions. J- Failure to properly use and maintain this product could result in injury or death. M-All approved respirators shall be selected, fitted, used, and maintained in accordance with MSHA, OSHA, and other applicable regulations. N-Never substitute, modify, add, or omit parts. Use only exact replacement parts in the configuration as specified by the manufacturer. O-Refer to 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 instruction manual before donning.</p>							

3. Periodic training.
4. Periodic environmental monitoring.
5. Respirator-fit testing.
6. Maintenance, inspection cleaning, and storage of the respirators.
7. Selection of the proper NIOSH-approved respirator.

1.1.3 For safe use of the respirator, it is essential that the user be properly instructed in its use and maintenance. This manual must be made available to all users of the respirator. [Reference OSHA Regulations 1910.134.] Read the entire manual before installing or operating the equipment.

1.1.4 The respirator must be supplied with respirable air meeting requirements described herein. It is the responsibility of the owner to provide quality breathing-air to the respirator, and to establish a program to ensure that the respirator is properly used and maintained.

1.2 Safety Alerts

1.2.1 Clemco uses safety alert signal words, based on ANSI Z535.4-1998, to alert the user of a potentially hazardous situation that may be encountered while operating this equipment. ANSI's definitions of the signal words are as follows:



This is the safety alert symbol. It is used to alert the user of this equipment of potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

1.0 INTRODUCTION

1.1 Scope of Manual

1.1.1 This manual covers setup, operation, maintenance, replacement parts, and important warnings for safe operation of the Clemco Apollo 20 LP Supplied-Air Respirator.

1.1.2 OSHA requires the employer to establish a comprehensive respiratory protection program per regulations 29 CFR 1910.134(a)(b) and 29 CFR 1926.103, to include the following:

1. Program coordination by a designated responsible individual.
2. Evaluation of each worker's ability to perform the

CAUTION

"Caution" used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

⚠ CAUTION

"Caution" used with the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

⚠️ WARNING

“Warning” is used to indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠️ DANGER

“Danger” is used to indicate an imminently hazardous situation which, if not avoided, will result in death or serious injury.

1.3 Respiratory and Health Alerts

⚠️ WARNING

TOXIC DUST POISONING

Research by the Occupational Safety and Health Administration (OSHA) has discovered potential risks of lead and other heavy metal poisoning to unprotected abrasive blasting operators and other personnel who may be exposed to toxic dust in the abrasive blasting vicinity. Toxic dust is produced primarily by the removal and breakdown of lead or other heavy metal coatings during abrasive blasting.

The breakdown of toxic coatings and hazardous abrasive causes the contaminants to become airborne. Breathing toxic dust from lead or other heavy metal coatings may cause health and life threatening toxic poisoning and can damage vital organs. Breathing hazardous dust produced from silica abrasive may cause delayed life threatening respiratory disease such as silicosis.

Lead is one of several toxic dusts that may be present in an abrasive blasting operation. It is imperative that blasting contractors identify all material being removed by blasting, and obtain material safety data sheets (MSDS) for the blasting abrasive prior to blasting. It is the responsibility of the employer to identify all airborne contaminants in the blast vicinity, and ensure they do not exceed the permissible exposure limit (PEL) Ref. 29 CFR 1910.1000 and 29 CFR 1926.62. Thorough examinations should be made by an industrial hygienist or other qualified professional to identify all contaminants generated by blasting and in the blasting vicinity.

Exposure to dangerous levels of lead or other toxic or hazardous dust is not restricted to blast operators. There may be an equal or greater danger after the blasting process due to lingering airborne dust particles, and especially from dust generated during cleanup activity. Heavy metal paint, asbestos, sand or other silica, and other toxic material dusts will cause serious lung disease or death without the use of properly designed, and maintained NIOSH-approved, supplied-air respirator equipment by blasting operators and all personnel within the work site area. **Lead poisoning can cause death.** OSHA has stated that the permissible exposure limit of lead is 50 micrograms per cubic meter of air ($50 \mu\text{g}/\text{m}^3$), averaged over an 8-hour workday.

The Apollo supplied-air respirator system is approved by NIOSH as a Type-CE, continuous-flow, abrasive blast, supplied-air respirator, in accordance with title 42 CFR Part 84. The NIOSH recognized assigned protection factor (APF) for any supplied-air respirator equipped with a loose-fitting hood or helmet and operated in a continuous flow mode is 25, based upon the NIOSH Respirator Decision Logic (Pub. No. 87-108). In other words, any Type-CE respirator should be used only in atmospheres in which the contaminant level does not exceed 25 times the permissible exposure limit. However, in its Memorandum for Regional Administrators dated August 30, 1995, OSHA has stated that select individual Type-CE continuous-flow, abrasive blast, supplied-air respirator models that pass stringent tests conducted by independent third party testing laboratories will be granted APF values higher than the NIOSH recognized 25. Clemco contracted with Los Alamos National Laboratory to conduct the independent testing. Based upon the results of these tests, OSHA will treat the Apollo Supplied-Air Respirator (NIOSH Approval TC-19C-339) as having an APF of 1000 times the permissible exposure limit, or $50,000 \mu\text{g}/\text{m}^3$ when used in lead removal applications.

The employer must provide and maintain appropriate approved respirators, in addition to providing operator training and employing required work site safety practices.

