

Life-Saver™ 60

part no.
815500
815800

Self-Contained Self Rescuer (SCSR) 60-Minute Breathing Apparatus*

instruction manual

MSHA and NIOSH Approval No. TC-13F-385

WARNING

This manual must be read carefully by all persons who have or will have the responsibility for using or servicing this product. The Life-Saver 60 SCSR will perform as designed only if it is used and serviced according to the instructions. OTHERWISE, IT COULD FAIL TO PERFORM AS DESIGNED, AND PERSONS WHO RELY ON THIS PRODUCT COULD SUSTAIN SERIOUS PERSONAL INJURY OR DEATH.

The warranties made by MSA with respect to the product are voided if the product is not assembled, used, and serviced in accordance with the instructions in this manual. Please protect yourself and your employees by following the instructions. Please read and observe the WARNINGS, CAUTIONS, and limitations inside. We encourage our customers to write or call for a demonstration of this equipment prior to use, or for any additional information relative to use or repairs.

Call 1-800-MSA-2222 during regular working hours.

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*Approved by MSHA-NIOSH as a 60 minute escape apparatus. Refer to specific details regarding service duration in the *General Information Section*.



MSA

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

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NIOSH APPROVAL INFORMATION

1. Protection

SC - Self Contained

2. Cautions and Limitations

- 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.

Special User Instructions

(In accordance with Section 'S' of the NIOSH cautions and limitations)

1. Remove all foreign matter from your mouth (e.g., tobacco products, gum).
2. Harmless smoke may be emitted from the mouthpiece during activation. Continue to insert the mouthpiece, don the unit, and escape.
3. Coughing may occur momentarily, during start-up, due to a slight amount of harmless irritant. Do not remove the mouthpiece.
4. Breathe normally at the mouth. DO NOT use short, fast breaths.
5. Swallow often as you would normally. You must swallow excess saliva to prevent it from entering the mouthpiece.
6. Prior to use, the unit must be stored for a minimum of 24 hours at a temperature between 27°F and 120°F.

7. If the Life-Saver 60 is worn, carried or stored on moving or vibrating equipment the Shock Absorbing Cover (P/N 815773) must be installed on the unit.
8. One of the following components must be used to wear or carry the Life-Saver 60:
 - Fabric carrier pouch
 - Plastic belt attachment (with or without the hardware kit)
9. If the unit is to be stored, it must be visually inspected every 90 days to ensure the indicator is half blue and half pink.
10. If the blue half of the moisture indicator has changed to pink, remove the unit from service.
11. Any unit on which the indicator changes while being carried during a shift, with no evidence of physical damage, may be carried for the remainder of the shift before taking it out of service.
12. Any unit that shows visible evidence of one or more of the following conditions must be removed from service immediately:
 - damage at the seal area,
 - missing parts,
 - crack in plastic housing longer than 1/2 inch
 - punctures that expose the chemical in the unit
 - separation of the bottom from the main housing
 - dent or deformation in the stainless steel cover having a diameter greater than the diameter of a dime
13. When worn or stored on moving or vibrating equipment, the unit must be held in an upright position, or on its back (the belt side of the unit) and retained to keep it from moving.
14. Do not abuse the Life-Saver 60 SCSR by dropping, dragging, throwing, or sitting on the unit.

