K-S60 Chemical Oxygen Self-Rescuer

Operation manual

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Shaanxi Star Coal Mine Safety Equipment Co., Ltd.

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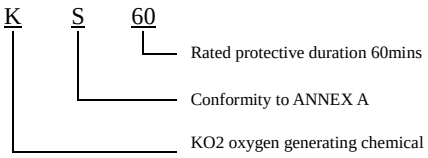
1. Overview

1) **Characteristics and Application**

K-S60 chemical oxygen self-rescuer（Hereinafter referred to as self-rescuer）is a personal breathing protector based on the principle of oxygen generated from chemical reaction, with the characteristics of rapid generation of oxygen at initial stage, mouthpiece with low temperature, safe and comfortable to wear, etc. It is applied in the environment where disasters like gas explosion, coal dust explosion, fire and other disasters occur in underground coal mines, causing poisonous and noxious gases or lack of oxygen for people to wear in time and withdraw from the disaster area for escape.

2) Implication of Model No.



3) Executive Standards:

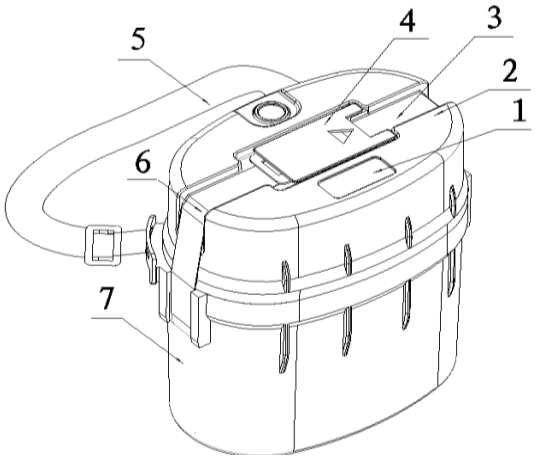
EN13794:2002: *Respiratory Protective Devices-self-contained closed-circuit breathing apparatus for escape-Requirements, Testing, Marking.*

AQ1057-2008: *Initial Oxygen Generator of Chemical Oxygen Self-Rescuer.*

MT427-1995: *Technical Conditions for Flake Oxygen Generating Chemical of Potassium Superoxide*.

2. Structure and working principle

1) Structural features：



1. Nameplate 2.Upper canister 3. Right sealing belt set 4. Protective cover 5.Straps set 6.Left sealing belt set 7. Lower canister

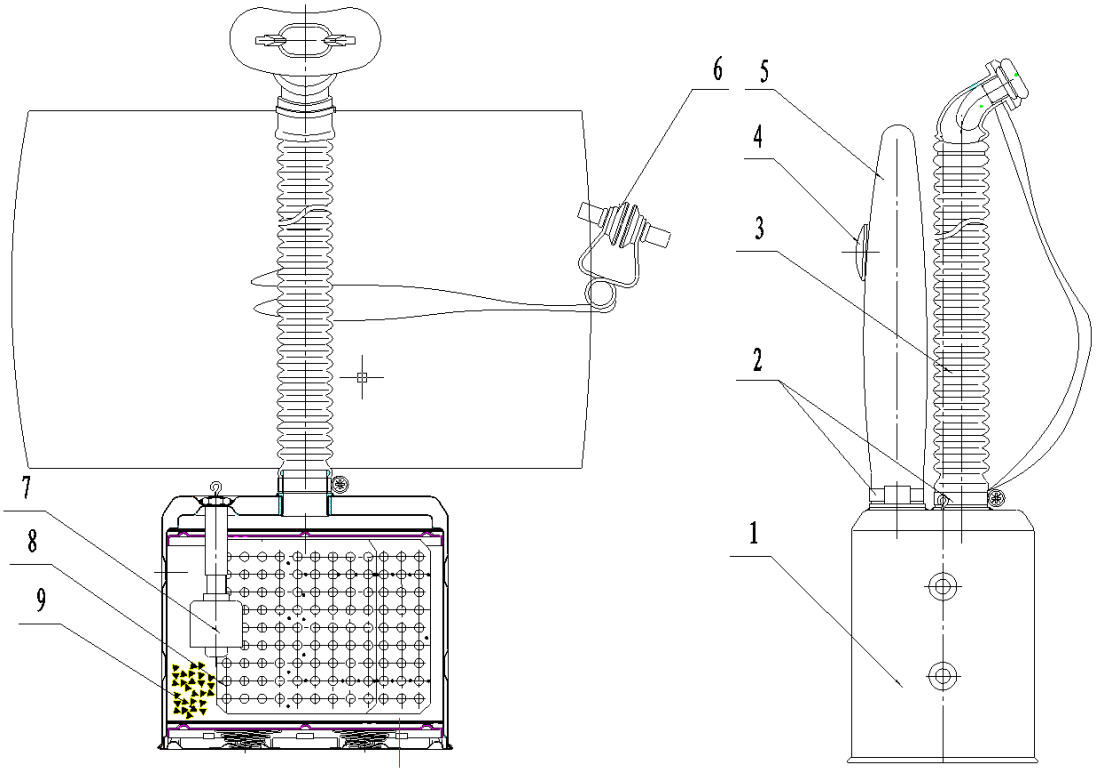


Figure 2 (upper canister and protective cover dismounted)

1. Inner pot, middle canister 2. Hose clamp 3. Breathing tube set 4. Vent valve 5.Gasbag 6. Nose clip set 7. Oxygen candle 8. Heat sink 9.Chemical

2) Working principle

K-S60 chemical oxygen self-rescuer adopts the reciprocating respiratory system, isolating breathing system from external air during use, without being affected by the ambient nocuous gases. When the exhaled air from human body enters the chemical pot, there will be a chemical reaction with the oxygen generating chemical to produce oxygen which will enter the gasbag; the oxygen in the gasbag can be inhaled directly when inhaling. During normal exhaling, the exhaled air enters the chemical pot through mouthpiece, breathing hose, breathing valve, and breathing tube, causing a chemical reaction. The reaction equations are as follows:

$$2KO_2+H_2O \rightarrow 2KOH+1\frac{1}{2}O_2+heat$$

$$2KOH+CO_2 \rightarrow K_2CO_3+H_2O+heat$$

Exhaling path：exhaling→ mouthpiece→ breathing hose→ exhaling valve→ breathing tube→ oxygen generating chemical pot→ water vapor & carbon dioxide in the exhaled air react with oxygen generating chemical to generate oxygen→ gasbag

Inhaling path：O_2 gas mixture in the gasbag →inhaling valve→ breathing hose→ mouthpiece →human lung

When the oxygen generated by oxygen generating chemical exceeds the human body's oxygen consumption volume, the pressure inside the gasbag will gradually increases. If the pressure reaches the opening pressure of vent valve, the valve will automatically open to vent excess gases. When the gasbag pressure is lower than the opening pressure of vent valve, the valve will automatically close to ensure normal breathing.

3. Main specifications

The main characteristic of the apparatus self rescue – type K-S60 is indicated in the following table:

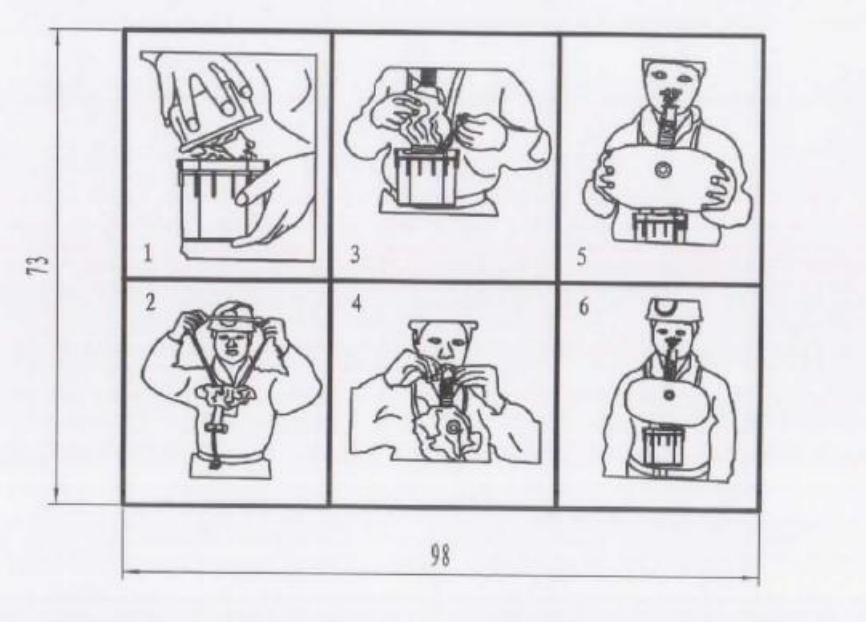
Item		Specification
Model		K-S60
Protective Duration		Intermediate speed walking 60mins； Sit quietly 180 mins
Inhalation Temperature		≤50 ℃
Max temperature during the use		130 ℃
Size (mm)		186×114×242
Weight (kg)		2.60
Effective Life	In carrying	5 years
	In storage	10 years

The apparatus is mainly for underground use, and pass the test according to EN 13794:2002 ANNEX A

3.1 Marking

Each container is marked with the following indication (i.e. of marking) where are indicated the main information: name and brand of the manufacturer, type name K-S60 Chemical Oxygen Self-rescuer, standard EN 13794, serial number /manufacturing No., Production date, working duration, the CE followed from the Notified Body Number that check the production control: Eurofins Product Testing Italy Srl NB 0477.

On each apparatus K-S60 self rescue apparatus are indicated with the following pictogram in order to don it clearly:



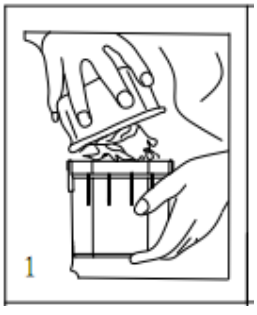
Description of the check that the user must do before the use:

- The air tightness of outer container
- Whether the color change for humidity indication card
- The completeness of protection cover
- The completeness of sealing strip
- The firmness of straps

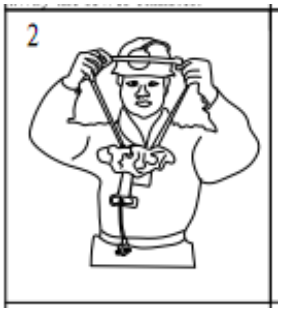
4. Basic information about the product

4.1. The product is researched, developed and manufactured by Shaanxi Star Coal Mine Safety Equipment Co., Ltd.
4.2. The product is marked CE according to the directive 89/686/EEC and passed the tests according to international certification Standard No.: EN13794:2002;
4.3. The product is named as K-S60 isolated closed-circuit escape breathing apparatus.
4.4. See the nameplate for the production batch and production date of the product; The storage life of the product is classified into two categories: Category 1: carrying time: 5 years; Category 2: storage time: 10 years.
4.5. The maximum temperature during the use of the product is 130℃。

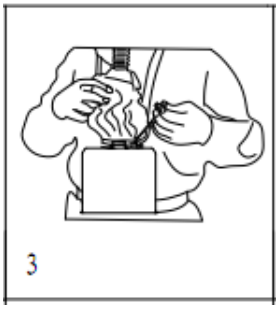
5. Diagram for Use



1) Move the self-rescuer to the front abdomen when use, hold the bottom with left hand and uncover the protective cover with right hand from outside to inside to expose the top locking strip; pull open the opening wrench and discard the sealing belt; remove the upper canister, grip the lower canister with left hand, grasp and pull out the inner pot via straps from the lower canister with strength and throw away the lower canister.



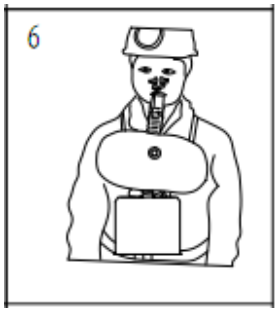
2) Hang the neck belt of the head band set around the neck; tie well the waistband; arrange the thermal insulation and gasbag well.



3) Pull up the mouthpiece stuff and pull to activate the oxygen candle connected with it quickly to bulge the gasbag promptly. (Note: If it fails to start after being pulling open during use, exhale air into self-rescuer till the gasbag bulges to 70% of its capacity.)

4) Put the mouthpiece into the mouth; bite the teeth cushion tightly; pull open the nose clip pad to clip the nose; start breathing through mouth.

5) Breathe through mouth; arrange the gradually bulging gasbag well with both hands.



6) After finishing the above operation, withdraw from the disaster area. Don't be panic when you feel insufficient inhaling on the way; slow down your pace and take deep breath. Don’t walk quickly again before you get sufficient gas in the gasbag.(Note that the gasbag or breathing hose shall not be pierced by sharp objects during use because it will result in poisoning if there exists noxious gas in the user’s ambient environment)

6. Attention

1) Make sure to bite the mouthpiece tightly and clamp the nose clip well when wearing the self-rescuer to withdraw from the disaster area. Never take down the mouthpiece or the nose clip midway; do not touch the metal surface of the canister directly during use to avoid scalding.

2) The oxygen generated by oxygen generating chemical is drier and hotter than environmental air but it is harmless to human body.

3) Don’t press the gasbag when wearing self-rescuer in case of damage or air leakage.

4) Operate accurately and quickly when wearing self-rescuer. All the users must be trained and passed the professional examination before being equipped with a self-rescuer. If irritation/allergy to mouthpiece occurs during training process, please do not use the product.

5) When the self-rescuer is used together with another Personal Protective Equipment/instrument, the user has to check whether the reciprocal protective features are respected.

7. Maintenance

1) One must carry the self-rescuer along with oneself and avoid colliding. To use it as a

seat cushion is strictly prohibited.

2) Never open the self-rescuer randomly if not for use.

3) Make sure to check if there is any damage or collision concave on the surface of self-rescuer before carrying a self-rescuer. If anything abnormal is found, deliver the self-rescuer to the relative department to check in time.

4) Self-rescuer is one-off equipment; a used self-rescuer has been scrapped and can not be used again.

5). Observe the humidity paper via the observing window. If its color changes from blue to pink, it indicates that the product can not be used.

6).Self-rescuer should be carried along with the user; check the straps to make sure it is safe and reliable before use.

7) Air tightness of self-rescuers should be checked uniformly every three months; besides, observe whether there is color change of humidity paper.

8) For overdue and scrapped chemical oxygen self-rescuer, professional staff should open the canister, dismount the gasbag components, and flush the inside oxygen generating chemical first before disposal. Never litter chemical pots or chemicals in case of a fire or other accidents.

9) Our company does not provide spare parts; if there is damage to the product part, then the product shall be scrapped.

10) Users shall not change the product structure without authorization; users shall not assemble without permission once the self-rescuer is opened.

8. Components of Whole set

1) Components of a single self-rescuer

a) Self-rescuer	1pc
b) Operation manual	1pc
c) EC declaration of conformity	1pc

2) Components of self-rescuers in a whole carton

a) Self-rescuer	6 pcs
b) Operation manual	6 pcs
c) EC declaration of conformity	6 pcs

9. Transportation and storage

1) Self-rescuers can be transported by land, water, air and all kinds of ways. When transported, it is necessary to prevent violent collision, pressure, sun & rain exposure and cased together with corrosive substances.

2) Self-rescuers should be stored in a ventilated warehouse free of corrosive gases, water drop and liquids with relative air humidity no more than 90% and a temperature between 0～40° C.

10. Out of box audit

Check the integrity of self-rescuers and accessories according to the packing list or Article 8 “Components of Whole set” in the operation manual after opening the carton.

11. Warranty

We guarantee the quality of the self-rescuer within 12 months from the date of shipment and would be responsible to repair it free in charge for any non-man-made damage during the period (except for any damage from force majeure, e.g. natural disasters, war, etc).

Please call our company if operation manual in other language is needed.

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