

## Care and Maintenance of the SR-100 Self-Contained Self-Rescuer



### Instructor's Guide

The content of this training specific to the CSE SR100 was taken from the CSE SR-100 User's Manual dated 5/95. For more information regarding the content contact: CSE Corporation, 600 Seco Road, Monroeville, PA 15146, Phone: 412-856-9200.

This training package was designed at the NIOSH Pittsburgh Research Laboratory. For more information contact: Michael J. Brnich, Jr., CMSP at (412) 386-6840 or Launa Mallett, Ph.D. at (412) 386-6658. You may also write them at: NIOSH Pittsburgh Research Laboratory, 626 Cochran's Mill Road, PO Box 18070, Pittsburgh, PA 15236

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## Care and Maintenance of the SR-100 Self-Contained Self-Rescuer

### Package Components

The training modules listed below can be used together or separately as appropriate for each audience. This guide explains each module and provides a list of related materials.

- Instructor's Guide - gives an overview of the training package and includes an inspection checklist
- Video - lasts five minutes and introduces care and maintenance issues
- Computer Based Training (CBT) CD - covers inspection and care issues for individual trainees or groups
- Screen Saver - reminds users of 3+3 donning procedures

### Introduction

A persistent problem with self-contained self-rescuers (SCSRs) has been nagging doubts about the reliability of these important personal protective devices. One dimension of the reliability issue is the concern that workers do not adhere to manufacturers' recommended inspection and care procedures.

In order to appreciate the need to take care of their apparatus, it is important for miners to understand the protection an SCSR offers. Some mistakenly believe filter self-rescuers and SCSRs provide the same level of protection, though the filter self rescuer is approved only as protection from carbon monoxide. The SCSR can protect miners from many other toxic substances such as Sulfur Dioxide, Hydrogen Sulfide, and Acrolein, a deadly product of burning timbers. And, of course, SCSR's may also protect workers from oxygen deficiency. Because the SCSR is a life saver, miners must take care to ensure the unit is ready for use if needed.

### Description of the SR-100

The SR-100 is a closed circuit self-contained oxygen supply system designed for use in toxic or oxygen deficient atmospheres. Because of its small size, light weight and rugged construction, it is belt wearable and ideally suited for self-rescue in the mining industry. The SR-100 provides starting oxygen from a small compressed oxygen bottle and eliminates the uncertainty of initiating oxygen flow. Except for the starter oxygen, the rest is provided chemically. The chemical generation of oxygen to meet the demand requirements during heavy work periods ensures there are no mechanical parts that can cause maintenance problems. The SR-100 is rugged and durable. But like anything else that is man-made, it may not work if it is not properly cared for.

### Performance Objectives

The objective of this training package is to teach miners how to conduct routine inspections on their self-contained self-rescuers and to properly care for them. It also is designed to reinforce the relationship between routine inspection and the performance of the unit when it must be donned.

After completing either the video session or the CBT module, a trainee will be able to:

- conduct the daily required inspection according to the provided checklist.
- conduct the required 90 day inspection according to the manufacturer's recommended procedures.
- always properly care for an SCSR.
- assess when a damaged SCSR should be examined for removal from service.

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- know the criteria that require an SCSR to be removed from service.

### Video Training Session

Look through the remainder of this section to become familiar with the training activity. Before conducting the hands-on portion of the training, you should review the objectives and materials thoroughly.

### Materials Needed

To conduct this training activity, you will need:

- A VCR, TV monitor, and a copy of the videotape.
- Copies of the “*Inspection S. A. F. E. T. Y. Checklist*” for trainees to follow when inspecting a unit. (Attached)
- Two or three SCSR units. These can be either the trainees’ own SCSRs, or extra units available at the mine. A training apparatus could also be used.

### Conducting a Class

You are urged to follow these tips:

1. Present a brief introduction to trainees that explains the purpose of the class.
2. Have trainees view the videotape.
3. After showing the video, give each trainee a copy of the “*Inspection S. A. F. E. T. Y. Checklist*”. Demonstrate the procedure for inspecting the unit and have trainees follow along with the checklist.
4. Ask trainees if they have any questions and discuss any points they may not understand.

5. Next, break trainees into groups of two or three. Using the “*Inspection S. A. F. E. T. Y. Checklist*”, have miners in each group inspect an SCSR.

6. After all trainees have finished inspecting their units, ask several to share with the class what they found.

7. As pointed out in the video, the SCSR will provide protection in an irrespirable atmosphere. Remind trainees that as long as they can still breathe from the apparatus after donning it, the unit is still providing oxygen. The breathing resistance will increase when the unit is working.

8. Discuss with trainees the importance of caring for the unit when in the mine. Miners need to understand that the SCSR may not work properly if internal components are damaged.

### Care and Maintenance of the SR-100

This information is provided for trainers to use during class discussion. The following procedures should be followed to care for and maintain the SR-100.