WARNING

1. Read and follow all NIOSH/ MSHA approval limitations as they apply to using the apparatus.
 2. **FOR USE ONLY BY THOSE INSTRUCTED OR TRAINED WITH THIS DEVICE.**
 3. **DO NOT OPEN THE CASE UNTIL READY FOR USE. DO NOT DAMAGE THE CASE OR SEAL** due to the possibility of water vapor leakage. If water vapor, that is present in normal air, penetrates the case or seal it will deteriorate the oxygen generating chemical over time, which will reduce or destroy the effectiveness of the unit.
 4. **IF THE UNIT IS WORN OR CARRIED, VISUALLY INSPECT DAILY. VERIFY THAT THE INDICATOR IS HALF PINK CAST AND HALF BLUE CAST** and that there is no damage to the unit. Follow the proper procedures for daily inspection, preventive maintenance, and disposal.
 5. **USE THE APPARATUS ONLY ONCE**, whatever the period of time. Once the seal between the canister and the end cap is broken the unit is considered used.
 6. **MAINTAIN A TIGHT MOUTHPIECE AND NOSE CLIP SEAL** when the unit is in use. Leakage of exhaled breath will allow the bag to deflate and no gas will be available for inhalation. On inhalation, a tight seal is necessary to eliminate the possibility of inhaling toxic gases.
 7. **AVOID DAMAGING OR KINKING THE BAG** during use. Protect it from objects or pressure that would tend to deflate it.
 8. **DO NOT ALLOW ANY COMBUSTIBLE OR FOREIGN SUBSTANCES (gasoline, grease, etc.)** to enter the canister or apparatus before, during, or after use. Combustibles in contact with canister chemicals produce a chemical reaction that may rupture the canister.
 9. **PROTECT EYES, SKIN, LUNGS, AND CLOTHING** from canister chemical when disposing of apparatus. Follow the proper procedures for disposal.
 10. **DO NOT BLOCK FLOW PASSAGE DURING USE.** Protect from vomitus (in case of sickness) or other foreign materials. In case of vomiting, remove the mouthpiece and cover it with your hand to block airflow. Return the mouthpiece to your mouth as soon as possible.
 11. **DO NOT STORE BELOW -40 degrees F OR ABOVE 130 degrees F.** Follow the proper storage procedures in this manual.
 12. The unit must have been stored at temperatures between 27 degrees F and 120 degrees F for 24 hours minimum before use.
- FAILURE TO FOLLOW THE ABOVE WARNINGS CAN RESULT IN SERIOUS PERSONAL INJURY OR DEATH.**

INTRODUCTION

This manual provides information for the operation, maintenance, and user training for the MSA Life-Saver 60 Self-Contained Self-Rescuer (SCSR). Because the conditions during an emergency are unpredictable, thorough training and an understanding of unit operation will help the user maximize performance.

The training and experience with the unit must be emphasized. Maximum experience with the equipment results in maximum confidence in its effectiveness. As a result, the user will be more relaxed and the demands on the apparatus will be decreased. A training version of the Life-Saver 60 SCSR is available.

The proper handling must also be emphasized. Improper handling can result in moisture penetrating into the Life-Saver 60 SCSR chemical bed, thereby decreasing its service life.

CARE FOR THE Life-Saver 60 SCSR AS IF YOUR LIFE DEPENDS ON IT. IN AN EMERGENCY IT MAY!

GENERAL INFORMATION

The Life-Saver 60 SCSR is a single use, self-contained closed-circuit breathing apparatus. Its operation is independent of the surrounding atmosphere. Once properly donned, the Life-Saver 60 SCSR is designed to provide respiratory protection during escape from an area containing smoke, toxic gases or an oxygen deficient atmosphere.

As the user breathes on the apparatus, they exhale carbon dioxide (CO₂) and water vapor. The CO₂ and water vapor react with the potassium superoxide (KO₂) bed in the canister to produce oxygen and remove CO₂ from the breathable gas. The chemical reaction is demand sensitive; the harder the user breathes, the more CO₂ and water vapor are produced and thus, the more oxygen that is

generated. If the breathing slows, then less oxygen is generated.

The gas or operating life of the unit during escape is dependent on the demands of the user. Factors influencing the user demand include the following:

- The degree of physical activity—how hard the user must work.
- The physical condition of the user.
- The user's breathing rate, which can be increased by excitement, fear, or other emotional factors.
- The degree of training—experience with this or similar equipment.
- The condition of the apparatus.

This apparatus is MSHA-NIOSH approved as a one-hour (60 minute) unit. The actual operating life for an average sized man will vary as follows:

- a. Sixty (60) minutes or more during moderate to heavy use.
- b. Four to five (4-5) hours under rest or light use.
- c. Less than 60 minutes under extremely heavy use.

The initial volume of oxygen (approximately 9 to 10 liters) is NOT supplied by the KO₂ bed; it is supplied by a chlorate candle. The candle is activated during donning and takes about 45 to 90 seconds to fill the breathing bag with a supply of uncontaminated air. Although the bag does not fill instantaneously, this initial oxygen supply allows time for the primary chemical in the canister (the KO₂ bed) to become activated by the user's exhaled breath.