To avoid any potential danger of respiratory injury, approved, supplied-air respirators must be worn at all times in the presence of any type of dust. The respirator must be maintained as described herein. Improper use of any respirator may cause life threatening respiratory disease, and immediate poisoning from toxic dust. Respirators should be removed only after the ambient air has been tested with a dust monitor, and found to be safe to breathe.

Toxic dust poisoning may also occur by eating, drinking, or smoking in a contaminated area, or by eating, drinking, or smoking in a non-hazardous area before thorough washing of hands and face. Do not eat, drink or smoke in the blast area.

Thoroughly wash hands and face to remove contaminants before eating, drinking, or smoking outside the blast area.

This manual does not contain all the health and safety requirements regarding toxic and hazardous dust exposure. Obtain copies of the OSHA regulations and consult a safety professional and/or industrial hygienist for complete requirements.

Within this manual we refer to hazardous or contaminated environments. These environments can be any place around the blast area that could contain toxic or hazardous dust.

If these warnings are not completely understood, or if further information is required, contact a local OSHA office. If any personnel in the abrasive blasting vicinity cannot read or comprehend these warnings and the entire content of this instructional material, assign a qualified person to instruct him/her.

A pamphlet about abrasive blasting hazards titled "Preventing Silicosis and Death From Sandblasting", Publication No. 92-102, is available from Publications Dissemination, DSDTT National Institute for Occupational Safety and Health, 4676 Columbia Parkway Cincinnati, OH 45226 (513) 533-8287

1.4 Cautions and Limitations

1.4.1 Not for use in atmospheres immediately dangerous to life or health.

1.4.2 Do not exceed maximum use concentrations established by regulatory standards.

1.4.3 Air-line respirators can be used only when the respirators are supplied with respirable air meeting the requirements of CGA G-7.1 for Grade D or higher quality.

1.4.4 Use only the pressure ranges and hose lengths specified in the instruction manual.

1.4.5 Failure to properly use and maintain this product could result in injury or death.

1.4.6 All approved respirators shall be selected, fitted, used, and maintained in accordance with MSHA, OSHA, and other applicable regulations.

1.4.7 Never substitute, modify, add, or omit parts. Use only exact replacement parts in the configuration as specified by the manufacturer.

1.4.8 Refer to users instructions, and/or maintenance manuals for information on use and maintenance of these respirators.

1.4.9 Special or critical users instructions, and/or specific use limitations apply. Refer to instruction manual before donning.

1.5 Special Use Limitations

1.5.1 Air pressure at the point of attachment (the point of attachment is where the respirator supply hose is connected to the respirable air source) must be maintained between the minimum and maximum pressures as shown in the table in Section 4.2.2.

⚠ WARNING

Failure to maintain the minimum pressure at the point of attachment may reduce air flow below the minimum flow required by OSHA. Reduced air flow may result in ingress of hazardous toxic dust, subjecting the user to immediate health and life threatening poisoning and subsequent respiratory disease.

1.5.2 Use no more than 3 sections of respirator hose to obtain a total maximum length of 300 feet as noted in the table in Section 4.2.2.

1.5.3 The respirator is designed for specific use in abrasive blasting applications. Do not use in other operations such as painting or welding.

1.5.4 Do not supply compressed air to this respirator. Air from compressors poses hazards, especially from Carbon Monoxide, that are not covered in these instructions.

1.6 Protection

1.6.1 Assigned Protection Factor (APF): The NIOSH recognized assigned protection factor for any Type-CE respirator (the Apollo respirator is a Type-CE respirator) is 25 times the permissible exposure limit (PEL). In other words, CE respirators should be used only in atmospheres in which the contaminant level does not exceed 25 times the PEL. However, based upon the results of independent testing, OSHA will treat the Apollo Supplied-Air Respirator as having an APF of 1000 times the PEL when used in lead removal applications.

1.6.2 Head: The respirator protects the wearer's head and neck from minor impact and from abrasion caused by rebounding abrasive. However, the respirator does not meet the requirements for industrial head protection as stated in ANSI Z89.1-1997.

1.6.3 Face: The Apollo 20 inner lens meets impact and penetration requirements under ANSI Z87.1-1989.

1.6.4 Eyes: Apollo respirators do not provide primary eye protection. Wear approved eye protection with the respirator.

1.6.5 Hearing: Noise generated by the Apollo respirator and measured inside the helmet do not exceed 80 decibels. (42 CFR part 84.140) When any exterior noise causes the internal noise level to exceed 80 decibels, the user must wear additional hearing protection. A variety of hearing protectors can be worn with the respirator.

1.7 Description

1.7.1 The Clemco Apollo 20 Supplied-Air Respirator is approved by the National Institute of Occupational Safety and Health (NIOSH).