1. Inspection: Each day, begin by checking the seal on the unit.

a. Look at the security band to see that it is in place and fits tightly between the grooves in the top cover. Examine the copper security seal and make sure it hasn’t been broken.

b. Check the seal gaskets on the top and bottom case covers for signs of damage. Be sure the case covers aren’t displaced and the gaskets exposed.

c. Inspect the moisture indicators on the

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*top of the top cover and front of the bottom cover. Both must be blue. If either indicator is pink or white, don't use the unit.*

*d. Examine the unit for damage to the case or end covers. Look for cracks, punctures, burnt areas, and substantial dents.*

*e. Check to see that the SR-100 can be removed quickly from its pouch. If the carrying pouch is dirty, it may be hard to remove the unit during an emergency.*

**2. Maintenance:** *After the unit has passed inspection, it's up to each miner to keep it ready for use.*

*a. Always keep the unit clean and protect it from abuse. It should not be thrown about or subjected to severe physical abuse.*

*b. Do not store the SR-100 in an environment where it will be subjected to temperatures above 130° F.*

Following instruction, miners should exhibit mastery in inspecting the SR-100. This includes the following components:

- 1. Determine that the security band is in place and fits tightly between the grooves in the top cover; and the copper security seal is not broken.*
- 2. Determine the seal gaskets on the top and bottom case covers are not exposed or damaged.*
- 3. Determine the moisture indicators on the top of the top cover and front of the bottom cover are both blue; and describe what to do if either indicator is pink or white.*

*4. Determine if there are cracks, punctures, burnt areas, and substantial dents on the case or end covers.*

*5. Determine if the SR-100 can be removed quickly from its pouch.*

*6. Describe what steps must be taken to keep it ready for use including: a.) keeping it clean and not subject so severe physical abuse and b.) making sure the SR-100 is not in an environment where it will be subjected to temperatures above 130° F.*

Some items addressed in the training are explained more fully below:

**Security band** - The security band is designed to secure the top and bottom case covers to seal the SR-100 to prevent moisture from entering the unit. If the band become displaced, the seal may be breached allowing moisture to enter the unit.

**Seal gaskets** - Under normal circumstances very little of the lid seals are visible. The CSE user's manual says to check for split seals, but this can only be seen when the seal is exposed. CSE recommends removing the unit from service any time the seal has been exposed.

**Color indicators** - The color indicator is designed to change color at about 30% relative humidity. The indicator can change color to pink or white underground if the SCSR was warm and then taken into a cooler mine atmosphere. Although the seals are good, moisture can form inside the unit under these conditions. If this happens, the color indicator will return to blue when the unit is returned to a warmer, dryer environment.

**SR-100 Pouch** - Miners should be aware that an official CSE pouch has a certification

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number on the label. These pouches are made to CSE's specifications and are certified by MSHA and NIOSH. Other pouches should not be used.

### Computer-Based Training

Look through the remainder of this section to become familiar with the training activity. Before conducting the hands-on portion of the training, you should review the objectives and materials thoroughly.

#### Materials Needed

To conduct this training activity, you will need:

- *A personal or laptop computer with Windows 95 or higher and capability to read a CD.*
- *A projection unit for group presentation.*
- *The SCSR S.A.F.E.T.Y. Check CD.*
- *Two or three SCSR units. These can be either the trainees' own SCSRs, or extra units available at the mine. A training apparatus could also be used.*

#### Conducting a Class

This computer-based training can be worked individually with limited trainer supervision or it can be presented to a group of trainees by using a projection unit. A trainer should review the exercise, including reading the instructor's notes, before providing the CD to trainees.

You are urged to follow these tips:

1. *Be sure the display properties on the computer monitor being used is set to minimum configuration of 16 bit color and 800 x 600 screen area.*

2. *Gather SCSR units to be used during the inspection activities and review the completed checklists after these activities.*
3. *Present a brief introduction to trainee or trainees that explains the purpose.*
4. *Have printed copies of the "Inspection S. A. F. E. T. Y. Checklist" for trainees to take with them after training.*
5. *Use the "Inspection S. A. F. E. T. Y. Checklist" as an evaluation tool.*
6. *After all trainees complete their inspections, refer to the class discussion points under Care and Maintenance of the SR-100 found under the Video Training Session section.*

#### Screen Saver

A screen saver is included in this package as a reminder of the importance of every miner knowing the 3+3 donning procedures. The is available on a floppy disc. It can be copied and shared with everyone at your organization.

#### Additional Resources:

Kyriazi N, Shubilla JP [2000]. Self-contained self-rescuer field evaluation: sixth phase results. NIOSH Information Circular 9451.

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### Inspection S.A.F.E.T.Y. Checklist

Check the box if the unit passes that part of the inspection.

- Sealed:**
  - security band in place (copper seal in place)
  - seals (gaskets) intact
  - both moisture indicators blueNote any problems with seals:
  
- Abuse not found (no signs of significant damage)**  
Note significant damage:
  
- Fit in carrying pouch for easy removal**
  
- Evaluation shows carrying pouch is not worn out or extremely dirty**  
Note problems with pouch:
  
- Time and Temperature checked:**
  - now over 32°F
  - never exposed to over 130°F
  - manufactured 10 years ago or less
  
- You know your SR-100 is ready to protect you!**  
Comments: