TECHNICAL MANUAL

OPERATOR'S ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

BREATHING APPARATUS, OXYGEN-GENERATING, M20

NSN 4240-00-678-5263

This copy Is a reprint which includes current pages from Changes 1 and 2.

H E A D Q U A R T E R S , D E P A R T M E N T O F T H E A R M Y
J U L Y 1 9 7 5

Change

No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C.,2May 1994

Operator's Organizational, Direct Support
and General Support Maintenance Manual
(Including Repair Parts and Special Tools List)
BREATHING APPARATUS, OXYGEN-GENERATING, M20

TM 3-4240-212-14&P, 1 July 1975, is changed as follows:

1. Remove old pages and insert new pages as indicated below.

2. New or changed material is indicated by a vertical bar in the margin of the page.

Remove pages	Insert pages
A	A
2-5 and 2-6	2-5 and 2-6

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CHANGE
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *17 May 1983*

**Operator's Organizational, Direct Support,
and General Support Maintenance Manual
(Including Repair Parts and Special Tools List)
BREATHING APPARATUS, OXYGEN-GENERATING, M20
(NSN 4240-00-678-5263)**

TM 3-4240-212-14&P, 1 July 1975, Is changed as follows:

1. Remove old pages and insert new pages as Indicated below New or changed material is indicated by a vertical bar In the margin of the page. Added or revised Illustrations are indicated by a vertical bar adjacent to the identification number. Delete the warnings on inside front cover with pen and ink.

Remove pages	*Insert pages*
None	A
i and	i and ii
2-1 and 2-2	2-1 and 2-2
2-5 and 2-6	2-5 and 2-6
4-1 and4-2	4-1 and 4-2
B-1 and B-2	B-1 and B-2
B-5 and B-6	B-5 and B-6
B-9 and B-10	B-9 and B-10

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By Order of the Secretary of the Army-

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Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-28, Organizational Maintenance requirements for Breathing Apparatus, Oxygen-Generating.

WARNINGS

Do not use the breathing apparatus for chemical-biological agent protection In atmospheres where the use of impermeable protective clothing is required.

Do not use the breathing apparatus in an explosive gas atmosphere

Never allow any substance to enter the canister neck-especially oil, gasoline, or grease. The canister contains oxygen-producing chemicals which will cause flammable material to burn. Keep the outside of the canister, the foil seal, and the inside of the plunger valve assembly free of moisture, oil, dirt, or grease.

Do not use the canister after the initial preset time has elapsed. Once the oxygen starts generating in the canister, it will continue as long as moisture and carbon dioxide are in the canister or until the oxygen-producing chemical is expended, even if the apparatus is not being worn. The canister must be replaced before using the apparatus again.

Do not touch the bottom of the quick-starting canister with bare hands after starting apparatus. It will be hot. Wear gloves to protect the hands.

Make sure that the apparatus is supplying oxygen and that all its connections are tight before entering a contaminated area.

Return to fresh air immediately after the timer rings. Remove the facepiece or change canisters in fresh air only.

The timer works independently of the functioning of the apparatus or the breathing rate of the wearer. Each user must learn from personal experience the indications and feeling when a canister is no longer capable of generating oxygen.

Canisters contain Potassium Superoxide which is a chemical that is extremely corrosive to all body tissues with direct contact. Exposure to this chemical is highly unlikely during normal use of the canister, however, used canisters must be handled as hazardous waste to avoid the possibility of future environmental health hazards.

DO NOT throw away used canisters in ordinary trash.

DO turn in used canisters to your hazardous waste management office or Defense Reutilization and Marketing Office (DRMO).

Disposal of hazardous waste is restricted by the Resource Conservation and Recovery Act as amended (42 U.S.C.A. sec 6901 et seq). Violation of these laws is subject to severe criminal penalties

Return to fresh air before investigating or correcting any malfunctions in the breathing apparatus.

LIST OF EFFECTIVE PAGES

Insert latest changed pages; dispose of superseded pages in accordance with applicable regulations.
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*Zero in this column indicates an original page.

TECHNICAL MANUAL
No. 3-4240-212-14&P)

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *1 July 1975*

OPERATOR'S ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) BREATHING APPARATUS, OXYGEN-GENERATING, M20 (NSN 4240-00-678-5263)

Current as of May 1975

***This manual supersedes TM 3-4240-212-15, 13 September 1960, and TM 3-4240-212-25P, 24 July 1967, including all changes.**

LIST OF ILLUSTRATIONS

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

These instructions are for use by the operator, and by organizational, direct support, and general support maintenance personnel. They apply to the M20 oxygen-generating breathing apparatus.

1-2. Record and Report Forms

a. Equipment maintenance forms and procedures for their use are prescribed in TM 38-750.

b. The reporting of errors, omissions, and recommendations for improving this manual by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 (Test) located in the back of the manual and forwarded direct to Commander, Edgewood Arsenal, ATTN: SAREA-DE-ET, Aberdeen Proving Ground, MD 21010.

Section II. DESCRIPTION AND DATA

1-3. Description

a. General. The M20 oxygen-generating breathing apparatus (OBA) (fig. 1-1) is a self-contained breathing device that operates independently of outside air. It is carried on the operator's back and will supply oxygen for 60 minutes. To insure sufficient time for use of the OBA in an emergency, a safe limitation of 45 minutes has been established for the life of the canister. The breathing apparatus consists of a facepiece group, backplate assembly, harness assembly, oxygen-generating canisters, spanner wrench, and accessories.

b. Facepiece Group (fig. 1-2).

(1) Faceblank. The molded rubber faceblank is available in one size and will fit most faces. Openings in the faceblank accommodate two plastic lenses and the facepiece valve assembly. Lens clamps secure the lenses in the faceblank. Integral deflectors direct air against the lenses to help prevent fogging. The singlepiece, rubber head harness consists of five adjustable straps and a head pad. Five buckles (two at the cheeks, two at the temples, and one at the forehead) attach the head harness to the faceblank.

(*2) Facepiece valve assembly.* The facepiece valve assembly is a tubular-metal housing with an inles branch, outlet branch, and facepiece fitting. A check valve is located inside each branch of the facepiece valve assembly. A manually operated pressure relief valve is used to release excess pressure. It is located on the inlet branch of the facepiece valve assembly A nut and washer fasten the facepiece valve assembly in the faceblank. A housing clamp seals the junction.

(3) Breathing tubes. The breathing apparatus has two flexible-rubber breathing tubes. A hose clamp fastens one end of each breathing tube to the facepiece valve assembly; a coupling on the other end of each breathing tube connects one tube to the inhalation elbow, and the other tube to the plunger valve assembly.

c. Backplate Assembly (fig. 1-3).

(1) Guard and backplate assembly. The guard and backplate assembly consists of a canister guard mounted on a backplate; the backplate is curved to fit the operator's back. A pad on the backplate provides a cushioning support for the operator's back. Insulating material covers the assembly and prevents heat from being transferred to the assembly from the canister.

(2) Bail assembly. A bail assembly is pivotmounted on the canister guard. The assembly consists of a bail with a jack-screw. The jack. screw contains a handwheel and a pressure plate, which secures the canister in the canister guard.

(3) Breathing bag. The breathing bag is made of rubber-coated fabric. It contains two rubber hoses that are permanently cemented in place. A portion of each hose extends outside the bag. One hose extension serves as an outlet, the other as an inlet. Hose connections and tabs on the bottom of the bag support the breathing bag on the guard and backplate assembly.

(4) Inhalation elbow. An inhalation elbow is

Figure 1-1. Oxygen-generating breathing apparatus, M20.

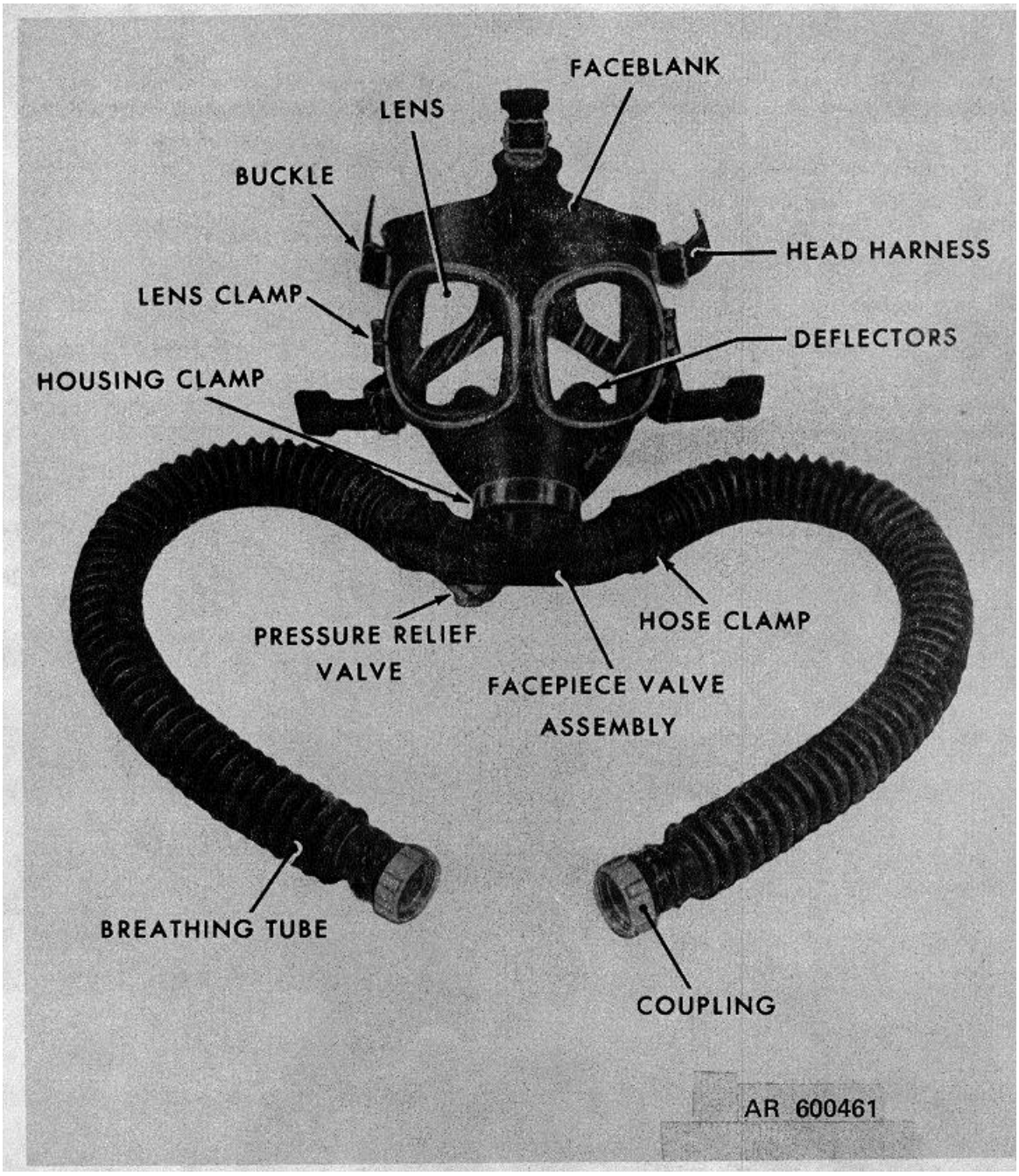

Figure 1-2. Facepiece group.

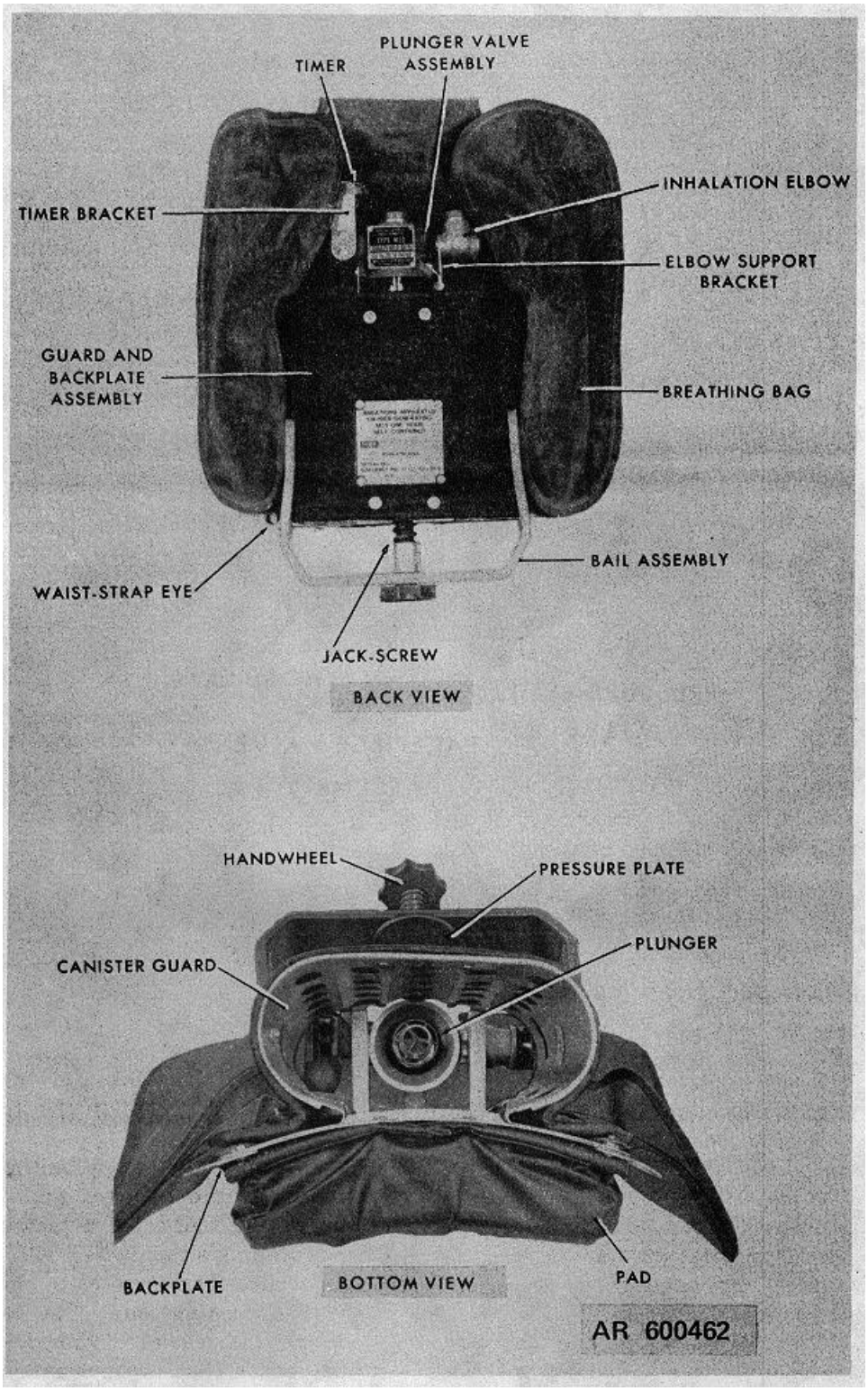

Figure 1-3. Backplate assembly, back and bottom views.

mounted on the canister guard with an elbow support bracket. The elbow adapts the breathing bag outlet hose to the coupling end of the inhalation breathing tube.

(5) Plunger valve assembly. A plunger valve assembly is mounted on the canister guard. The assembly has a connection at the top for the exhalation-breathing-tube coupling and a connection at the side for the breathing-bag inlet hose. The bottom of the assembly is shaped to receive the neck of the canister. A plunger pierces the copper-foil seal that covers the canister neck.

(6) Timer and timer bracket. A timer is mounted on the plunger valve assembly by a timer bracket. The timer knob, when turned clockwise, simultaneously winds and sets the timer (up to 60 minutes). (A safe limitation of 45 minutes has been placed on the life of the canister.) The timer dial is marked in increments of 1 minute. Every 5 minutes is marked with a heavy dark line; every 10 minutes is marked with a number. An alarm bell rings at 40 minutes and again at the end of the 45 minutes (the set time). Some timers have a stop nut that limits the setting to 45 minutes.

d. Harness Assembly. The harness assembly (fig. B-3) has two shoulder straps, two chest straps, and two waist straps that support the backplate assembly on the operator's back. During assemblies fasten the shoulder and chest straps to the top of the backplate assembly. Snaphooks on the waist straps fasten to waist strap eyes at the bottom of the backplate assembly. An eyelet on one chest strap and a hook on the other chest strap fasten the harness around the operator. A tie strap holds the shoulder straps in place on the shoulders. Two breathing tube straps hold the breathing tubes in position. Slides on the shoulder, chest, and waist straps adjust the strap length for proper fit.

e. Oxygen-Generating Canisters. Either a standard canister (gray, requires outside air to activate) (fig. 1-1) or a quick-starting canister (green, self-activating) can be used with the M20 breathing apparatus. The standard canister is used when the ambient temperature is above 50° F.; the quick-starting canister is used when the ambient temperature is below 50° F. If desired, the quick-starting canister may be used at all temperatures. (Its starting time is the same in all temperatures). The standard canister can be used when the temperature is below 50 °F., but it is slow to start (requires as along as 20 minutes). If a standard canister is to be used in temperatures below 50 °F., it should be kept warm before use for a faster start. User instructions are printed on the outside of each canister.

NOTE

The standard canister has been discontinued by MSA. However, there are standard canisters in stock which should be used until the supply is expended. At that time, three quickstarting canisters will be supplied with the M20.

(1) Standard canister The standard canister contains chemicals (oxides of sodium and potassium) that release oxygen when exposed to moisture. A foil seal covers the neck opening to protect the chemical filling from moisture until the canister is installed for use. A disk and a tearoff cap protect the foil seal. They are removed before the canister is installed. A flange and gasket on the canister neck seal its junction with the plunger valve assembly when the canister is installed in the guard. A plunger in the valve assembly pierces the canister's foil seal and opens the neck. Inside the canister a copper tube extends from the center of the neck opening to the bottom. Exhaled breath enters the canister through the tube, passes upward through the tube and through the chemical filling. Moisture and carbon dioxide in the exhaled breath react with the chemicals to produce oxygen which passes out the canister neck from around the tube.

(*2) Quick-starting canister.* The quickstarting canister is similar to the standard canister, except that a chlorate candle is installed in its base. The chlorate candle supplies oxygen until the chemical reaction begins in the canister. The candle also produces heat which accelerates the rate of action between the filling and the exhaled breath. A cover protects the starting mechanism of the chlorate candle A lanyard connects the cotter pin to the cover. Withdrawing the cotter pin releases the starting mechanism that ignites the chlorate candle. Early models of the quick-starting canister have two chlorate cnadles installed in the base of the canister.

f. Accessories.

(1) Carrying case. The luggage-type case (fig. 1-1) is made of composition board and metal. It has a leather-strap handle. The case is compartmented to hold the canisters, breathing apparatus, and accessories. Two luggage clamps secure the hinged lid.

(*2) Spanner Wrench.* A spanner wrench (fig. 1-1) is supplied with the apparatus. The wrench is used to tighten or loosen the breathing tube couplings.

(3) Antifogging kit. The antifogging kit furnished with the breathing apparatus is a

chemically treated cloth in a tubular container. Rubbing the lenses with the cloth prevents fogging. Instructions for use are printed on the containers.

(*4) M20 oxygen breathing apparatus hood.* The rubber-coated cloth hood is worn over the facepiece to protect the head and neck of the wearer. An opening in front is ringed with elastic material, which fits around the facepiece lenses and valve assembly to hold the hood in place. The M20 hood is the only hood designed to be used with the breathing apparatus.

1-4. Tabulated Data

All numerical data are approximate.

Carrying case:

Length	23 1/8 In
Width	17 1/4 in
Depth	10 1/8 In
Cubage	2.2 cu ft

Weights:

Breathing apparatus without canisters	13 lb
Regular canister	4 1/2 lb
Quick-starting canister	4 3/4 lb
Carrying case (empty)	13 lb
Carrying case. breathing apparatus, three canisters, and accessories	40 lb

Life of canisters:

Shelf life	Indefinite
Useful life	Recommended for 45 minutes from the time the canister begins to generate oxygen

Section III. USE AND FUNCTIONING

NOTE

Users of the breathing apparatus should work in pairs. One man can check on the other man's elapsed time on a single canister and assist him if necessary.

WARNING

Do not use the breathing apparatus for chemical-biological agent protection in atmospheres where the use of full impermeable protective clothing is required.

WARNING

Do not use the breathing apparatus in an explosive gas atmosphere.

1-5. Use

Since the wearer breathes only oxygen generated within the canister, the breathing apparatus can safely be used to provide respiratory protection against irrespirable gases, vapors, aerosols, or combinations thereof, and in oxygen-deficient atmospheres. The hood presently issued with the breathing apparatus has no inner seal (such as that on the M3 toxicological agent protective hood) which can be used to provide an effective, vapor-proof seal with the M3 toxicological agent protective suit. Also, the stitching holes in the seams of the M20 hood have not been sealed. Use of the breathing apparatus with hood in atmospheres having high concentrations of chemical or biological agents may result in physiological reactions caused by absorption of the agent through the skin in the head or neck areas. Since, at this time, there is no protective hood which can be used with the breathing apparatus to provide impermeable protection to the head and neck areas of the wearer, the breathing apparatus must not be used for chemical-biological protection in atmospheres where the use of full impermeable protective clothing is required.

1-6. Functioning

a. The breathing apparatus removes carbon dioxide and moisture from exhaled breath and generates oxygen to replace that consumed by the operator. Exhaled breath flows from the facepiece (fig. 1-4), through an exhalation valve in the facepiece valve assembly, and through the exhalation breathing tube to the plunger valve assembly The plunger valve assembly routes the exhaled breath through the canister and into the breathing bag

b. As the exhaled breath passes through the canister, moisture in the breath reacts with the chemical filling to form oxygen directly: A secondary reaction between the carbon dioxide in exhaled breath and the chemical filling forms water. The water, in turn, continues to react with the filling to form additional oxygen Once the generation of oxygen starts in the canister, it will continue as long as moisture and carbon dioxide

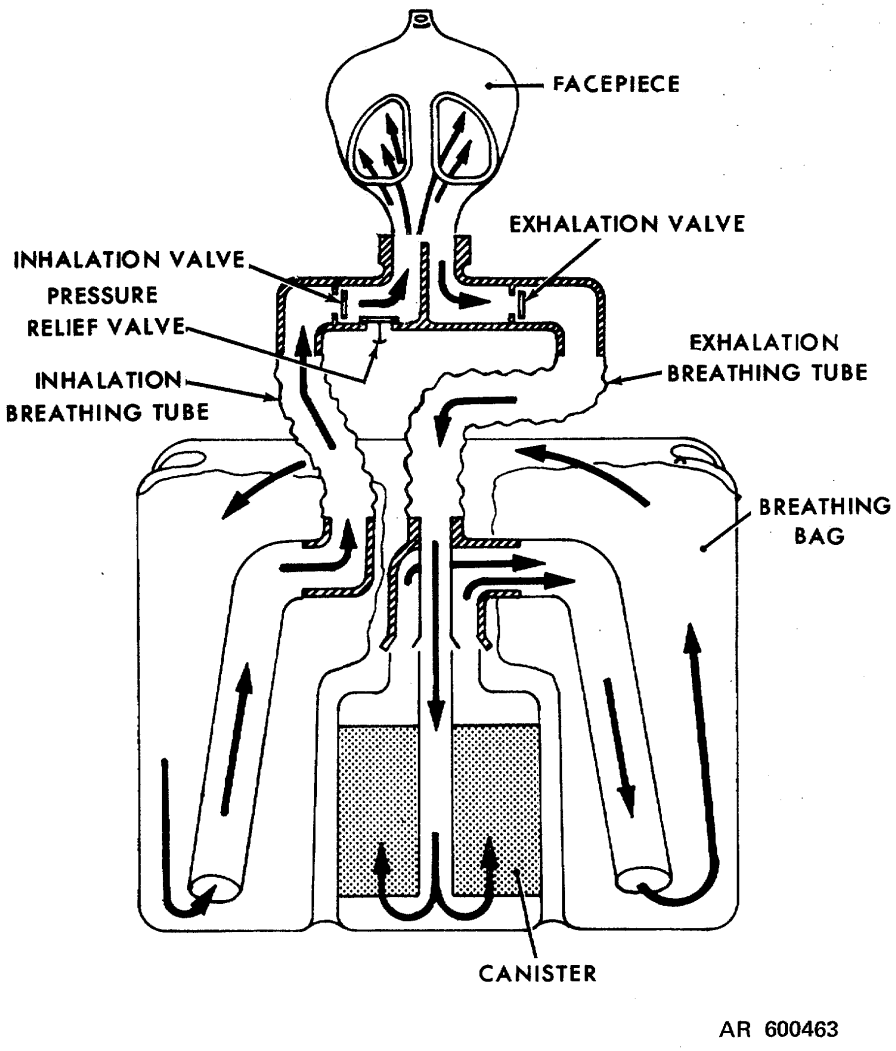

Figure 1-4. Apparatus airflow.

are in the canister or until the oxygen-producing chemical is expended even if the apparatus is not being worn. The generated oxygen flows from the canister into the breathing bag. The heat evolved during the chemical reaction is dissipated as the breathing mixture circulates in the breathing bag.

c. When the operator inhales, air is drawn from the breathing bag through the inhalation breathing tube, the inhalation valve in the facepiece valve assembly, and then into the facepiece. A pressure relief valve in the facepiece valve assembly allows the operator to release any excess pressure that builds up in the breathing apparatus.