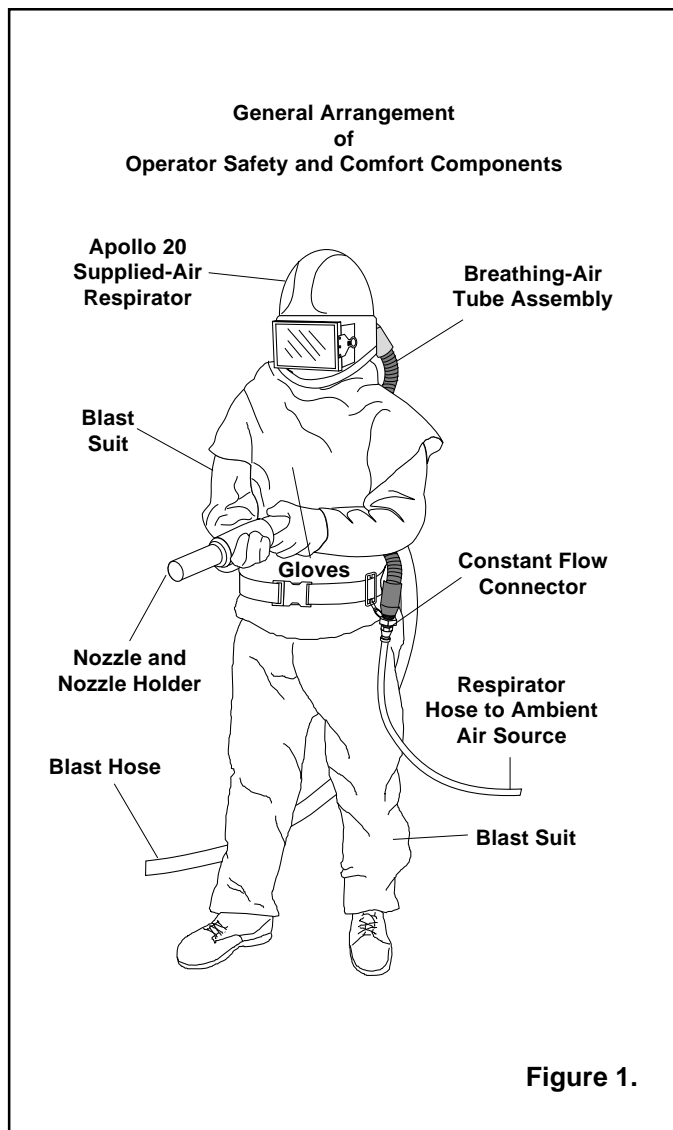


Figure 1.

⚠WARNING

OSHA/NIOSH approval applies only when this supplied-air respirator is used as a complete system. Do not make any non-approved modification, deletion, or substitution. Non-approved components voids the NIOSH approval and may permit ingress of toxic and hazardous dust, and result in toxic poisoning and respiratory disease.

1.7.2 The respirator comes with a Constant-Flow Connector assembly, that connects the respirator hose to the breathing tube.

1.7.3 The respirator is designed for use with ambient air pumps only, that deliver 6 to 15 cfm within the approved pressure range as noted in the table in Section 4.2.2.

⚠WARNING

Do not supply compressed air to this respirator. Air from compressors pose hazards, especially from carbon monoxide that are not included in these instructions. Compressors used for breathing air require safety and monitoring devices that are not included in these instructions. Using compressors that are not suitable for breathing air could result in death. Reference OSHA Regulations 1910.134(d) and 1910.94(6).

1.7.4 High Pressure Conversion Kit: This optional accessory kit contains parts and instructions to convert the Apollo 20 LP (respirator for use with ambient air pump), to Apollo 20 HP (respirator for use with Grade "D" Compressed Air). The kit is listed in Section 10.1.

2.0 INSPECTION

NOTE: A Clemco respirator hose must be used with the Apollo Respirator. If one is not available, it must be ordered from an authorized distributor of Clemco products. Hoses are not included with respirators, because blast operators often are assigned personal respirators, while using common respirator hoses.

2.1 Component Checklist

2.1.1 Make sure that all the respirator components are present. Each respirator box should contain the following:

- Helmet with chin strap, suspension and cape attached
- Breathing tube assembly
- Constant-Flow Connector with belt

NOTE: Respirator hose must be ordered separately.

2.1.2 When all of these components are present, prepare the respirator for operation per Section 3.0. See Figure 1 for a typical arrangement.

3.0 PREPARATION

3.1 Adjust Helmet Suspension per Section 6.1.

3.2 Lens Assembly

⚠️WARNING

Never use the respirator without the fixed inner lens and middle lens in place. The fixed lens provides support for the window gasket, and the middle lens compresses the gasket. If the gasket is not adequately supported and compressed, leaks can occur which could permit entry of toxic and hazardous dust or abrasive into the helmet.

3.2.1 The lens system is an important part of the respirator assembly. The helmet is supplied with an inner lens, secured by a thick rubber gasket. Held in place on top of the inner lens by the lens frame, are the middle lens and up to three perforated cover lenses.

3.2.2 Check that the inner lens is in place. (See Section 9.1)

3.2.3 The middle lens and perforated cover lenses are secured to the helmet by the lens frame. The middle lens will not need to be changed often because it is protected by perforated cover lenses. As one cover lens becomes frosted during blasting, it can be torn off to expose the next lens. Check that the perforated cover lenses are in place. (See Section 9.2)

3.3 Belt

3.3.1 Using the spring clip attached to the Constant-Flow Connector, attach the connector to the belt slide.

3.4 Breathing Tube Assembly

3.4.1 Attach the red end of the breathing tube to the

threaded air inlet fitting at the back of the helmet.

3.4.2 Attach the swivel connector on the black end, to the Constant-Flow Connector, or alternate air control device.

⚠️WARNING

The red end of the breathing tube must attach to the helmet, and the black end to the Constant-Flow Connector. Failure to properly attach the tube may increase noise levels beyond OSHA limits.

3.4.3 Use the molded-in handle to carry or hang the respirator. Never hold, carry or hang the respirator by the breathing tube. Mishandling the respirator in this manner may damage the tube or helmet inlet. Any leaks or breaks in the breathing tube will alter the air flow through the respirator and affect user's safety and comfort.