Although very unlikely, if the candle does not activate during donning, the emergency starting procedure must be used. This procedure requires that the user breath ambient air and exhale into the breathing bag until the bag is full. The sides of the bag are then squeezed to force this air out the volume relief valve. The user then repeats the bag filling process to

General & Description

assure the activation of the chemical bed. (Refer to the Emergency Starting Procedure.)

DESCRIPTION OF THE APPARATUS

The apparatus consists of the following major components (See Figure 1):

1. A top rubber protective cover. It is held in place by the two posts on the sides of the unit. It is required to protect the latch, tamper mechanism and stainless steel end cap.
2. One stainless steel canister end cap. The moisture indicator is on the top of this end cap.
3. One steel band to secure the stainless end cap. The band is stamped with the date of manufacture of the apparatus. The steel band has an integral hook to assist with removing the end cap.
4. One breathing bag. The nose clip, mouthpiece, and relief valve are located on the breathing bag.
5. One stainless steel canister. The canister contains the primary KO_2 bed, and the chlorate candle. There is an integral rubber gasket that seals the steel canister end cap.
6. One urethane outer housing for the canister.
7. Two ventilation port covers on the bottom of the urethane outer housing.
8. One neck strap and waist strap that are attached to the canister housing.
9. One pair of goggles attached to the neck strap with a Velcro (hook and loop) fastener.
10. One desiccant bag stored under the end cap.



Figure 1. Life-Saver 60 Components

INSPECTION BEFORE USE

This procedure is to be used for units worn continuously or carried to the work location.

1. The unit must be inspected daily when being carried, worn or stored on machines or on vibrating equipment in anticipation of use.



2. The moisture indicator on the top of the apparatus end cap must be inspected. It indicates readiness for use. A unit is good if the window is two distinct colors. Normally the window will be 1/2 bluish cast and 1/2 pinkish cast. Should the complete window become all pink cast, remove the unit from service. Refer to the Disposal Instructions of this manual for proper procedures.

3. The general condition of the assembly and all visible components must be inspected. If worn on the belt, the unit must be removed from the swivel adapter or carrier for the daily inspection.

NOTE

Any unit that shows visible evidence of one or more of the following conditions must be removed from service immediately:

- damage at the seal area,
- missing parts,
- crack in plastic housing longer than 1/2 inch
- punctures that expose the chemical in the unit
- separation of the bottom from the main housing
- dent or deformation in the stainless steel cover having a diameter greater than the diameter of a dime.

Donning

DETAILED INSTRUCTIONS FOR DONNING AND ACTIVATION

In an emergency, the unit is to be donned and activated using the following steps:



1. IF WORN ON A BELT, REMOVE the unit from the belt swivel adapter.



- To remove the unit from the belt, turn the unit upside down and lift the unit slightly. Pull the unit away from the belt.
2. IF WORN IN A POUCH, REMOVE the unit from the pouch.
 3. KNEEL. While in a kneeling position, place the Life-Saver 60 SCSR on the floor in front of you so that the back of the unit is facing you.

4. REMOVE YOUR CAP AND LAMP and place it beside you so that the light shines on the unit.



5. REMOVE THE RUBBER PROTECTIVE COVER.
6. UNLATCH THE BAND by pulling the strap located on top of the end cap.

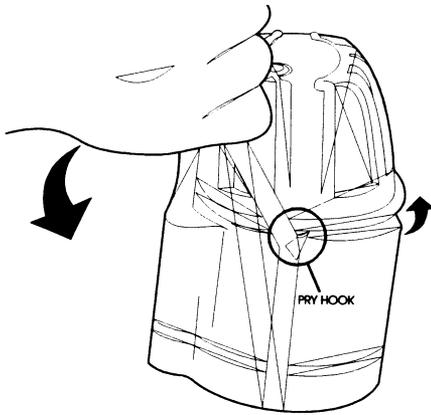


NOTE

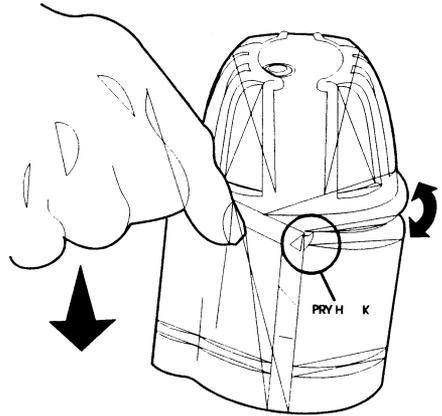
It is possible for a vacuum to develop under the end cap due to changes in work site elevation, temperature, and pressure. If a vacuum has developed, you must use the internal pry-hook to break the vacuum and dislodge the end cap.



7. USE THE BAND TO DISLodge THE END CAP. There is an internal hook on the band.



- a. Rotate the band from front to back. The internal pry-hook will break the seal.



- b. Dislodge the end cap by PULLING UPWARD on the band.
8. SEPARATE THE BAND FROM THE Life-Saver 60 SCSR. The two (2) ventilation port covers will separate from the bottom of the unit with the band. Discard the band and the two ventilation port covers.
9. REMOVE THE TOP STAINLESS STEEL END CAP. This will expose the neck strap, breathing bag, and goggles.



10. A small desiccant bag is also contained under the end cap. It can be discarded because it is not needed for unit operation.

Donning

11. LOOP THE NECK STRAP OVER YOUR HEAD.



12. UNFOLD THE BREATHING BAG with a gentle pull. This activates the starter candle oxygen generation. The gentle pull on the breathing bag is required to unplug the mouthpiece from its packed position. The mouthpiece, nose clip and bag relief valve will be visible.
13. IMMEDIATELY INSERT THE MOUTHPIECE into your mouth after unfolding the bag. Otherwise loss of oxygen from the starter candle will occur.



14. BITE DOWN to hold the mouthpiece in place. Inhale through the nose.
15. EXHALE INTO THE UNIT. The initial exhaled breath will start oxygen generation from the KO_2 .
16. Using one hand, APPLY THE NOSE CLIP to seal both nostrils.
17. BREATHE AND SWALLOW NORMALLY at the mouth. You must swallow excess saliva to prevent it from entering the mouthpiece.



18. ADJUST THE NECK STRAP so that there is no weight on the mouth-piece.



19. DETACH THE GOGGLES from the Velcro on the neck strap.
20. PUT ON THE GOGGLES.



21. WRAP THE WAIST STRAP around the waist and secure with a shoe-string knot. Do not tighten excessively or it will make breathing more difficult.

NOTE

Leave some space between your chest and the unit. This will minimize the amount of heat that you will feel from the chemical reaction inside the canister.



22. REPLACE YOUR CAP AND LAMP.
23. ESCAPE to fresh air.

3+3 Procedure & Emergency Starting

3 + 3 PROCEDURE

These steps can be summarized as the 3 + 3 procedure developed by NIOSH/MSHA. In summary to don the unit complete the following procedure:

ISOLATE YOUR LUNGS FROM THE TOXIC ATMOSPHERE

1. Open the unit and activate the oxygen (Steps 1-12).
2. Insert the mouthpiece (Steps 13-15).
3. Put on the nose clip (Step 16).

PERFORM THE FINISHING STEPS

1. Don the neck strap and goggles (Step 18-20).
2. Don the waist strap (Step 21).
3. Replace cap and lamp and escape (Steps 22-23).

EMERGENCY STARTING PROCEDURE

This procedure is to be used in the event that the chlorate candle does not fire upon donning.

NOTE

Remember that the breathing bag will inflate after the candle fires; this will happen in 45 to 90 seconds.

If the bag does not appear to start inflating properly within the first 45 seconds and if there is not enough bag volume to breathe then the candle has not fired.

If the candle does not fire, follow the emergency procedure;

1. Remove the nose clip.
2. Inhale from ambient through the nose.
3. Exhale into the mouth bit.
4. Repeat the inhalation and exhalation procedure until the bag is full.



5. Squeeze the bag from the sides, using both hands, until the bag is flat. This will vent the air out of the bag volume relief valve.
6. Repeat the inhalation and exhalation procedure until the bag is full.
7. Re-apply nose clip.
8. Breathe normally on the apparatus.
9. Continue to escape.

INSTRUCTIONS DURING USE

1. Remove all foreign matter from your mouth (e.g. tobacco products, gum)
2. Smoke may be emitted from the mouthpiece after activation of the unit. The smoke is harmless, continue to insert the mouthpiece, don the unit and escape.
3. Coughing may occur momentarily after start up due to a slight amount of harmless irritant. Do not remove the mouthpiece.
4. Breathe normal. DO NOT take short fast breaths.
5. Swallow often, as you would normally to prevent saliva from entering the mouthpiece.
6. Do not pull the neck strap too tight. Leave enough space so that the breathing bag can inflate properly and achieve maximum bag height.
7. Work calmly and try to limit physical activity to conserve oxygen.
8. Do not remove the mouthpiece or nose clip. The breathable air will be dry and warm. This indicates normal operation of the unit.
9. You may experience a slight increase in breathing resistance.
10. Talk only when necessary. Talking will cause saliva to enter the canister and shorten the duration of the unit. Speak slowly and clearly. The breathing bag performs like a speaking diaphragm to transmit the sound.
11. If the canister feels uncomfortably hot, place an insulating material (like your work gloves) between your chest and the canister.
12. Keep fingers away from the ventilation ports in the bottom of the canister protective housing. The metal canister becomes very hot during operation.
13. As the unit approaches the end of service duration the breathing bag volume will decrease and go flat, the breathing resistance will increase, and the breathable air temperature will increase.
14. In some situations (for example: while climbing down overcasts in mines) it may be necessary to bend your head and look over the top of the breathing bag for full downward vision.

Maintenance & Storage

MAINTENANCE

Keep the Life-Saver 60 SCSR unit clean. Make sure the indicator is clean and visible. Clean the unit by wiping it with a dry cloth or brush. Temporarily remove the protective rubber cover to clean both the protective cover and the stainless steel end cap. Do not immerse the unit in water or expose the unit to excessive heat.

Keep the protective rubber cover properly secured to the unit. The holes in the cover must be engaged over the posts.

The Life-Saver 60 SCSR field repairs are limited to the following items:

- Plastic Belt Attachment P/N 815784
- Hardware Kit P/N 815930
- Rubber Protective Cover P/N 815773
- Fabric Carrier (Pouch) P/N 815861

If the Life-Saver 60 SCSR has a puncture that exposes the chemicals, it cannot be shipped or repaired. Follow the proper procedures to dispose the unit.

STORAGE

WARNING

If the unit has been exposed to temperatures below 27°F or above 120°F for any length of time, it must be stored at a temperature between 27°F and 120°F for a minimum of 24 hours prior to use.

Store the unit at temperatures between 27°F and 120°F. The unit may be stored for a short term (less than 24 hours) at temperatures between -40°F and +130°F.

When stored on moving or vibrating equipment the unit must be in an upright position (as worn) or on its back (the belt side of the unit) and held from moving.

SERVICE LIFE

The Life-Saver 60 SCSR has a maximum service life of 10 calendar years from the date of manufacture. If the unit is continuously stored in a *static* condition this 10 year service life applies. If the unit is stored in a *mobile* condition such that it is worn or carried or placed on face machinery, or moving or vibrating equipment, the service life is 2,600 shifts of 8 hours each (5 shifts/week x 52 weeks/year x 10 years) or 20,800 hours maximum (2,080 hours/year x 10 years).

If the shifts are not 8 hours, adjustments to the service life must be made accordingly, but not exceeding a total of 20,080 hours (2,080 hours/year x 10 years) of the unit being stored in a *mobile* condition. If a unit is stored in both *static* and *mobile* conditions, the service life must be determined based on the percentage of time under each condition. Although the service life may be calculated to be less than 10 years from the date of manufacture depending on the storage conditions, the service life may never exceed a maximum of 10 years from the date of manufacture.

If the use history of a unit cannot be determined, it must be assumed that the unit was carried three (3) shifts per day, everyday, since the date of manufacture. It then must be removed from service when the maximum service life of 20,800 hours is reached as defined above.

See the examples on page 19 for further clarification.

The date of manufacture is indicated on the stainless steel band near the moisture indicator. Additional markings required for field use may be added in the space provided on the band with paint, a stamp, or an electric writing pencil.

SHIPPING INSTRUCTIONS

Because of the potassium superoxide (KO₂) within the unit, this unit is classified as a U.S. Department of Transportation Hazardous Material and United Nations Dangerous Good when shipped. Basic shipping data currently used by MSA are as follows:

Proper Shipping Name	
.	Oxygen generator, chemical)
Hazard Class 5.1
Subsidiary Risk N/A
UN Number UN3356
Packing Group 11
Net quantity of hazardous materials per unit 0.79 kg

In the event that a unit must be shipped, the device must be labeled as "oxygen generator, chemical" and a trained shipper familiar with hazardous materials regulations must assure that applicable marking, labeling, packaging, shipping paper, placarding, and carrier-specific requirements (if any) applicable to the method of transportation are fulfilled. Additional information is available from MSA.

DISPOSAL INSTRUCTIONS

When discarded by a United States generator, this unit is a hazardous waste with U.S. EPA Hazardous Waste Numbers of D001 and D005, any applicable state waste codes, and any additional codes that should be applied based on the unique situation of the generator and the conditions of the products use. The D001 code applies because the potassium superoxide (KO₂) in the canister is a U.S. Department of Transportation oxidizer. The D005 code applies because the candle within the device contains barium. Generators should use this information and any user-specific data to make their own hazardous waste determination in accordance with federal, state, and local regulations.

Contact a permitted hazardous waste management facility for disposal arrangements. A procedure to address safe handling and deactivation of the unit by permitted hazardous waste management facilities is available in the Material Safety Data Sheet (MSDS) for this unit.

APPENDIX I:

INSTALLATION OF BELT CARRIER

In order to assure user comfort and to reduce interference in tight quarters it is recommended that the Life-Saver 60 be mounted as tight to the body as possible. MSA offers two (2) pieces of hardware to accomplish this. Please follow the following instructions:

Plastic belt adapter part #815784

1. Orient the plastic adapter so that the flat side of the post will be down when the adapter is mounted to the belt ("TOP" is printed on the adapter to assure correct positioning).
2. It is strongly recommended that the adapter be bolted directly to the belt in the most convenient location. This will allow the unit to be worn tight to the body.
3. Use either set of screws (5/8" or 5/16"), lock washers and tee-nuts to attach the plastic adapter to the belt. Thickness of belt will indicate what screw size to use.

NOTE

The plastic adapter can also be worn on the belt by passing it through the belt loops. The loops can only accept up to a 1.25" wide belt. In this case no screws are required. The strap should be as taunt as possible to assure tightness to body.

APPENDIX II:

GENERAL SPECIFICATION

Size

Height 5.6 in.
 Width 7.7 in.
 Depth 4.8 in.

Weight

As carried 5.9 lbs.
 As used 5.1 lbs.

Minimum Bag Volume 8.5 liters

Operating Temperature Range

Low temperature 27°F
 High temperature 120°F

Storage Temperature Range

Normal Storage 27°F to 120°F
 Short Term -40°F to 130°F

Service Life (see page 14)

Maximum 10 years from date of manufacture.

Operating Characteristics

Inhalation Temperature
 (at mouthpiece) less than 115°F
 (@ 75°F ambient)

CO₂ Concentration . . . less than 1.5%

O₂ Concentration . . greater than 21%

Inhalation Resistance
 (40 LPM breathing rate) . < 1.9 in. WC

Exhalation Resistance
 (40 LPM breathing rate) . < 1.9 in. WC

APPENDIX III:

HOW OXYGEN IS GENERATED

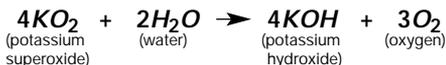
The breathing bag is flat when the unit's external covers are initially removed. The unit itself contains only a small quantity of air. Two chemical sources within the unit release the life sustaining oxygen.

The first source of oxygen is a cylinder of the chemical Sodium Chlorate (NaClO_3), that looks like a common wax candle. The chlorate candle, as it is commonly known, has added ingredients that allow it to decompose or burn. During burning, the oxygen in the basic chemical is released leaving a porous cylinder composed primarily of sodium chloride (NaCl) that is similar to common table salt.

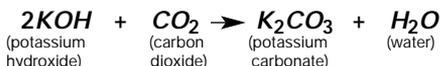
To initiate burning, a primer cap is used to ignite a powdered charge. This cap provides enough energy to start the chemical reaction in the candle. This reaction is self-sustaining. Filters in the candle housing remove any undesirable by-products of the chemical reaction.

The primary function of the candle is to provide an immediate source of oxygen to fill the system including the breathing bag. The candle cannot remove carbon dioxide (CO_2) from the exhaled breath.

The second chemical charge in the canister is potassium superoxide (KO_2). This chemical consists of coarse granules held in place by baffles contained in the canister. The chemical reaction of moisture from water vapor (H_2O) in the exhaled breath with the potassium superoxide (KO_2) releases or liberates oxygen. The chemical reaction is expressed as follows:



In addition to this, a second reaction takes place between the potassium hydroxide and the carbon dioxide in the exhaled breath to combine and retain CO_2 according to the following equation:



These reactions are self-regulating. That is, the reactions respond to the quantity of CO_2 or water available. Therefore, the device is demand sensitive. The harder the user works the more oxygen that is generated and the more CO_2 that is removed.

The KO_2 liberates oxygen at a rate slightly faster than it can be consumed which ensures adequate supply regardless of work rate. The oversupply would cause an increased system pressure except that an automatic relief valve is built into the breathing bag. The relief valve will vent and then reset. A check valve between the relief valve and ambient environment prevents any backflow of ambient gases which may be toxic.

The device is NIOSH/MSHA certified as a 60 minute unit when tested according to a regulated work load schedule. If work loads are markedly reduced, (e.g., resting), the unit may provide oxygen for 4-5 hours. Conversely, if work loads are markedly increased, the useful life will be decreased. The indicators of end of service life of a canister are:

1. Breathing bag does not fill or the bag goes flat.
2. Resistance to breathing increases substantially.

If either of these conditions exist, the user must take whatever measures are necessary to obtain a source of breathable air.

APPENDIX IV:

GLOSSARY

<i>Ambient:</i>	Completely surrounding (on all sides); as the ambient air.
<i>Deficient:</i>	Lacking in necessary amount or quantity.
<i>Heat Exchanger:</i>	Removes heat from the inhaled gas.
<i>Don:</i>	To wear or put on.
<i>Toxic:</i>	Poisonous; any substance, solid, liquid, or gas, that tends to impair health, or cause death, when introduced into the body or onto the skin.
<i>Static:</i>	Standing or fixed in one place: stationary non-vibrating.

APPENDIX V:

ORDERING INFORMATION

Part Number	Description
815800	Life-Saver 60 SCSR, Plastic Belt Adapter with Mounting Hardware and Rubber Protective Cover
815784	Plastic Belt Adapter
815773	Rubber Protective Cover
815930	Hardware Kit (includes 4 each, nuts, 5/16" long screws, 5/8" long screws, and washers)
815861	Fabric Carrier (Pouch)
815779	Unit Manual
697412	Training Video
815992	Training Unit
815926	Training Unit Manual
815957	Personal Mouthpiece & Noseclip for Trainer (pkg. of 25)

Service Life Examples and Calculations:

Example #1:

If a unit is initially stored in a static condition for 3 years, how long can it be worn at a rate of 8 hours per shift, 5 shifts per week, and 52 weeks per year?

With 30% of the service life consumed during the 3 years storage in a static condition, the remaining service life is 2,600 shifts x 70% = 1,820 shifts of 8 hours per shift, 5 shifts per week, and 52 weeks per year. At this rate the unit could be worn for 7 years after the 3 years static storage.

Example #2:

If a unit is initially stored in a static condition for 2 years, how long can it be stored on moving equipment that is running for two 10 hour shifts per day, 5 days a week, and 52 weeks per year?

With 20% of the service life consumed during the 2-year storage in a static condition, the remaining service life is 20,800 hours x 80% = 16,640 hours.

16,640 hours ÷ 20 hours/day = 832 days
 832 days ÷ 5 days/week = 166.4 weeks

166.4 weeks ÷ 52 weeks/year = 3.2 years (or 3 years and 10 weeks)

Therefore, the unit can be stored on moving equipment for a period of 3 years and 10 weeks after the initial static storage period of 2 years.

Example #3:

If a unit is initially carried for 3 years at a rate of 10 hours per shift, 5 shifts a week, and 50 weeks per year, how long can it be carried at a new rate of 4 hours per shift, 5 shifts a week, and 50 weeks a year?

10 hours/day x 5 days/week x 50 weeks/year x 3 years = 7,500 hours

After the initial period, the remaining life is 20,800 - 7,500 = 13,300 hours

The new rate is 4 hours/day x 5 days/week x 50 weeks/year = 1,000 hours/year

The remaining life calculation at the new rate is 13,300 hours ÷ 1,000 hour/year = 13.3 years; however, since the total service life cannot exceed 10 years, this unit can be carried at the new rate for 7 years.



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