1-7. Use of Spectacles

a. Of the spectacles tested, the only ones found to satisfactory for use with the breathing apparatus are Bausch and Lomb Standard, Semi-Rimless, Highland Bal-Grip. Personnel who must wear spectacles while using the apparatus should request them from the medical officer in charge. The spectacles should meet the following specifications:

(1) Eye size ..... 42 to 46 mm
(2) Bridge ..... 18 to 24 mm
(3) Lens prescription plastic (CR-39), oval shape
(4) Temple ..... size 5 1/2 in to 7 in., type CC, plain. U15b, flat without embossment

b. When wearing spectacles with the apparatus, the M20 OBA hood must be attached to the facepiece.

CHAPTER 2
OPERATING INSTRUCTIONS

Section I. PREPARATION FOR USE

2-1. Before Operating

a. Remove M20 breathing apparatus from carrying case.

b. Inspect apparatus for loose or missing parts and for any apparent damage. Give special attention to the backplate assembly, harness assembly, canisters, and hood.

c. Test pressure relief valve operation (para 3-2).

d. Test timer operation (para 3-4),

e. Adjust and test facepiece group (para 3-3).

f. Ensure that inside of plunger valve assembly is free of oil, dirt, or grease.

g. Clean lenses with a soft cloth and rub with antifogging cloth.

h. Report any defects to organizational maintenance personnel.

2-2. Assembling Breathing Apparatus

a. Installing Hood on Facepiece.

(1) Thread coupling end of breathing tube assemblies through hood opening (A, fig. 2-1) so that breathing tubes and valve assembly extend outside the hood.

(2) Fit hood opening around top of lenses and around bottom of facepiece (B) below valve assembly.

b. Connecting Breathing Tubes.

(1) Connect exhalation breathing tube coupling to threaded inlet at top of plunger valve assembly. Turn coupling fingertight (as tight as possible with the fingers).

(2) Connect inhalation breathing tube coupling to threaded outlet of inhalation elbow. Turn coupling fingertight.

(3) Tighten both couplings with spanner wrench.

(4) Unsnap the breathing tube straps (1, fig. B-3). Place one breathing tube inside each strap and refasten. The straps hold the breathing tubes in position when wearing the apparatus.

c. Preparing Canister.

WARNING

Never allow any substance to enter the canister neck-especially oil, gasoline, or grease. The canister contains oxygen producing chemicals which will cause flammable material to burn. Keep the outside of the canister, the foil seal, and the Inside of the plunger valve assembly free of moisture, oil, dirt, or grease.

CAUTION

Do not pull lanyard on quick-starting canister before installation or canister will deform and blow out the seal and gasket.

(1) If available, use a standard canister when temperature is above 50° F.; use a quickstarting canister if temperature is from 30°F to 50° F.

(2) Pull tab extending from canister tear-off cap (use pliers, if needed, to remove cap).

(3) Remove disk from canister foil seal,

(4) If a quick-starting canister is used, remove cover from candle-starting mechanism by lifting end of cover nearest bottom edge of canister. Slide cover toward center of canister base.

(5) Allow cover to dangle from lanyard; DO NOT PULL LANYARD AND RELEASE COTTER PIN AT THIS TIME.

d. Installing Canister.

(1) Turn handwheel on bail assembly counterclockwise until pressure plate clears canister guard.

(2) Insert canister in guard and swing bail back until bottom of canister rests on pressure plate.

(3) Turn handwheel clockwise until canister neck is firmly seated in plunger valve assembly.

(4) When a quick-starting canister is installed, pass loosened candle cover and lanyard through bail assembly toward front of apparatus so that the cotter pin can be removed by a direct pull, DO NOT PULL COTTER PIN AT THIS TIME.

Section II. OPERATION UNDER NORMAL CONDITIONS

2-3. Starting Apparatus

a. General. Prepare apparatus for use (para 2-1 and 2-2). If an assistant is available, the apparatus may be put on before starting; otherwise, it must be started and then put on.

b. Starting Apparatus Using Standard Canister.

(1) Place apparatus on a flat surface so that

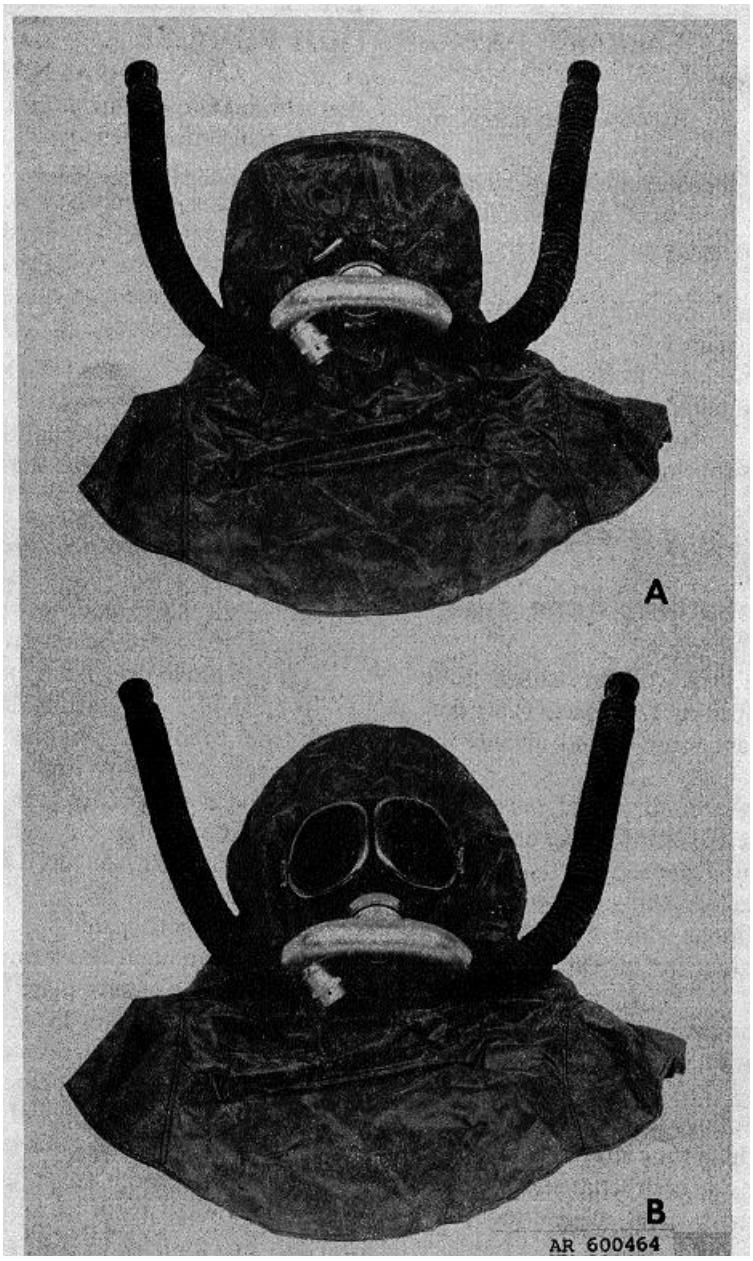

Figure 2-1. Hood installation

the facepiece can be donned separately.

(2) Don facepiece (as follows) and pull hood back overhead.

(a) Grasp facepiece between thumb and fingers, insert chin, and push head harness over the top of the head gently. Do not stretch head harness more than necessary.

(b) Make sure that head harness straps lie flat against head and that the harness pad is centered on back of head.

(c) Adjust harness straps so that facepiece fits snugly and comfortably against face.

(d) Place hand around housing clamp. Wiggle the facepiece from side to side, causing the rubber to sit more tightly against the face. Take up looseness by readjusting the straps. Start at the bottom and work upward.

(3) Close inhalation (right-hand) breathing tube by squeezing it firmly, depress stem of pressure relief valve, and inhale deeply.

(4) Release breathing tube and stem of pressure relief valve and exhale.

(5) Repeat steps (3) and (4) above until breathing bag is fully inflated.

(6) Deflate breathing bag by depressing stem of pressure relief valve and pressing on bag.

(7) Feel bottom of canister. If it is warm, inflate breathing bag for use by following steps (3) through (5) above. If it is not warm, repeat steps (3) through (6) above until canister becomes warm.

WARNING

Do not use canister after initial preset time has elapsed. Once the oxygen starts generating in the canister, it will continue as long as moisture and carbon dioxide are in the canister or until the oxygen-producing chemical is expended, even if the apparatus is not being worn. The canister must be replaced before using the apparatus again.

WARNING

The timer works independently of the functioning of the apparatus, or the breathing rate of the wearer. Each user must learn from personal experience the indications and feelings when a canister is no longer capable of generating oxygen.

(8) Set timer (clockwise) to desired minutes, not to exceed 45 minutes. When setting timer, consider time required by user to return to fresh air and, if necessary, to decontaminate equipment.

(9) Remove facepiece.

(10) Put on apparatus (para 2-4)

c. Starting Apparatus Using Quick-Starting Canister.

(1) Follow the same procedures listed for the standard container in para 2-3 *b* (1) through (6). Heed the same warning and note

(2) Set timer to desired minutes not to exceed 45 minutes. When setting the timer, consider time required by user to return to fresh air, plus time required by user to decontaminate equipment before removing mask.

(3) Remove cotter pin from candle-starting mechanism by pulling the cover that is attached to the lanyard.

WARNING

Do not touch the bottom of quickstarting canister with bare hands after starting apparatus. It will be hot.

(4) Smoke may come from the facepiece when the candle begins to function. Allow the smoke to dissipate before donning facepiece

(5) Insure that breathing bag inflates. Sufficient oxygen is generated within a few seconds to supply the user with oxygen until exhaled breath starts normal functioning.

(6) Don apparatus (para 2-4).

2-4. Putting on Apparatus (figs. 2-2 and 2-3)

a. Unfasten chest straps and straighten shoulder straps.

b. Put arms through shoulder straps and raise apparatus onto back by the shoulder straps.

c. Fasten chest straps around body by inserting hook on one strap into eyelet of the other strap.

d. Adjust shoulder and chest straps to h6ld apparatus securely on back. The backplate pad should rest against small of back.

e. Grasp facepiece between thumb and fingers, insert chin, and gently push head harness over top of head. Adjust head harness straps so that facepiece fits snugly against face (para 3-3b through e).

f. Close inhalation (right hand) breathing tube by squeezing it firmly. When this is done, the facepiece will collapse if it is fitted properly.

g. Pull hood over head and arrange cape of hood over neck and shoulders.

h. If a seal is required, tape hood to clothing.

2-5. Using Apparatus

WARNING

Make sure that apparatus is supplying oxygen and that all its connections are tight before entering an oxygen deficient area.

Figure 2-2. Donned apparatus, front view.

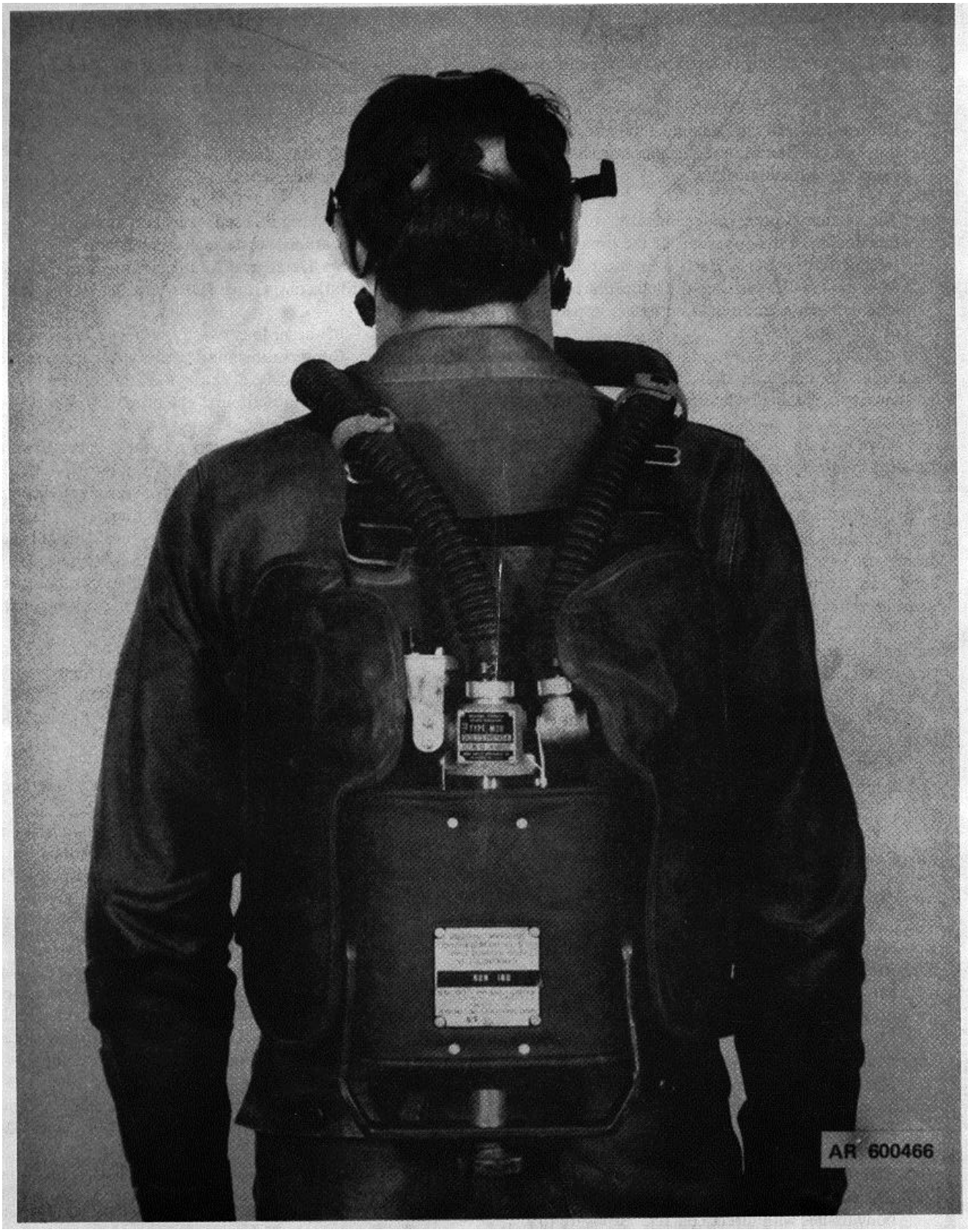

Figure 2-3. Donned apparatus, back view

a. During operation, release excess pressure that may build up in breathing bag and facepiece by depressing stem of pressure relief valve (fig. 2-4). Do not allow the breathing bag to partially collapse by releasing too much air.

WARNING

Return to fresh air immediately after the timer rings. Remove the facepiece or change canisters in fresh air only.

The timer works independently of the functioning of the apparatus or the breathing rate of the wearer. Each user must learn from personal experience the indications and feeling when a canister is no longer capable of generating oxygen.

b. Be alert for malfunctions and ringing of timer. Depletion of canister is indicated by an increase in resistance to breathing or lens fogging, as well as by the timer alarm.

c. Move to fresh air after mission is completed, when a malfunction occurs, or when the timer rings.

2-6. Stopping Operation

a. If clothing or apparatus has become contaminated during use, wash off contamination before removing hood and facepiece. A shower can be taken while wearing protective clothing and apparatus.

b. Remove hood and facepiece. If wet, do not allow water to enter breathing tubes.

c. Lift facepiece up and over the head; let it drop back over the shoulders suspended by breathing tubes.

d. Unhook chest straps and remove apparatus from back.

e. Wipe apparatus to remove moisture.

f. Remove and dispose of used canister (para 2-7).

2-7. Removing and Disposing of Canister

a. Removing Canister.

WARNING

The canister may be hot after use. Wear gloves to protect the hands.

(1) Lay the apparatus on a bench or table with the backplate and pad down.

(2) Turn handwheel on bail counterclockwise until pressure plate clears canister guard.

(3) Swing bail outward and tilt the top of the apparatus upward to allow canister to slide from guard.

(4) If canister sticks in guard, jar apparatus to free canister or pry canister from guard.

b. Disposing of Canister

WARNING

Canisters contain Potassium Superoxide which is a chemical that is extremely corrosive to all body tissues with direct contact. Exposure to this chemical is highly unlikely during normal use of the canister; however, used canisters must be handled as hazardous waste to avoid the possibility of future environmental health hazards:

DO NOT throw away used canisters as ordinary trash.

DO turn in used canisters to your hazardous waste management office or Defense Reutilization and Marketing Office (DRMO).

Disposal of hazardous waste is restricted by the Resource Conservation and Recovery Act as amended (42 U.S C.A. sec 6901 et seq). Violation of these laws is subject to severe criminal penalties.

(1) Turn in the used canister to your hazardous waste management office or DRMO for proper disposal.
(2) Notify either office that proper disposal instructions are contained in the canister's Material Safety Data Sheet (MSDS) which is available through the Hazardous Materials Information System.
(3) Provide the following information about the canister to either office m order to help it obtain the proper MSDS.

- The Federal Supply Class (FSC) is 4240.
- The National Items Identification Number (NIIN) is 001741365.
- The Commercial and Government Entity Code (CAGEC) is 40912.
- The Part Number is 92908
- The trade name is Chemox Canister (Breathing Apparatus).

(4) In the very unlikely possibility that chemicals are spilled from the canister, notify your hazardous waste management office immediately for proper disposal. Do not come in direct contact with the chemicals

2-8. After Operating

a. Unsnap breathing tube straps. Remove breathing tubes and refasten strap around harness shoulder straps

b. Uncouple breathing tubes from backplate assembly

c. Clean inside of facepiece with soap and water Keep liquid from flowing into the mask assembly

d. Allow apparatus to dry

e. Replace faceform into cavity of facepiece, return breathing apparatus to the carrying case See figure 2-5 for proper storage.

f. Report any damage or defects discovered during operation to organizational maintenance personnel.

Figure 2-4. Using pressure relief valve

Figure 2-5. M20 apparatus in carrying case.

Section III. Operation Under Unusual Conditions

2-9. Using Breathing Apparatus in Cold Weather

To make sure that your breathing apparatus functions properly in cold weather.

a. Keep the breathing apparatus free of ice and snow, whenever possible.

b. If the breathing apparatus should become icy or wet, warm the apparatus when you can an., remove moisture with a clean, dry cloth.

c. When temperature Is from -30° F. to 50° F use the quick starting canister.

CHAPTER 3

OPERATOR'S MAINTENANCE

Section I. TROUBLESHOOTING

WARNING

Return to fresh air before investigating or correcting any malfunctions.

3-1. Scope

a. This section contains troubleshooting or malfunction information and tests for locating and correcting most of the troubles which may develop in the M20 breathing apparatus Each malfunction or trouble symptom for an individual component, unit, or system is followed by a list of tests or inspections necessary for you to determine probable causes and suggested corrective actions for you to remedy the malfunction.

b. This manual cannot list all possible malfunctions that may occur or all tests or inspections, and corrective actions If a malfunction is not listed (except when malfunction and cause are obvious), or is not corrected by listed corrective actions, you should notify higher level maintenance.

c. Table 3-1 lists the common malfunctions that you may find during the operation or maintenance of the M20 breathing apparatus or its components You should perform the tests /inspections and corrective actions in the order listed.

NOTE

Before you use this table, be sure you have performed all normal operational checks. If you have a malfunction which is not listed in this table, notify the next higher level of maintenance.

Table 3-1. Operator's Troubleshooting Procedures

Malfunction
test or inspection
corrective action

1. AIR IN FACEPIECE IS ODOROUS OR IRRITATING

Step 1. Check breathing tube couplings.

Step 2. Inspect breathing tube for defects. Notify higher maintenance of defects.

Step 3. Inspect pressure relief valve for defects. Notify higher maintenance of defects.

Step 4. Inspect breathing bag for tears or damage. Notify higher maintenance of defects.

Step 5. Inspect canister handwheel. Tighten handwheel.

2. BREATHING RESTRICTED

Step 1. Make sure breathing bah is not overinflated. Release pressure, paragraph 2-5*a.*

Step 2. Make sure canister is not depleted. Install new canister, paragraph 2-2*c* and *d*.

Step 3. Inspect facepiece valve assembly for defects. Notify higher maintenance of defects.

3. LENSES FOG

Step 1. Make sure canister is not depleted. Install new canister, paragraph 2-2*c* an *d*.

Step 2. Check ambient temperature. Use antifogging cloth if temperature is below freezing.

4. TIMER DOES NOT RING

Step 1. Inspect timer for defects. Notify higher maintenance of defects.

Section II. MAINTENANCE PROCEDURES

3-2. Testing Pressure Relief Valve

a. Depress and release pressure relief valve stem to see that valve operates freely.

b. Report defects to organizational maintenance personnel.

3-3. Adjusting and Testing Facepiece Group

a. Disconnect breathing tubes from backplate assembly.

b. Don facepiece as follows grasp facepiece between thumb and fingers, Insert chin, and gently push head harness over the top of the head. The head harness will stretch out of shape If forced over the top of the head.

c. Make sure that head-harness straps lie flat against the head and that the head-harness pad is centered on the back of the head.

d. Adjust harness straps so that facepiece fitssnugly and comfortably against the face, and that the lenses are positioned properly for good visibility

e. Place hand around housing clamp Move the facepiece from side to side to adjust It snugly against the face. Take up looseness by readjusting

the straps. Start at the bottom and work upward.

f. Cover coupling end of inhalation (right-hand) breathing tube with palm of hand and inhale. When this is done, the facepiece will collapse if it is fitted properly and there are no leaks in facepiece, exhalation valve, or inhalation breathing tube.

g. Cover coupling end of exhalation (left-hand) breathing tube with palm of hand and exhale forcibly. Exhaled breath should escape from around facepiece if there are no leaks in the inhalation valve or exhalation breathing tube.

h. Remove facepiece by grasping head harness pad and sliding head harness forward.

i. If facepiece, breathing tubes, or valves leak, report the malfunction to organizational maintenance personnel.

3-4. Testing Timer

a. Turn knob past 10 on timer dial and listen for a regular ticking sound.

b. Make sure that timer's alarm rings 5 minutes before the completion of the set time, and again at the completion of the set time. On earlier models the alarm will ring only at the completion of the set time.

c. Report defects to organizational maintenance personnel.

CHAPTER 4
ORGANIZATIONAL MAINTENANCE

Section I. SERVICE UPON RECEIPT OF MATERIAL

4-1. Servicing New (or Used) Equipment.

a. Remove M20 breathing apparatus from carrying case.

b. Make sure that the following items (fig. 1-1) are included with the apparatus:

(1) Hood
(2) Canisters (three).
(3) Technical manual.
(4) Spanner wrench.
(5) Antifogging kit.
(6) Instruction card.

c. Install the timer and bracket assembly on the apparatus if it has not been installed previously (para 4-10).

d. Perform preventive maintenance checks and services.

e. Correct or report all defects.

f. Return M20 breathing apparatus to carrying case.

Section II. PREVENTIVE—MAINTENANCE CHECKS AND SERVICES

4-2. General

The preventive-maintenance checks and services (table 4-1) provide you with a list of maintenance services that must be performed at the intervals prescribed. Use the list to make sure that all required maintenance is accomplished. If corrective action Is not authorized at organizational level, report equipment defects to your NCO or Officer.

4-3. Explanation of Columns

A number In the sequence number column Indicates the numerical sequence in which the service opposite the number must be performed. Time required to perform the monthly checks and services is listed in man-hours (elapsed time).

Table 4-1. Organizational Preventive Maintenance Checks and Services

Monthly schedule
Total man-hours required: 2.9

Sequence number	*Item to be inspected procedure*	*Work time (M/H)*
	Section I-Facepiece Group Man-hours required: 1.2	
1	LENSES	
	Inspect for scratches, chips, or breaks	0.1
	Replace, If necessary	0.2
2	FACEBLANK	
	Inspect for cracks, leaks, cuts, and signs of deterioration. If found, notify higher maintenance	0.1
3	BREATHING TUBES	
	Inspect for damage, cuts, or deterioration	0.1
	Replace faulty components (para 4-7)	0.3
4	HEAD HARNESS	
	Inspect for broken straps, deterioration, or loss of resiliency	0.1
	Replace (para 4-5)	0.1
5	PRESSURE RELIEF VALVE	
	Insure that valve operates freely	0.1
	Replace defective components (para 4-8)	0.1
	SECTION II—Backplate Assembly and Harness Assembly Man-hours required. 1.1	
6	BREATHING BAG	
	Inspect for holes, tears, and signs of deterioration If found, notify higher maintenance	0.1
7	BAIL ASSEMBLY	
	Be sure that handwheel turns freely Inspect for damage or corrosion. If found, notify higher	0.1

Table 4-1 Organizontal Preventive Maintenance Checks and Services—(Continued)

Work Sequence number	*Item to be inspected procedure*	*Work time (M/H)*
8	PLUNGER VALVE ASSEMBLY	
	Insure that Inside of valve assembly Is free of oil, dirt, or grease.	
	If malfunction, notify higher maintenance	0.1
9	TIMER	
	Test accuracy of timer	0.3
	Repair or replace, If necessary (para 4-10)	0.2
10	HARNESS ASSEMBLY	
	Inspect webbing for damage Inspect for corroded *or* missing hardware	0.1
	Replace, if necessary (para 4-11)	0.2
	SECTION III-Accessories Man-hours required: 0.6	
11	CARRYING CASE	
	Inspect for damage, pay particular attention to leather strap handle and luggage clamps	0.1
	Replace, If necessary	0.1
12	M20 OBA HOOD	
	Inspect for tears or leaks	0.1
13	SPANNER WRENCH & ANTIFOGGING KIT	
	Inspect for damage	0.1
	Replace, if necessary	0.1

Section III. ORGANIZATIONAL TROUBLESHOOTING

4-4. SCOPE

a. This section contains troubleshooting or malfunction Information and tests for locating and correcting most of the troubles which may develop in the M20 breathing apparatus Each malfunction or trouble symptom for an individual component, unit, or system Is followed by a list of tests or Inspections necessary for you to determine probable causes and suggested corrective actions for you to remedy the malfunction.

b. This manual cannot list all possible malfunctions that may occur or ail test or inspections, and corrective actions. If a malfunction is not listed (except when malfunction and cause are obvious), or is not corrected by listed corrective actions, you should notify higher level maintenance

c. Table 4-2 lists the common malfunctions that you may find during the operation or maintenance of the M20 breathing apparatus or its components should perform the tests/inspections and corrects tons In the order listed.

NOTE

Before you use this table, be sure you have performed all normal operational checks If you have a malfunction which Is not listed in this table, notify the next higher level of maintenance.

Table 4-2. Organizational Troubleshooting

Malfunction
test or Inspection
corrective action

1. AIR IN FACEPIECE IS ODOROUS OR IRRITATING
   Step 1. Defective breathing tub Repair (para 4-7)
   Step 2. Defective pressure relief valve Repair (para 4-8)
   Step 3. Breathing bag torn or damaged Notify higher maintenance

Malfunction	*test or inspection*	*corrective action*
Step 4 Canister loose		Tighten handwheel
2. BREATHING RESTRICTED		
Defective facepiece valve assembly		Notify higher maintenance
3. TIMER DOES NOT RING		
Defective timer		Replace /para 4-10)
4. FACEPIECE GROUP LEAKS		
Defective component		Repair or notify higher maintenance

Section IV. ASSEMBLY OF FACEPIECE GROUP

4-5. Head Harness

a. Removal. Unfasten head-harness straps (1, fig B-1) from facepiece buckles.

b. Installation.

(1) Place new head harness in facepiece with rough side toward facepiece

(2) Position straps marked NECK at bottom of facepiece, straps marked SIDE at temple positions, and strap marked FRONT at top of facepiece

(3) Fasten straps to corresponding facepiece buckles.

4-6. Lens and Lens Clamp

a. Removal

(1) Remove screw and sleeve nut from lens clamp (6, fig B-1).

(2) Separate ends of clamp far enough to clear lens and remove clamp

(3) Remove lens (5) by stretching edge of facepiece socket away from lens and working lens free of socket.

b. Installation

(1) With convex surface of lens facing toward front of facepiece, insert lower edge of lens in facepiece socket.

(2) Work lens into facepiece socket by stretching edge of socket until lens is firmly seated.

(3) Fit lens clamp around facepiece socket and position as shown in figure B-1.

(4) Install sleeve nut and screw in lens clamp.

(5) Tighten screw m sleeve nut. Take care not to distort clamp or damage facepiece.

4-7. Breathing Tubes (Exhalation and Inhalation)

a. Removal.

(1) Loosen hose clamp (12, fig. B-1) that attaches the breathing tube to the facepiece valve assembly by lifting latch on clamp with screwdriver.

(2) Unwrap tape from tube.

(3) Separate breathing tube from facepiece valve assembly

b. Disassembly.

(1) Loosen hose clamp (15) that attaches breathing tube to hose insert (17) by lifting latch on clamp with screw-driver.

(2) Unwrap tape from tube.

(3) Separate hose insert from breathing tube. It may be necessary to pry tube from insert to break adhesive applied during assembly.

(4) Remove union nut (16} and gasket (18) from hose insert.

c. Inspection

(1) Inspect components for deterioration or damage

(2) Replace faulty components.

d. Assembly.

(1) Install union nut on hose insert.

(2) Slide hose clamp (15) on end of breathing tube.

(3) Apply a thin film of rubber adhesive MIL-A-5092A to outside of hose-insert end that fits in tube.

(4) Slide hose Insert into end of breathing tube as far as it will go.

(5) Wrap the end of the breathing tube that has the insert with one layer of adhesive tape.

(6) Place hose clamp over adhesive tape and tighten.

(7) Install gasket on hose insert.

e. *Installation*

(1) Moisten inner end of breathing tube with water Do not use oil.

(2) Slide hose clamp (12) on end of breathing tube.

(3) Insert appropriate branch of facepiece valve assembly In breathing tube.

(4) Wrap end of breathing tube with one layer of adhesive tape.

(5) Place hose clamp over adhesive tape and tighten clamp.

4-8. Pressure. Relief Valve

a. Disassembly

(1) Unscrew pressure relief valve (11, fig. B-1) from facepiece valve assembly.

(2) Remove gasket (9) and spring (10).

b. Inspection

(1) Inspect components for damage or corrosion and make sure that they are free of dirt.

(2) Replace defective components.

(3) Replace valve.

c. Assembly

(1) Install gasket and spring.

(2) Screw pressure relief valve onto facepiece valve assembly.

(3) Tighten relief valve with a wrench Use only enough force to compress gasket.

4-9. Timer Knob

a. Removal. Pry knob (7, fig. B-2) from timer shaft. Knob is held on by friction and will slide off.

b. Installation. Fit knob over timer shaft so that knob points to 60 (zero setting). Press knob as far as it will go on shaft.

4-10. Timer and Bracket Assembly

a. Installation

(1) Remove timer and bracket assembly from shipping package.

(2) Loosen hose clamp (2, fig. B-2), which attaches breathing bag tube to plunger valve assembly (10), by lifting latch with a screwdriver.

(3) Unwrap tape from breathing bag tube

(4) Separate breathing bag tube from plunger valve assembly.

(5) Remove screws (3) that are stored on plunger valve.

(6) Place timer and bracket assembly on plunger valve as shown in figure B-2.

(7) Fasten bracket to valve assembly with screws is).

(8) Moisten inner surface of breathing bag tube with water. Do not use oil.

(9) Slide hose clamp on breathing bag tube

(10) Slide breathing bag tube on plunger valve

(11) Wrap end of breathing bag tube with one layer of adhesive tape.

(12) Place hose clamp over tape and tighten clamp

b. Repair

(1) Removal

(a) Loosen hose clamp (2) which attaches breathing bag tube to plunger valve (10), by lifting latch with a screwdriver.

(b) Unwrap tape from breathing bag tube.

(c) Separate breathing bag tube from plunger valve.

(d) Remove screws (3) that hold timer bracket (8) to plunger valve. Lift off timer and bracket.

(2) Disassembly.

(a) Pry knob (7) from timer shaft Knob is held on by friction and will slide off

(b) Remove nut and washer that hold timer (9) and timer dial to bracket

(3) Inspection

(a) inspect components for damage. Be sure that timer operates properly.

(b) Replace timer If defective. Repair the timer bracket if it is bent or damaged.

(4) Assembly.

(a) Insert timer shaft In hole of timer bracket.

(b) Fit timer lugs in slots on timer bracket.

(c) Place dial over timer shaft so that the 60-minute mark faces outward (away from breathing bag) and the dial lugs fit into slots on the timer bracket

(d) Install washer and nut and tighten nut

(e) Fit knob over timer shaft so that knob points to 60 (zero setting). Press knob on shaft as far as it will go

(f) Install timer and bracket assembly (a (6} through (12) above.).

4-11. Harness Assembly

a. Removal

(1) Unhook waist-strap snaphooks (fig B-3) from waist-strap eyes on backplate assembly

(2) Remove four screws (21, fig. B-2} and nuts (20) that hold harness D-ring assemblies to backplate The screws and nuts are located under insulating material on backplate

b. Installation

(1) Replace the four screws (21, fig. B- 2) and nuts (20) that hold harness D-ring assemblies to backplate

(2) Hook waist strap snaphooks (fig B-3) to waist-strap eyes on backplate assembly The rough side of the leather tie strap should face outward.

4-12. Breathing Tube Strap

Place breathing tube strap around the harness assembly shoulder strap and snap shut (1, fig B-3).

CHAPTER 5

DIRECT SUPPORT MAINTENANCE

Section I. FACEPIECE GROUP

5-1. Valve Assembly, Facepiece

a. Removal

(1) Disconnect breathing tubes from facepiece valve assembly (para 4-7 *b*).

(2) Loosen housing clamp (7, fig. B-1). If necessary, remove clamp. Take care not to distort it.

(3) Remove nut (3) and washer (4).

(4) Work rubber faceblank (2) from around facepiece valve assembly. Separate valve assembly from facepiece.

(5) Remove housing clamp from facepiece.

b. Testing Inhalation Check Valve.

(1) Blow into inlet branch of facepiece valve assembly Air should pass freely through inlet branch.

(2) Try to draw air from inlet branch. Inhalation check valve should close with an audible click and prevent air passage.

(3) If inhalation check valve does not operate properly, install a new facepiece valve assembly.

c. Testing Exhalation Check Value.

(1) Try to draw air from outlet branch of facepiece valve assembly. Air should pass freely.

(2) Blow air into outlet branch. The exhalation check valve should close and prevent air passage.

(3) If exhalation check valve does not operate properly, install a new facepiece valve assembly.

d Installation.

(1) Moisten inside of facepiece opening with water. Do not use oil.

(2) Slide housing clamp over facepiece opening.

(3) Install facepiece valve assembly in facepiece opening. The inlet branch containing pressure relief valve must be at right side of facepiece. Stretch rubber facepiece to seat facepiece valve assembly.

(4) Install washer and nut on facepiece valve assembly. Make sure rubber surrounding hole in facepiece is held firmly between washer and flange on valve assembly.

(5) Tighten housing clamp. Take care not to distort clamp or damage facepiece.

(6) Install breathing tubes (para 4-7*e*).

5-2. Faceblank

a. Removal.

(1) Remove facepiece valve assembly (pars 5-1*a* (2) through (5)).

(2) Unfasten head-harness straps and remove harness.

(3) Remove lenses and lens clamps (para 4-6*a).*

b. Installation.

(1) Install lenses and lens clamps in a new faceblank (pars 4-6 *b*) .

(2) Install head harness on faceblank (para 4-5*b).*

(3) Install facepiece valve assembly in faceblank (para 5-1*d*).

Section II. BACKPLATE ASSEMBLY

5-3. Waist-Strap Eyes

a. Removal.

(1) Unhook harness snaphooks from waiststrap eyes (17, fig. B-2).

(2) Remove screws (18 and 19) and nuts (16) that fasten waist-strap eyes to guard and backplate assembly (13).

b. Installation.

(1) Pass screw (19) through upper hole in waist-strap eye, through hole in guard and backplate, and through eyelet in tab on breathing bag.

(2) Pass screw (18) through lower hole in waiststrap eye and through hole in guard and backplate.

(3) Install nuts (16) and tighten.

(4) Attach snaphooks on harness straps to waiststrap eyes.

5-4. Breathing Bag

a. Removal.

(1) Loosen hose clamps (2, fig. B-2) attaching breathing bag tubes to plunger valve (10) and to inhalation elbow (6) by lifting latches

with a screwdriver.

(2) Separate breathing bag tubes from plunger valve and inhalation elbow.

(3) Remove screws (19) and nuts (16) that fasten breathing-bag tabs to guard and backplate assembly (13).

b. Installation

(1) Arrange breathing bag (1) on guard and backplate assembly as shown in figure B-2.

(2) Moisten inner surface of inlet and outlet tubes with water. Do not use oil.

(3) Slide hose clamps on breathing bag inlet and outlet tubes

(4) Slide breathing bag inlet tube onto plunger valve outlet as far as it will go

(5) Wrap end of breathing bag inlet tube with one layer of adhesive tape.

(6) Place hose clamp over adhesive tape and tighten clamp

(7) Slide breathing bag outlet tube onto inhalation elbow as far as it will go.

(8) Wrap end of breathing bag outlet tube with one layer of adhesive tape (MSS 8135-6).

(9) Place hose clamp over adhesive tape and tighten clamp.

(10) Fasten breathing bag tabs to guard and backplate assembly with screws (19) and nuts (16)

5-5. Inhalation Elbow and Support Bracket

a Removal

(1) Loosen hose clamp (2, fig. B-2), which attaches breathing bag outlet to inhalation elbow (6), by lifting latch on clamp with screwdriver.

(2) Unwrap tape protecting breathing bag outlet tube.

(3) Separate breathing bag from inhalation elbow.

(4) Remove screws (5) attaching elbow to support bracket (4).

(5) If necessary to replace support bracket, remove screws (11) and nuts (12).

b. Installation.

(1) If elbow support bracket was removed, fasten it in place with screws (11) and nuts (12)

(2) Install elbow on support bracket by using screws (5).

(3) Moisten inner surface of breathing bag outlet tube with water Do not use oil.

(4) Slide hose clamp on breathing bag outlet tube

(5) Slide breathing bag outlet tube onto inhalation elbow.

(6) Wrap end of breathing bag outlet tube with one layer of adhesive tape (MSS 8135-6).

(7) Place hose clamp over adhesive tape and tighten clamp.

5-6. Plunger Valve Assembly

a. Removal

(1) Loosen hose clamp (2, fig. B-2), which attaches breathing bag to plunger valve (10), by lifting latch on clamp with screwdriver.

(2) Unwrap tape from breathing bag inlet tube.

(3) Separate breathing bag from plunger valve.

(4) Remove screws (3) fastening timer and bracket assembly to plunger valve.

(5) Remove screws (11) that attach elbow support bracket

(6) Remove screws (3) that fasten plunger valve to its three bracket supports on guard and backplate assembly.

b. Installation.

(1) Place plunger valve assembly between supports on guard and backplate assembly as shown in figure B-2

(2) Fasten plunger valve to its three bracket supports with screws (3).

(3) Install elbow support bracket.

(4) Place timer and bracket assembly on plunger valve assembly as shown in figure B-2.

(5) Fasten bracket to valve assembly with screws (3).

(6) Moisten inner surface of breathing bag inlet tube with water. Do not use oil.

(7) Slide hose clamp on breathing bag inlet tube.

(8) Slide breathing bag inlet tube onto plunger valve

(9) Wrap end of breathing bag inlet tube with one layer of adhesive tape (MSS 8135-6).

(10) Place hose clamp over adhesive tape and tighten clamp

5-7. Bail Assembly

a. Removal.

(1) Remove nuts (15, fig. B-2) attaching bail assembly (14) to guard and backplate assembly (13).

(2) Spread ends of bail to clear studs and remove bail.

b. Installation.

(1) Spread ends of bail to insert studs on canister guard into holes on bail.

(2) Install nuts (15) on studs.

5-8. Guard and Backplate Assembly

a. Removal.

(1) Remove harness assembly (para 4-11*a*)

(2) Remove waist-strap eyes (para 5-3*a*(2)).

(3) Remove breathing bag (para *5-4a* (1) through (3)).

(4) Remove plunger valve assembly (para *5-6a (5)).* Leave timer and bracket assembly attached.

(5) Remove inhalation elbow and support bracket (para *5-5a(4)* and (5).)

(6) Remove bail assembly (para *5-7a).*

b. Installation.

(1) Install bail assembly (para *5-7b).*

(2) Install inhalation elbow and support bracket (para 5-5*b* (1) and (2)).

(3) install plunger valve (para 5-6 *b* (1) and (2)).

(4) Install breathing bag (para 5-4 *b* (1) through (9).)

(5) Install waist-strap eyes (para 5-3 *b* (1) through (3)).

(6) Install harness assembly (para 4-11 *b).*

CHAPTER 6
SHIPMENT, ADMINISTRATIVE STORAGE, AND DESTRUCTIO TO PREVENT ENEMY USE

Section I. SHIPMENT AND ADMINISTRATIVE STORAGE

6-1. Shipment

The breathing apparatus and its accessories are shipped in a carrying case. Prepare the apparatus for shipment by disconnecting the breathing tubes from the backplate assembly. Pack the facepiece with paper to protect it from being crushed. Use a cushioning material (cloth, paper, etc.) to form a tight pack. The canisters can be shipped either in the carrying case or separately.

6-2. Administrative Storage

The breathing apparatus is prepared for storage the same way it is prepared for shipment (para 6-1). Store the apparatus in a cool, dry place. Refer to TM 740-90-1 for administrative storage instructions.

Section II. DESTRUCTION TO PREVENT ENEMY USE

6-3. General

Destruction to prevent enemy use will be in accordance with TM 43-0002-31.

APPENDIX A

REFERENCES

TM 38-750	The Army Maintenance Management System (TAMMS)
TM 43-0002-31	Destruction of Chemical Weapons and Defense Equipment to Prevent Enemy Use
TM 740-90-1	Administrative Storage of Equipment
SB 708-42	Federal Supply Code for Manufacturers - United States and Canada Code to Name (Cataloging Handbook H4-2.

APPENDIX B
BASIC ISSUE ITEMS LIST, ITEMS TROOP INSTALLED OR AUTHORIZED LIST, ORGANIZATIONAL, AND DIRECT SUPPORT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

B-1. Scope

This appendix lists basic Issue items, Items troop installed or authorized, and repair parts required for performance of organizational and direct support maintenance of the M20 breathing apparatus.

B-2. General

This Basic Issue Items, Items Troop Installed or Authorized, and Repair Parts List is divided into the following sections

a. Section II—Basic Issue Items List. Not Applicable.

b. Section III. Items Troop Installed or Authorized List. A list, in alphabetical sequence, of Items which, at the discretion of the unit commander, may accompany the end Item, but should not be turned in with the end item.

c. Section IV—Repair Parts List. A hat of repair parts authorized for use in the performance of maintenance. Parts lists are composed of functional groups in ascending numerical sequence, with the parts In each group tasted In figure and item number sequence.

d. Section V—Special Tools List. Not Applicable

e. Section Vl—National Stock Number and Part Number Index A hat, In ascending numerical sequence, of all National stock numbers appearing in the listings, followed by a list, In alphameric sequence, of all part numbers appearing In the tastings. National stock number and part numbers are cross-referenced to each illustration figure and Item number.

B-3. Explanation of Columns

The following provides an explanation of columns found in the tabular listing:

a. Illustration. This column Is divided as follows:

(1) Figure number. Indicates the figure number of the Illustration In which the item is shown.

(2) Item number. The number used to identify each Item called out In the Illustration.

b. Source, Maintenance, and Recoverability Codes (SMR)

(1) Source code. Source codes are assigned to support Items to indicate the manner of acquiring support items for maintenance, repair, or overhaul of end Items. Source codes are entered m the first and second positions of the Uniform SMR Code format as follows:

Code	*Definition*
PA—	Item procured and stocked for abated or known usage
XB—	Item is not procured or stocked If not available through salvage, requisition

NOTE

Cannibalization or salvage may be used as a source of supply for any items source coded above.

(2) Maintenance code. Maintenance codes are assigned to indicate the levels of maintenance authorized to USE and REPAIR support Items. The maintenance codes are entered in the third and fourth positions of the Uniform SMR Code format as follows:

(a) The maintenance code entered In the third position will Indicate the lowest maintenance level authorized to remove, replace, and use the support item. The maintenance code entered In the third position will indicate one of the following levels of maintenance:

Code	*Application/explanation*
C—	Crew or operator maintenance performed with organizational maintenance
O—	Support Item IS removed, replaced, used at the organizational level
F—	Support Item IS removed, replaced, used at the direct support level

(b) The maintenance code entered in the fourth position Indicates whether the Item Is to be repaired and identifies the lowest maintenance level with the capability to perform complete repair (i.e., all authorized maintenance functions) This position will contain one of the following maintenance codes:

Code	*Application/explanation*
O—	The lowest maintenance level capable of complete repair of the support Item IS the organizational level
F—	The lowest maintenance level capable of complete repair of the support Item Is the direct support level
Z—	Non reparable No repair is authorized.

(3) Recoverability code. Recoverability codes are assigned to support Items to Indicate the disposition action on unserviceable items. The recoverability code is entered In the fifth position of the Uniform SMR code format as follows:

Recoverability codes	*Definition*
Z—	Nonreparable Item When serviceable, condemn and dispose at the level indicated in position 3

c. National Stock Number. Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

d. Part Number Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and in

spection requirements, to identify an item or range of items.

NOTE

When a stock numbered item is requisitioned, the repair part received may have a different part number than the part being replaced.

e. Federal Supply Code for Manufacturer (FSCM). The ESCM is a 5-digit numeric code fisted in SB 708-42 which is used to identify the manufacturer, distributor, or Government agency, etc.

f Description. Indicates the National item name and, If required, a minimum description to identify the item.

g. Unit of Measure (U/M). Indicates the standard of the basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea. in, pr, etc.). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

h. Quantity Incorporated in Unit. Indicates the quantity of the item used In the breakout shown on the illustration figure, or an assembly.

B-4. Special Information

Action change codes indicated in the left-hand margin of the listing page denote the following:

C—Indicates a change in data

B-6. How to Locate Repair Parts

a. When National Stock Number or Part Number is Unknown:

(1) First. Using the table of contents, determine the functional group within which the repair part belongs. This Is necessary since illustrations are prepared for functional groups, and listings are divided into the same groups.

(2) Second. Find the Illustration covering the functional group to which the repair part belongs.

(3) Third. Identify the repair part on the illustration and note the Illustration figure and item number of the repair part.

(4) Fourth. Using the Repair Parts Listing, find the figure and item number noted on the illustration.

b. When National Stock Number or Part Number is Known:

(1) First. Using the Index of National Stock Numbers and Part Numbers, find the pertinent National stock number or part number. This index is in ascending NSN sequence followed by a list of part numbers in ascending alphameric sequence, cross-referenced to the illustration figure number and Item number.

(2) Second. After finding the figure and item number, locate the figure and item number in the repair parts list.

B-6. Abbreviations

Abbreviation	*Explanation*
cad	cadmium
ID	inside diameter
OD	outside diameter
NC	American National coarse thread
NF	American National fine thread
OBA	Oxygen-Breathing Apparatus
Pltd	plated
tu	tube
UNC	Unified coarse thread

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION Part Number & FSCM / Usable On Code	(3) U/M	(4) QTY AUTH
4240-00-816-3819	GOGGLES, INDUSTRIAL WA60-5H0746-0315 (74936)	EA	1

SECTION IV. REPAIR PARTS LIST

	(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION *USABLE ON CODE*	(7) U/M	(8) QTY INC IN UNIT
							GROUP 0100: FACEPIECE		
C	B-1	1	PAOZZ	4240-00-343-8126	15465	40912	HARNESS, HEAD	EA	1
C	B-1	2	PAFZZ	4240-00-712-1203	45287	40912	FACEBLANK, RUBBER	EA	1
C	B-1	3	PAFZZ	5310-00-205-7421	3925	40912	NUT, PLAIN, RD, BRASS, CAD PLTD, 7/8-27, 2 DRIVE POINTS	EA	1
C	B-1	4	PAFZZ	5365-00-638-5896	B5902	40912	SPACER, RING, RD, BRASS, NICKEL FINISH, 0.906 IH. ID x 1.156 IH. OD x 0.0312 IN. THK	EA	1
C	B-1	5	PAOZZ	4240-00-585-5535	B15614	40912	LENS, FACEPIECE, 2 PER CAN	CN	2
C	B-1	6	PAOZZ	4240-00-090-5342	B15850	40912	C W ASSEMBLY, LENS	EA	2
C	B-1	7	MOZZ	4240-00-730-3894	61925	40912	CLAMP ASSEMBLY, HOUSING	EA	1
C	B-1	8	PAFZZ	4240-00-714-1890	82083	40912	VALVE ASSEMBLY, FACEPIECE	EA	1
C	B-1	9	PAOZZ	5330-00-599-1022	B3532	40912	GASKET, RUBBER, RD, 0.870 IN. ID x 1.096 'N. OD x 1/16 IN. THK, 2 PER BG	B6	1
C	B-1	10	PAOZZ	4240-00-290-4356	17548	40912	SPRING, HELICAL COMPRESSION	EA	1
C	B-1	11	PAOOZ	4240-00-391-5373	40433	40912	VALVE ASSEMBLY, PRESSURE RELIEF	EA	1
C	B-1	12	PAOZZ	4730-00-824-0361	62720	40912	C W , HOSE, STEEL, CAD FINISH, 1-3/8 IH. ID, 6 PER BAG	BG	1
C	B-1	13	AOOOZ				TUBE ASSEMBLY, BREATHING		2
C	B-1	14	PAOZZ	4240-00-712-1199	82744	40912	TUBE, RUBBER	EA	1
C	B-1	15	PAOZZ	4730-00-288-9622	57909	40912	CLAMP, HOSE, STEEL, DULL BLACK FINISH, 3/4 IN. TO 1-1/4 IN. ID, 4 PER 8G	B6	1
C	B-1	16	PAOZZ	4730-00-824-1071	15756	40912	NUT, UNION	EA	1
C	B-1	17	PAOZZ	4240-00-391-5360	17554	40912	INSERT, NOSE	EA	1
C	B-1	18	PAOZZ	5330-00-599-1022	3532	40912	GASKET, RUBBER, RD, 0.870 IN. THK, 2 PER BAG	BG	1
							GROUP 0101: BACKPLATE ASSEMBLY		
C	B-2	1	PAFZZ	4240-00-815-6936	74173	40912	BAG ASSEMBLY, BREATHING	EA	1
C	B-2	2	PAOZZ	4730-00-288-9622	57909	40912	CLAMP, HOSE, STEEL, DULL BLACK FINISH, 3/4 IN. OD TO 1-1/4 IN. ID, 4 PER BA6	BG	2

SECTION IV. REPAIR PARTS LIST

	(1) ILLUSTRATION (a) FIG NO.	(b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION *USABLE ON CODE*	(7) U/M	(8) QTY INC IN UNIT
C	B-2	3	PAOZZ	5305-00-984-6206	MS35206-259	96906	SCREW, MACHINE, STEEL, CAD PLTU CROSS RECESS DRIVE, NO. 10-24NC 2A x 1/4 IN. LG	EA	10
C	B-2	4	XBFZZ		74172	40912	BRACKET, ELBOW SUPPORT	EA	1
C	B-2	5	PAFZZ	5305-00-984-6189	MS35206-241	96906	SCREW, MACHINE, STEEL, CAD PLTD, CROSS RECESS DRIVE, NO. 8-32NC 2A x 1/4 IN. LG	EA	2
C	B-2	6	XBFZZ		41838	40912	ELBOW, INHALATION	EA	1
C	B-2	7	PAOZZ	5355-00-307-7946	B46437	40912	KNOB, PUSH-ON TYPE	EA	1
C	B-2	8	PAOOZ	4240-00-307-7944	89415	40912	BRACKET ASSEMBLY ANU TIMER	EA	1
C	B-2	9	PAOZZ	6645-00-786-9145	62332	40912	TIMER	EA	1
C	B-2	10	PAFZZ	4240-00-343-8153	74174	40912	VALVE ASSEMBLY, PLUNGER	EA	1
C	B-2	11	PAFZZ	5305-00-889-3002	MS35206-242	96906	SCREW, MACHINE, STEEL, CAG PLTD, CROSS RECESS DRIVE, NO. 8-32NC-2A x 5116 IN. LG	EA	2
C	B-2	12	PAFZZ	5310-00-811-3494	MS21044-N08	96906	NUT, HEXAGON, SELF-LOCKING, HEX STEEL, NO. 8-32NC-2B	EA	2
C	8-2	13	PAFZZ	4240-00-712-1209	82086	40912	GUARD AND BACKPLATE ASSEMBLY	EA	1
C	B-2	14	XBFZZ		75016	40912	BAIL ASSEMBLY	EA	1
C	B-2	15	PAFZZ	5310-00-761-6882	MS51967-2	96906	NUT, PLAIN HEXAGON, STEEL, CAD OK ZINC PLTD, 1/4-20UNC-2B	EA	2
C	B-2	16	PAFZZ	5310-00-081-8087	MS21044-N06	96906	NUT, HEXAGON, SELF-LOCKING	EA	4
C	8-2	17	XBFZZ		46318	40912	EYE, WAIST STRAP	EA	2
C	B-2	18	PAFZZ	530S-00-984-4984	MS35206-227	96906	SCREW, MACHINE, STEEL, CAD PLTU, CROSS RECESS DRIVE, NO. 6-32NC-2A x 5/16 IN. LG	EA	1
C	B-2	19	PAFZZ	5305-00-889-3000	MS35206-230	96906	SCREW, MACHINE, STEEL, CROSS RE-CESS DRIVE, NO. 6-32NC2A x 1/2 IN. LG	EA	2
C	B-2	20	PAOZZ	5310-00-838-6537	MS35650-105	96906	NUT, HEXAGON,	EA	4
C	B-2	21	PAOZZ	5305-00-990-6444	MS35207-261	96906	SCREW, MACHINE, STEEL, CAD PLTU, CROSS RECESS DRIVE, NO. 10-32NF-2A x 3/8 IN. LG	EA	4

SECTION IV. REPAIR PARTS LIST

	(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION *USABLE ON CODE*	(7) U/M	(8) QTY INC IN UNIT
							GROUP 0102: HARNESS ASSEMBLY		
C	B-3		PAOZZ	4240-00-712-1202	82087	40912	HARNESS (ASSEMBLY)	EA	1
C	B-3	1	PAOZZ	4240-00-712-8037	82094	40912	STRAP, BREATHING TUBE, LEATHER	EA	2
							GROUP 0103- CANISTERS		
C	B-4	1	PACZZ	4240-00-174-1364	45151	40912	CANISTER, OXYGEN BREATHING, APPARATUS, STANDARD, TYPE I	EA	2
C	B-4	2	PACZZ	4240-00-174-1365	92900	40912	CANISTER, OXYGEN BREATHING APPARATUS, W/QUICK-STARTING DEVICE	EA	I
C	B-4	2	PACZZ	4240-00-933-7578	95710	40912	CANISTER, OXYGEN BREATHING APPARATUS, W/QUICK-STARTING DEVICE (ONE CANDLE)	EA	I
							GROUP 0104: ACCESSORIES		
C	B-4	3	PAOZZ	4240-00-712-1198	82140	40912	CASE, CARRYING	EA	1
C	B-4	4	PACZZ	4240 01-032-2468	D304157	40912	HOOD, PROTECTIVE	EA	1
C	B-4	5	PACZZ	5120-00-090-5345	B16726	40912	WRENCH, SPANNER	EA	1
C	B-4	6	PACZZ	6850-00-127-7193	B516-1	81361	ANTI-FOGGING KIT	EA	1

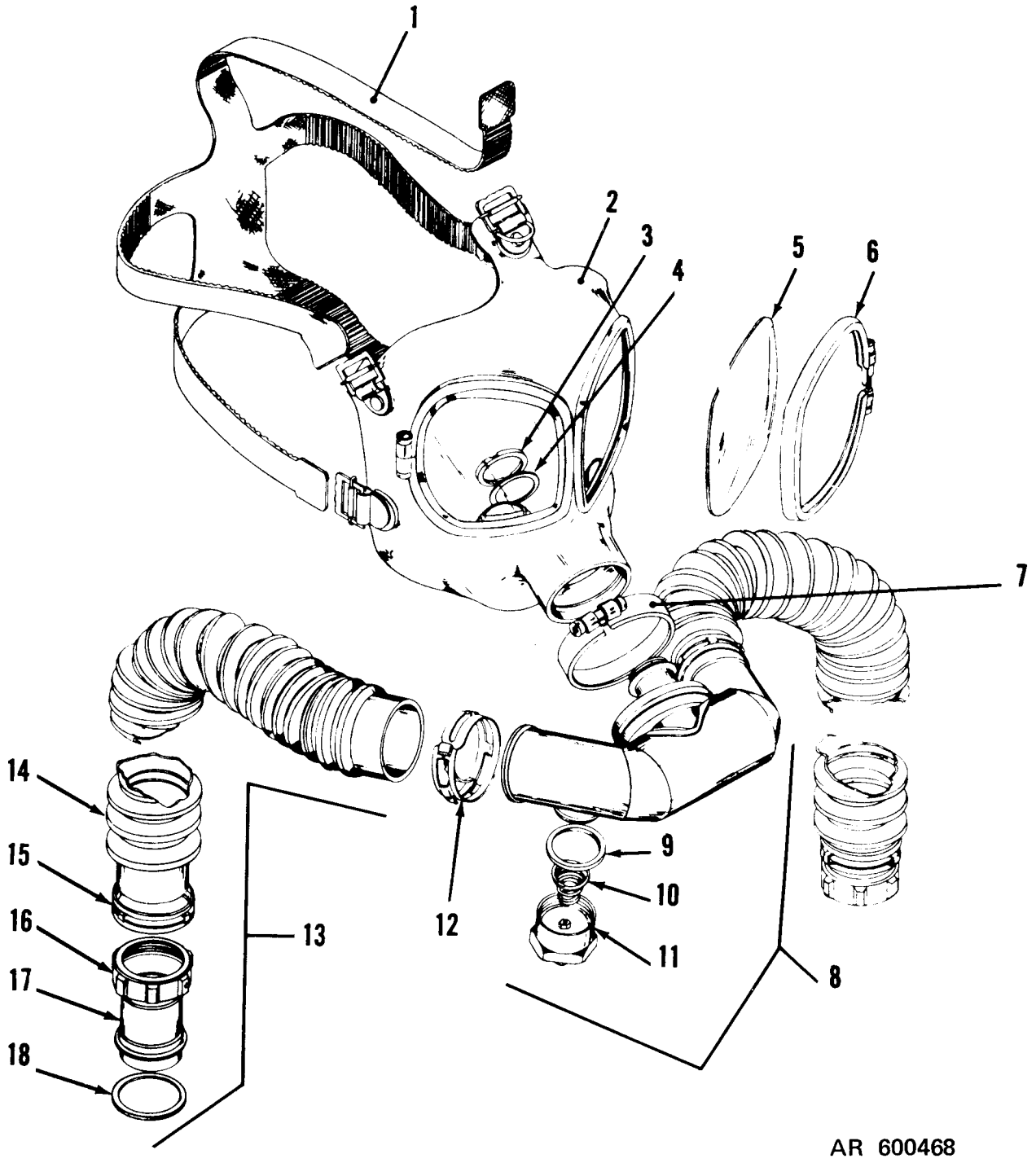

Figure B-1. Facepiece group, exploded view.

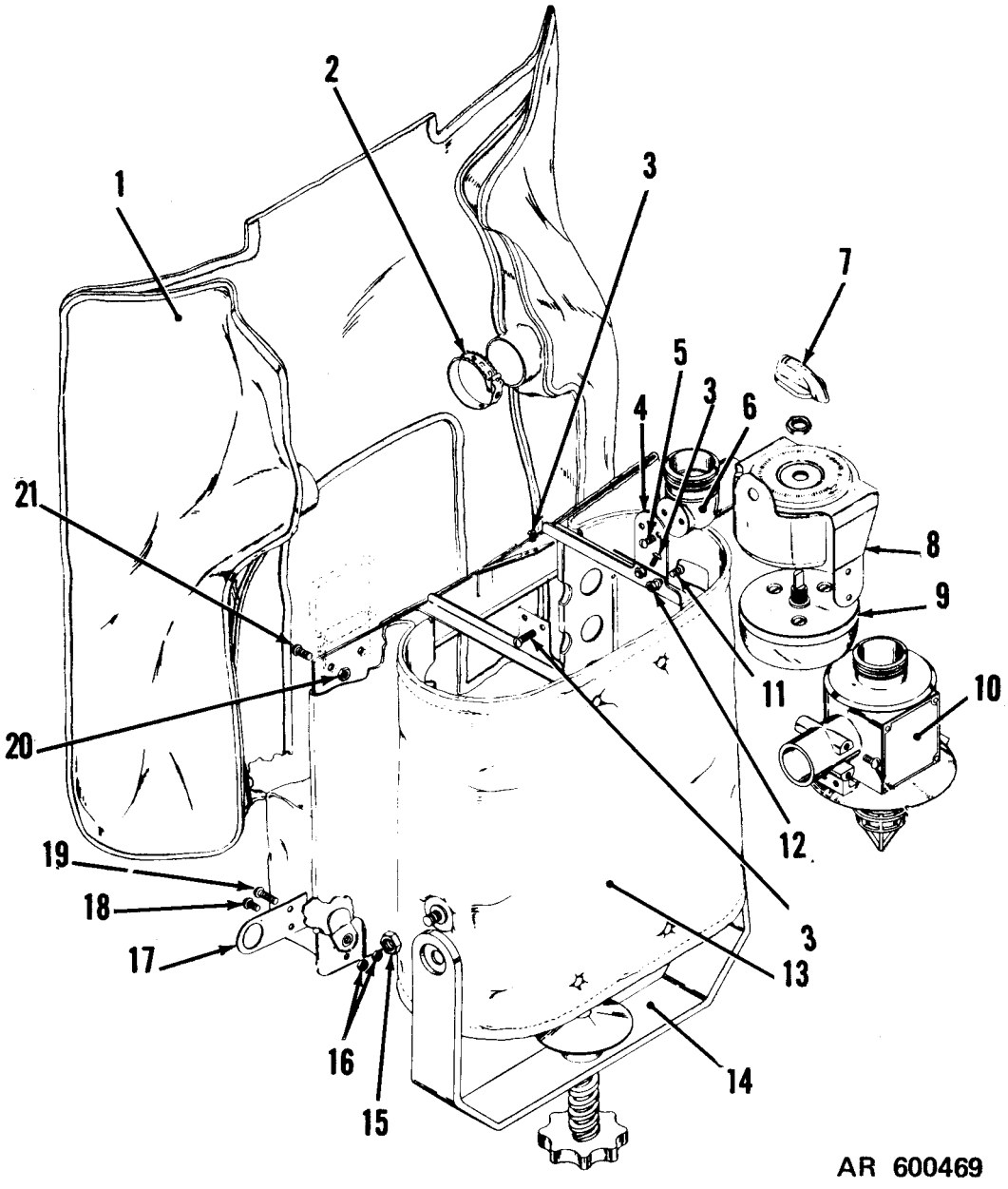

Figure B-2. Backplate assembly.

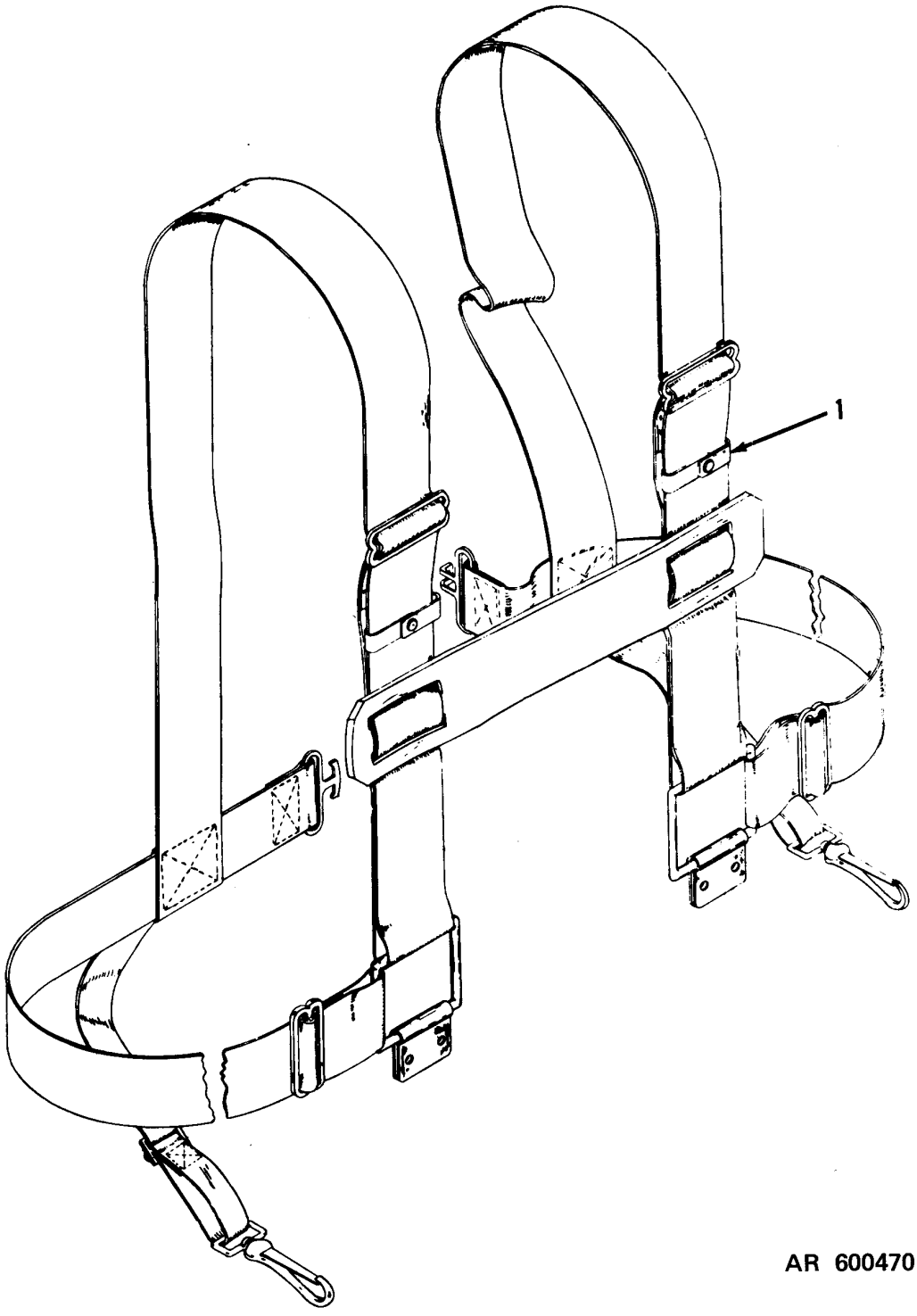

Figure B-3. Harness Assembly

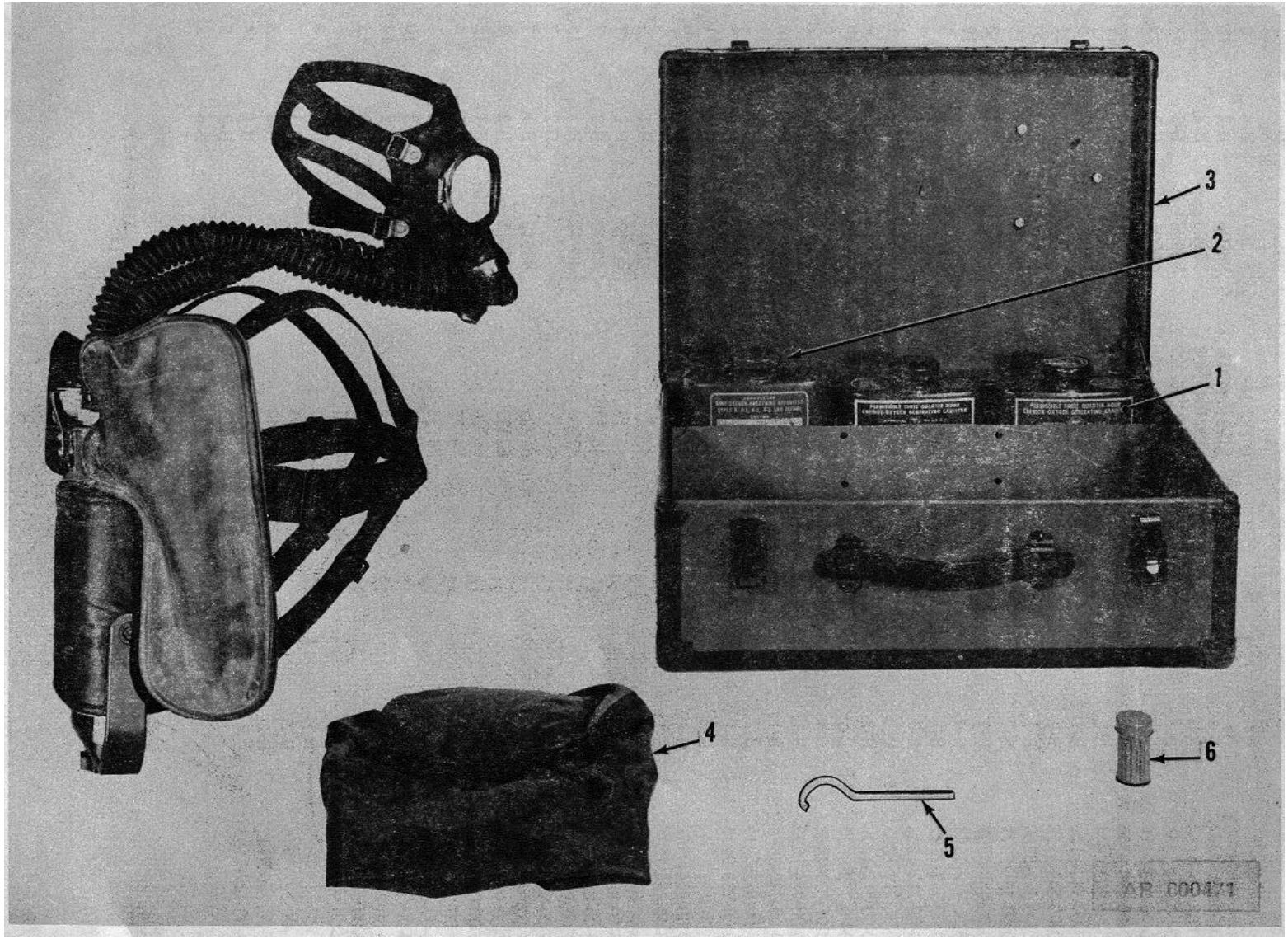

Figure B-4. Accessories.

Section VI. NATIONAL STOCK NUMBER AND PART NUMBER INDEX

National Stock Number	*Fig. No.*	*Item No.*
4240-00-090-5342	B-1	6
4240-00-174-1364	B-4	1
4240-00-174-1365	B-4	2
4240-00-933-7578	B-4	2
4240-00-290-4356	B-1	10
4240-00-307-7944	B-2	8
4240-00-343-8126	B-1	1
4240-00-343-8153	B-2	10
4240-00-391-5360	B-1	17
4240-00-391-5373	B-1	11
4240-00-585-550S	B-1	5
4240-00-712-119B	B-4	3
4240-00-712-1199	B-1	14
4240-00-712-1202	B-3	1
4240-00-712-1203	B-1	2
4240-00-712-1209	B-2	13
4240-00-712-8037	B-3	1
4240-01-032-2468	B4	4
4240-00-714-1890	B-1	8
4240-00-730-3894	B-1	7
4240-00-815-6936	B-2	
4730-00-288-9622	B-1	15
	B-2	2
4730-00-824-0361	B-1	12
4730-00-824-1071	B-1	16
5120-00-090-5345	B-4	5
5305-00-889-3000	B-2	19
5305-00-889-3002	B-2	11
5305-00-984-4984	B-2	18
5305-00-984-6189	B-2	5
5305-00-984-6206	B-2	3
5305-00-990-6444	B-2	21
5310-00-081-8087	B-2	16
5310-00-205-7421	B-1	3
5310-00-638-5896	B-1	4
5310-00-761-6882	B-2	15
5310-00-811-3494	B-2	12
5310-00-838-6537	B-2	20
5330-00-599-1022	B-1	9
	B-1	18
5355-00-307-7946	B-2	7
6645-00-786-9145	B-2	9
6850-00-127-7193	B-4	6

Part Number	*FSCM*	*Fig. No.*	*Item No.*
B-L-5-16-1	81361	B-4	6
MS21044N06	91906	B-2	16
MS21044N08	96906	B-2	12
MS35206-227	96906	B-2	18
MS35206-230	96906	B-2	19
MS35206-241	96906	B-2	5
MS35206-242	96906	B-2	11
MS35206 259	96906	B-2	3
MS35207-261	96906	B-2	21
MS35650-102	96906	B-2	20
MS56967-2	96906	B-2	15
3532	40912	B-I	8
		B-1	19
3925	40912	B-1	3
5902	40912	B-1	4
15465	40912	B-1	1
15614	40912	B-1	5
15756	40912	B-1	16
15850	40912	B-1	6
16726	40912	B-4	5
17548	40912	B-1	10
17554	40912	B-1	17
304157	40912	B-4	4
40433	40912	B-1	11
41838	40912	B-2	6
45151	40912	B-4	1
45287	40912	B-1	2
46318	40912	B-2	17
46437	40912	B-2	7
57909	40912	B-1	15
		B-2	2
61925	40912	B-1	7
62332	40912	B-2	9
62720	40912	B-1	12
74172	40912	B-2	4
74173	40912	B-2	1
74174	40912	B-2	10
75016	40912	B-2	14
82086	40912	B-2	13
82087	40912	B-3	—
82088	40912	B-1	8
82094	40912	B-3	1
82140	40912	B-4	3
82744	40912	B-1	14
89415	40912	B-2	8
92900	40912	B-4	2

APPENDIX C
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

C-1. General

The maintenance allocation chart lists the authorized maintenance functions for the four maintenance categories for the M20 breathing apparatus This chart is to be used by all levels of maintenance to Insure complete support of the equipment

Section II. EXPLANATION OF COLUMNS

C-2. Maintenance Functions

Maintenance functions authorized are limited to and defined as follows

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item In proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Replace. The act of substituting a serviceable like type part, subassembly, or module /component or assembly) for an unserviceable counterpart

e. Repair The application of maintenance services or other maintenance actions to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system

C-3. Explanation of Columns

a. Column 1—Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2—Component/Assembly Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance Is authorized

c. Column 3—Maintenance Functions Column 3 lists the functions to be performed on the item listed in column 2

d. Column 4—Maintenance Category Column 4 specifies, by the listing of a "work time" figure In the appropriate subcolumn/s), the lowest level of maintenance authorized to perform the function listed in column 3 This figure represents the active time required to perform that maintenance function at the indicated category of maintenance If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "work timer' figures will be shown for each category The number of man-hours specified by the "work tine" figure represents the average time required to restore an Item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart

MAINTENANCE ALLOCATION CHART
for
M20 OXYGEN GENERATING BREATHING APPARATUS

(1)	(2)	(3)	(4)					(5)
GROUP NUMBER	COMPONENT ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY*					TOOLS AND EQUIP
			C	O	F	H	D	
0100	FACEPIECE	Inspect Test	0.1 0.5					

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY*					(5) TOOLS AND EQUIP
			C	O	F	H	D	
		Service	0.2					
	Breathing tube assemblies	Repair		0.3				
	Valve assembly, faceplece	Replace			0.3			
	Pressure relief valve assembly	Test	0.1					
		Replace		0.1				
		Repair		0.1				
	Faceblank assembly	Replace			0.5			
0101	BACKPLATE ASSEMBLY	Repair			0.5			
	Timer and bracket assembly	Test	0.2					
		Replace			0.1			
		Repair			0.1			
0102	HARNESS ASSEMBLY	Inspect	01					
		Replace			0.2			
0103	CANISTERS	Inspect	0.1					
		Replace	0.1					
0104	ACCESSORIES							
	Carrying case	Inspect		0.1				
		Replace		0.1				
	Hood, oxygen breathing	Inspect	0.1					
		Replace	0.1					

*The subcolumns are as follows
C — operator/crew
O — organizational
F — direct support
H — general support
D — depot

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