3.5 Respirator Hose

3.5.1 Respirator hose must be NIOSH-approved Clemco respirator hose. Use one or two 50 foot hose(s), or one to three 100 ft. respirator hose to produce a maximum of 300 feet. Attach the female end of the respirator hose to the Constant-Flow Connector. Attach the other end of the respirator hose to an ambient air pump. Refer to table in Section 4.2.2.

4.0 AIR SUPPLY

⚠️WARNING

Air supplied to this respirator system is critical to the safety of the user. Read this section carefully. Poor quality air will cause serious respiratory injury or death to the user. See Toxic Dust Poisoning Warning in Section 1.3.

4.1 Air Quality

4.1.1 The quality of air supplied to the respirator is extremely critical to the safety of the user. Special care must also be taken to avoid accidental connection to any other gas lines; such as, oxygen, acetylene, or nitrogen.

⚠ WARNING

Never connect a breathing air line to an air source that has not been tested for gas and particulate contamination. The presence of unacceptable levels of carbon monoxide (CO) or other gases in the breathing air will cause death to the user.

4.1.2 Breathing air used to supply the respirator must be respirable breathing air and contain no less than 19.5 volume-percent of oxygen. Breathing air shall also meet the requirements for Grade D or higher quality, as described in Compressed Gas Association Commodity Specification pamphlet G-7.1., titled Commodity Specification For Air, published by Compressed Gas Association Inc., Arlington, VA. (42 CFR Chapter 1).

4.1.3 Prior to using the respirator, read the owner's manual and all instructions, labels, and warnings relating to the ambient air pump.

4.1.4 Take precautions to prevent contaminants from entering through the air pump's inlet filter. Locate the air pump's inlet filter away from all sources of contaminants including carbon monoxide, which is found in engine exhaust, and in any form of combustion. Place the pump in an area away from vehicle traffic. Do not locate the pump's inlet filter near any exhaust system outlet, ventilation flue, or source of fumes or particles of any kind. If the ambient air pump cannot be placed in an area where respirable air can be guaranteed, use an air inlet extension hose as specified by the pump manufacturer to bring air from an area where clean respirable air is ensured.

4.2 Air Volume and Pressure

4.2.1 The Apollo 20 LP respirator is designed for use with ambient pumps, that provides 6 to 15 cfm of Grade D breathing air at pressures as noted in the table in Section 4.2.2. According to OSHA regulations, the respirator provides adequate protection at 6 cfm. While 6 cfm is the minimum required air flow, test data show that when 7 cfm or more is used it provides even greater protection for the user.

4.2.2 Use the following table to determine the minimum and maximum pressure setting and maximum respirator hose length.

Total Hose Length	Maximum Number of Hose Sections	Pressure (psi)	
		Min.	Max.
50 feet	1	6	to 10
100 feet	2	8	to 14
200 feet	2	11	to 20
300 feet	3	15	to 20

5.0 OPERATION

⚠ WARNING

- **With the respirator on, leave the blast area immediately if any of the following conditions occur:**
 - **Any part of the respirator system becomes damaged.**
 - **Any air monitoring alarm is activated.**
 - **Airflow into the respirator is reduced or stops.**
 - **Breathing becomes difficult.**
 - **At the first sign of dizziness, nausea, fever, illness or injury.**
 - **Any contamination is noted by taste, smell or vision inside the respirator.**
 - **Vision becomes impaired.**
 - **Any irritation is noted.**
-

5.1 Prior to operation, thoroughly inspect and clean the helmet, breathing tube, respirator hose, air entry ports, and fittings of all dust and debris. Inspect the helmet suspension and adjust if necessary per Section 6.1.

5.2 Begin operation of the ambient air pump per the manufacturer's instructions.

5.3 Check air pressure at the point of attachment. Set the pressure between the minimum and maximum pressures assigned in Section 4.2.2.

5.4 Check all safety, and breathing equipment used in conjunction with the respirator as recommended by the manufacturer.

5.5 Check respirator hose and connections for tightness and leaks.

5.6 Put the respirator on in a clean non-hazardous environment, free of contaminants, where the air is safe to breathe. When putting the respirator on or taking it off, keep it upright to prevent dust and abrasive from falling inside.

5.7 Position the chin strap so it fits comfortably under the chin.

5.8 Position the knit cuff on the inner collar so that it fits snugly around the neck in turtleneck fashion, without any interference from clothing such as shirt collars. When correctly positioned the smaller elastic end of the collar must face up.

⚠WARNING

Correct placement of the inner collar is critical for providing the protection for which the respirator is designed. The collar must be positioned and maintained without any interference from items such as hair, facial hair, or shirt collars, between the collar and user's neck.

5.9 Pull the cape down to fully extend it and connect the four elastic straps (two on each side) under the arms, and tighten using the slides provided.

5.10 Put the belt and Constant-Flow Connector on over the cape. Buckle the belt around the waist, and tighten it by pulling the belt end through the buckle insert.

5.11 When finished blasting and with cleanup, remove the respirator in a clean, non-hazardous environment where the air is safe to breathe.

⚠WARNING

Do not put the respirator on, or store it in a blast contaminated environment. Do not remove the respirator in a contaminated environment except for emergency evacuation when the use of the respirator hinders escape.

NOTE: The quick disconnect coupling on the end of the respirator hose is not equipped with a shut-off. Therefore, if the hose is disconnected from the respirator while the pump is in operation, air will continue to flow freely from the hose. After removing the respirator in a clean environment, the air pump should be shut off.

6.0 ADJUSTMENTS

6.1 Helmet Suspension, Adjustment and Replacement, Figure 2

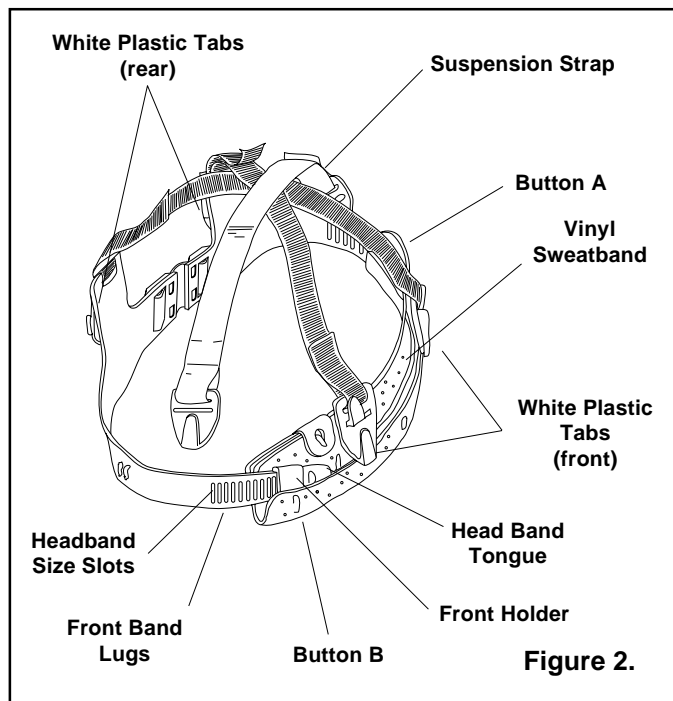


Figure 2.

⚠WARNING

The suspension maintains a fixed distance between the head and the helmet. It is critical that the suspension is properly installed, and adjusted as described, to provide maximum head protection and comfort.

6.1.1 Remove the cape from the helmet per Section 9.4.

6.1.2 Remove and discard the old suspension and suspension strap by extracting the plastic tabs from the wedge-shaped clefts in the shell.

6.1.3 Unfasten the vinyl sweatband from the two lower, outside buttons (A and B in Figure 2).

6.1.4 The suspension fits head sizes 6.5 to 8. Head sizes are marked on the headband slots. Slide the headband tongue through the front holder until the desired head size is reached. It is important that the adjustment be made evenly on both sides. Press the selected slots firmly onto the lugs on the front band.

6.1.5 Fasten the vinyl sweatband onto the buttons of the suspension.

6.1.6 Install the suspension strap before installing the suspension. Insert the yellow end tabs into the clefts on the helmet shell. When correctly installed the strap is between the suspension and helmet shell and above the ears.

6.1.7 Install the suspension by inserting the four white plastic tabs into the clefts on the shell. The tabs must fully seat in their respective locators.

6.1.8 Try the helmet on for fit and readjust if necessary.

6.1.9 Check that the chin strap is in place, then reattach the cape onto the helmet following the instructions in Section 9.4.

7.0 MAINTENANCE PROGRAM

7.1 Basic Service

7.1.1 A program for maintenance and care of the respirator must be established based on application, working conditions, and hazards involved, and include the following basic service.

- Inspection for defects (including a leak check)
- Cleaning and disinfecting
- Repair (service maintenance)
- Storage

Equipment must be properly maintained to retain its original effectiveness. [Reference OSHA Regulations 1910.134 (f)].

7.2 Inspection

7.2.1 Inspect respirators before and after each use. Inspection shall include a check for tightness of connections and the condition of the lenses, suspension, cape and elastic parts, breathing tube, respirator hose and connectors, and Constant-Flow Connector. [Reference OSHA Regulations 1910.134 (f)(2)].

7.2.2 The respirator hose, breathing tube, air entry ports, and fittings must be checked for dust contamination, and cleaned before making connections.

7.2.3 The helmet suspension is a very important component for maintaining maximum head and respiratory protection. It must be inspected for fit and wear on a daily basis, and replaced immediately at the first sign of wear. (See Section 6.1)

7.2.4 The inner collar is a very important factor in controlling air escape from the helmet and preventing ingress of dust. The elastic properties of the collar are intended to provide a snug fit on the user's neck. The cape must be replaced before the collar is stretched to the point where it no longer fits snugly around the neck.

7.2.5 The outer cape provides protection from rebounding abrasive and from abrasive ingress into the helmet. Inspect the outer cape frequently for wear. Replace the cape before holes are worn through, or any wear occurs that prevents the cape from providing the protection for which it is intended.

7.3 Cleaning and Disinfecting

7.3.1 Respirators must be cleaned and disinfected as frequently as necessary to ensure that proper protection is provided to the wearer. Respirators used by more than one person must be cleaned and disinfected after each use. See Section 8.0 for cleaning instructions. [Reference OSHA Regulations 1910.134 (b)(5); 1910.134 (f)(3)].

7.4 Repair (Service Maintenance)

7.4.1 Replacement or repairs shall be done only by trained persons, using genuine Clemco parts designed for the respirator. No attempt shall be made to replace components or to make adjustment or repairs beyond the manufacturer's recommendations. See Sec. 9.0 for service instructions. [Reference OSHA Regulations 1910.134 (f)(4)].

7.5 Storage

7.5.1 Daily Storage

7.5.1.1 When the respirator is not in use, it must be stored in a clean, dry area. Hang the respirator by the handle. Do not tuck the cape inside the helmet. Let the cape hang loose to allow air to circulate, to dry condensation from the cape and from inside the helmet.

7.5.2 Long-term storage

7.5.2.1 After inspection, cleaning and thorough drying, and after necessary repairs are made, the cape should be tucked inside the helmet. The respirator shall then be placed in a plastic bag and the bag sealed to keep out dust and moisture. Place the bag in a clearly marked carton and store it in a clean, dry place. [Reference OSHA Regulations 1910.134 (f)(5)].

8.0 CLEANING

⚠ CAUTION

Follow washing instructions as described in this section. Do not use any caustic chemicals or solvents that may be irritating or harmful to the user, or which change the properties of the materials used in any part of the respirator.

8.1 Outer Cape

8.1.1 The cape can be machine washed using warm water and mild detergent. Dry in a clothes dryer at the lowest temperature setting. Do not dry clean. See Section 9.4 for removal and installation instructions.

8.2 Sweatband and Suspension

8.2.1 The sweatband, suspension, suspension strap, and chin strap should be washed using warm water and mild detergent. See Section 6.1 for removing the suspension.

8.3 Helmet Assembly

8.3.1 The helmet assembly should be wiped clean with mild detergent and water. **DO NOT IMMERSE THE HELMET IN WATER!** While this does not permanently damage the helmet, it will require an extended drying period.

8.3.2 Care must be used to prevent abrasive entry when putting on or removing the respirator and when changing lenses. Vacuum the inside of the helmet to remove any abrasive.

8.4 Inner Lens

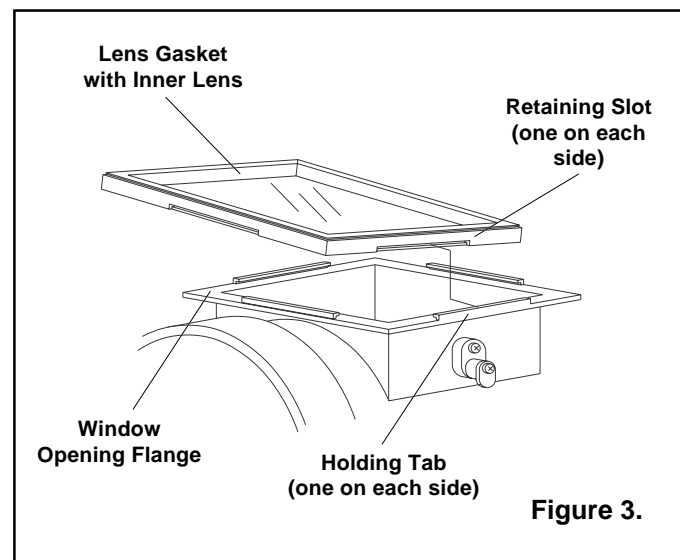
8.4.1 Inner and middle lenses should be replaced when pitted or scratched; however if they become dirty but not pitted, use mild detergent and water to clean them. Volatile solutions such as alcohol, gasoline or ammonia must not be used to clean these lenses. Allow the lens to air dry; cloth and towels can scratch the lens surface.

9.0 SERVICE MAINTENANCE

⚠ CAUTION

Clean the respirator of dust and media before maintenance. All maintenance must be done in a clean environment away from dust and media. Doing so will help prevent ingress of dust and contaminants.

9.1 Replacing Inner Lens, Ref. Figure 3



9.1.1 Open the lens frame.

9.1.2 Remove the middle lens and cover lenses.

9.1.3 Pull the lens gasket and inner lens off the window opening flange. The gasket is held in place by tabs on the flange, that fit into slots on the gasket.

9.1.4 Remove the old lens from the gasket lens channel, and clean the gasket.

9.1.5 Place a new lens into the gasket lens channel. The lens must be in place before affixing the gasket to the window opening.

9.1.6 Identify the retaining slots on the gasket, and the holding tabs located on the helmet window opening shown in Figure 3.

9.1.7 Slide one end of the gasket (with lens) onto the window opening flange, so the holding tab on the opening is inserted into the gasket retaining slot.

9.1.8 Push the gasket against the flange, while working from inside the helmet, push the gasket toward the tab, until the tab is fully inserted into the retaining slot.

9.1.9 Repeat the process on the opposite side. The gasket must be pushed beyond the holding tab in order to insert it into the slot.

9.1.10 Repeat the process on the top and bottom to lock the gasket in place.

9.1.11 Place perforated cover lenses and one middle lens in the lens frame per Section 9.2 before closing the frame.

9.1.12 To maximize the wear life of the inner and middle lenses, do not remove the last perforated cover lens (See Section 9.2). The respirator must never be used without the inner and middle lenses in place.

9.2 Replacing Perforated Cover Lenses, Figure 4

9.2.1 Unlatch and open the lens frame, and remove remnants of old lenses. If the middle lens is not damaged, save it for reuse.

9.2.2 Inspect the lens frame gasket and replace if worn or damaged.

9.2.3 Up to three cover lenses may be installed at one time. For maximum visibility, install only enough lenses to last during a work period.

9.2.4 Preparing lenses in the following manner will permit lenses to be pulled off easily by a user wearing heavy gloves.

9.2.5 Place the middle lens on a clean flat surface. Place up to three cover lenses on top of it.

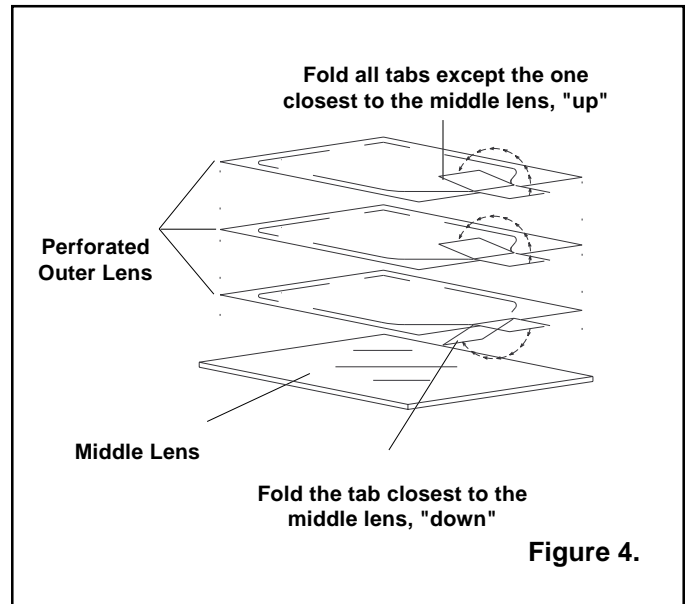
9.2.6 Fold the tab of the bottom lens down as shown in Figure 4.

9.2.7 Fold the tabs of the second, and top lens up.

9.2.8 Place the stack of prepared lenses into the lens frame so the folded tab of the top lens sticks through the front of the lens opening. When placed correctly, the perforated lenses will be against the frame, and the middle lens will be behind them offering additional support.

9.2.9 Installing the lenses in this manner will prevent

unintentional removal of the last perforated lens and prolong the life of the middle and inner lenses. It will be easier to remove the cover lens while wearing heavy gloves, if the tab is bent outward slightly.



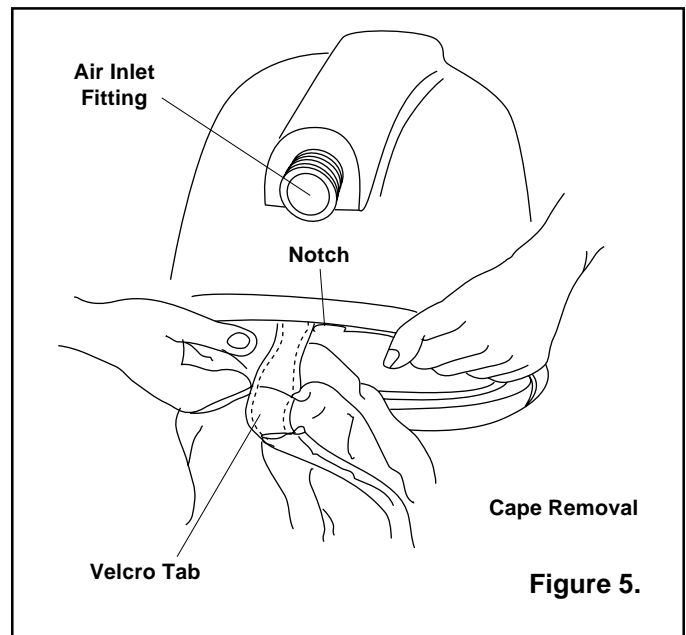
9.3 Suspension

9.3.1 To replace and adjust suspension, see Section 6.1

9.4 Outer Cape

9.4.1 When the cape becomes soiled or requires replacement, it can easily be removed as follows.

9.4.2 Separate the Velcro tabs on the back of the cape. See Figure 5.



9.4.3 Slide the ends of the cape to the notch. Continue sliding one end of the cape out of the groove until the entire cape is detached from the helmet.

9.4.4 To install the cape, separate the Velcro tabs on the cape and slide one end into the groove on the bottom edge of the cape attachment strap at the point where the groove is notched. Continue sliding the cape around the bottom of the helmet until the entire cape is completely into the groove. NOTE: Spraying a non-toxic silicone-base lubricant into the groove will reduce friction and ease assembly.

9.4.5 Join the Velcro tabs at the notch.

9.5 Air Channel Partition

9.5.1 Remove the cape and suspension per Sections 6.1 and 9.4.

9.5.2 Pull the partition from the front, to unsnap it from the retainers. Remove the back end of the partition from the tabs.

9.5.3 Place a new partition into the hood, with the slots in the back end placed behind the tabs.

9.5.4 Apply pressure on the front of the partition, while working from the back to snap it in place.

9.5.5 Replace the suspension and cape.

9.6 Lens Frame

9.6.1 The lens frame must be replaced at the first sign of wear, or of cracking around the hinge.

9.6.2 Open the lens frame, and remove the perforated cover lenses and middle lens.

9.6.3 Remove the two hinge screws, and replace the frame.

9.6.4 Install a new gasket in the frame before installing lenses.

9.7 Rubber Latch

9.7.1 Pull the old latch off of the three lugs.

9.7.2 Align the holes in the new latch over the lugs, with the flat side toward the frame.

9.7.3 Push the latch over each lug, making sure the rubber is under the lug.

9.8 Chin Strap

9.8.1 Replace the chin strap when worn.

10.0 REPLACEMENT PARTS

10.1 Supplied-Air Respirator Systems, and Alternate Accessories

Item	Description	Stock No.
(-)	Apollo 20 LP, less respirator hose	21299
(-)	Apollo 20 LP, complete, with 50 foot respirator hose	21423
(-)	High pressure conversion kit. Converts Apollo 20 low pressure (ambient air) respirator to high pressure (Grade "D" Compressed Air) respirator	22690

10.2 Supplied-Air Respirator replacement parts, Figure 6

Item	Description	Stock No.
1.	Gasket, molded window	99996
2.	Inner lens, 4-5/8" x 6-5/8" nom., Package of 5	21409
3.	Middle lens, 5" x 7" nom., package of 5	21410
4.	Cover lens, perforated, package of 25	21411
5.	Gasket, lens frame	21041
6.	Lens frame	20976
7.	Latch, lens frame, rubber	21298
8.	Button, rubber latch	21040
9.	Suspension	10532
10.	Air channel partition kit	21118
11.	Cape attachment strap	10534
12.	Cape with inner collar	21301
13.	O-Ring, .864" ID x 1.004" OD	22349
14.	Breathing tube assembly w/molded ends	21550
15.	Constant-flow connector, LP.....	21429
16.	Belt assembly, 2"	04430
17.	Respirator hose, 1/2" x 50 ft.	22510
	1/2" x 100 ft.	21413
18.	Nut, lens frame	90041
19.	Screw, lens frame	90295
20.	Screw, 8-32 x 1/2" sm	21402
21.	Screw, 8-32 x 1" sm	21403
22.	Washer, breathing tube, package of 6.....	04370
23.	Chin strap	04460
24.	Chin strap holder, 2 required	21696
25.	Screw, 8-32 x 1/2" ph hd, 2 required	21119

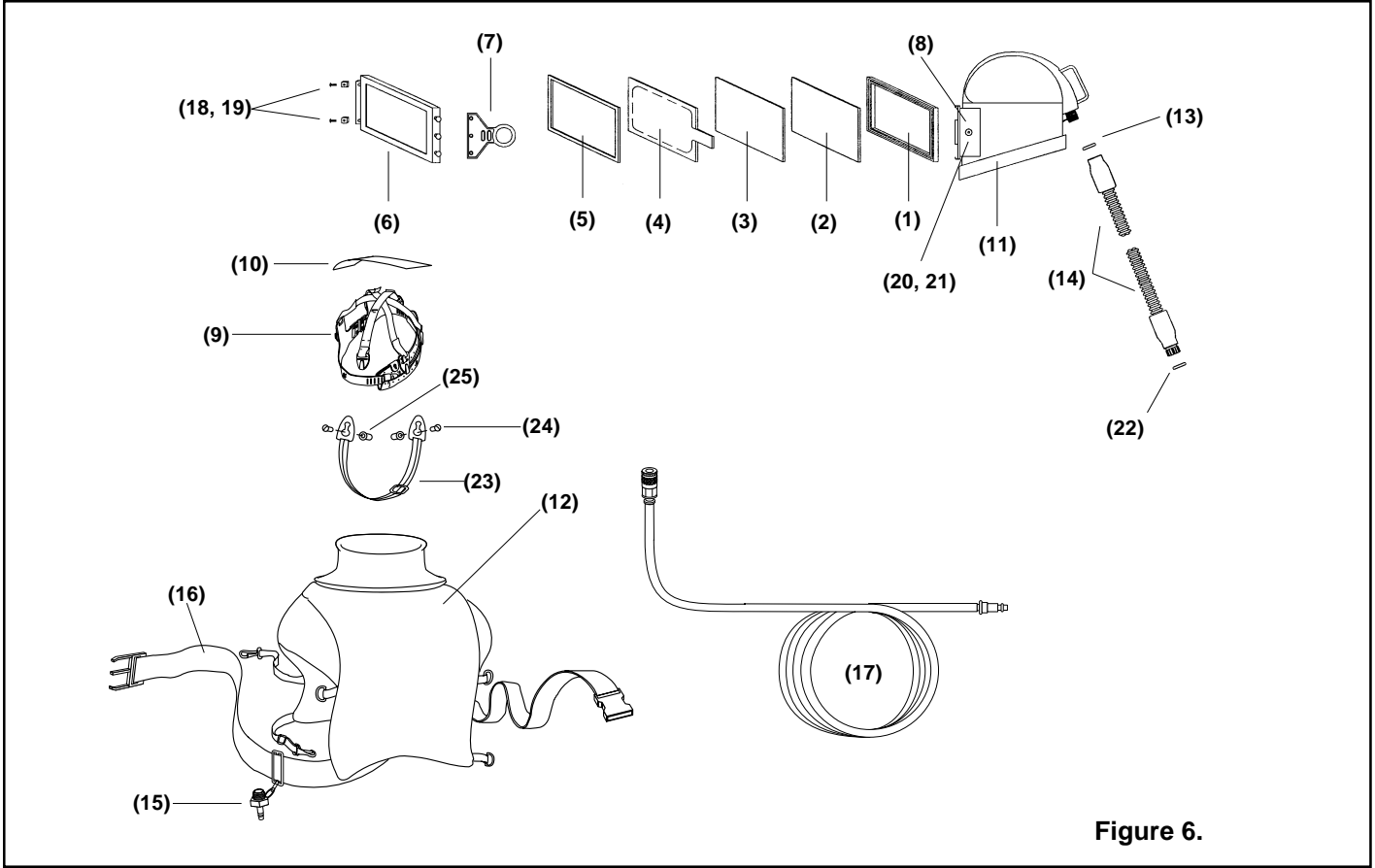


Figure 6.