

**PERSONAL PROTECTIVE EQUIPMENT©**  
**INSTRUCTOR'S GUIDE: SECOND EDITION**

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Prepared for the  
**Chemical Stockpile Emergency Preparedness Program**

**FEDERAL EMERGENCY MANAGEMENT AGENCY**  
Preparedness, Exercises, and Training Directorate  
Washington, D.C.

and

**U.S. DEPARTMENT OF THE ARMY**  
Office of the Assistant Secretary  
Installations, Logistics, and Environment  
Washington, D.C.

by  
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Oak Ridge, TN

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## **PREFACE**

This Instructor's Guide has been developed for use in a Federal Emergency Management Agency training course on **Personal Protective Equipment (PPE)** for the Chemical Stockpile Emergency Preparedness Program (CSEPP). Much of this material is derived directly from official documents provided by the U.S. Army and the respirator and protective clothing manufacturers. In many cases the only changes made to the information as given were the modifications necessary to adapt the procedures to the civilian environment. Additional materials and review were provided by U.S. Army Defense Ammunition Center & School; U.S. Army Materiel Command; U.S. Army Research Institute of Environmental Medicine; Federal Emergency Management Agency; Argonne National Laboratory; and Oak Ridge National Laboratory (ORNL). The original training materials were prepared by C. B. Foust, C. J. Coomer, and E. D. Copenhaver of the Oak Ridge National Laboratory. The second edition was prepared by Barry Shumpert, John Sorensen, Elaine Thompson, and Barbara Vogt of ORNL.

**Please remember that prerequisites before this training are certification of medical competency and completion of the *Chemical Awareness* or *ACT FAST* training.**

## **ACRONYMS**

AC	alternating current
BDO	Battledress Overgarment
CAIRA	Chemical Accident or Incident Response and Assistance
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CDC	Centers for Disease Control and Prevention
CSEPP	Chemical Stockpile Emergency Preparedness Program
DC	direct current
DOD	Department of Defense
EMT	emergency medical technician
IDLH	immediately dangerous to life or health
m	meter
mg	milligram
mm	millimeter
NCEH	National Center for Environmental Health
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Administration
PAPR	powered air-purifying respirator
PPE	personal protective equipment
USADACS	U.S. Army Defense Ammunition Center and School
WBGT	wet bulb/globe temperature

# INSTRUCTOR'S GUIDE

## COURSE DESCRIPTION

### Purpose

This course provides knowledge about the role of personal protective equipment (PPE) in the Chemical Stockpile Emergency Preparedness Program (CSEPP) emergency response, the different types of PPE involved in the Program, how to use and maintain the PPE, and factors that affect work rules, policies, and procedures relating to the use of PPE.

### Learning Objectives

The objectives of the training module are to allow the participants to:

- Protect themselves from contamination by donning PPE,
- Remove potentially contaminated PPE without contaminating themselves,
- Recognize the limitations of PPE, and
- Know their State and local work rules, policies and procedures, as well as those established by CSEPP.

## TARGET AUDIENCES

These training materials have been designed to prepare emergency workers to use PPE properly in a chemical agent emergency. Only personnel in States or counties potentially affected by emergencies related to the CSEPP are targeted for this training. The laws and regulations of each affected State will have to be reviewed to determine if additional training on PPE is required for the emergency workers. This document has been prepared to assist the trainer in preparing these persons to perform job functions requiring PPE.

All persons (including volunteers) designated as part of the emergency response (e.g., police, medics, paramedics, firefighters, medical personnel) to a chemical agent release must have appropriate access to PPE. All persons who anticipate being active in potentially hazardous environments as part of the emergency response plan must be equipped with the recommended PPE and must be trained in its proper use.

### Qualifications for Attendance

This course is designed for those workers in CSEPP whose functions may require them to use PPE. A prerequisite or concurrent course requirement is either the *Chemical Awareness Course* or the *ACT FAST Course*. In addition,

each person must agree to the conditions for issuance and to the medical requirements specified.

## **FACTORS CONTROLLING TRAINING**

### **Availability of PPE**

Gloves, aprons, overshoes, coveralls, and other items made of protective materials must be worn to eliminate prolonged or repeated contact with chemical agents. The Army, in conjunction with the Centers for Disease Control and Prevention/National Center for Environmental Health (CDC/NCEH) has conducted several studies and tests on PPE to select the appropriate PPE for CSEPP.

The protective clothing components that have passed these tests and been certified for use by CSEPP responders include:

- Protective suits
  - DOD Battledress Overgarment (BDO)
  - DuPont/Kappler Responder Coverall
  - DuPont/Kappler CPF3 Coverall
  - ADI Technologies Mark IV Overgarment
- Chemical protective gloves (used with cotton glove inserts)
- Military issue vinyl overshoes
- Chemical protective powered air-purifying respirator (PAPR) hood
- Toxicological agent protective apron

Each responder's protective clothing ensemble will consist of one of the four protective suits plus the protective gloves, overboots, and hood. Personnel performing decontamination should also wear a protective apron.

Although all four of the protective suits listed above are approved for CSEPP use, only two of them have been selected by States and counties in the program. **The remainder of this PPE training course focuses on these two suits: the DuPont/Kappler Responder Coverall and the DuPont/Kappler CPF3 Coverall.**

Only people who have successfully completed training in the chemical hazard, self-protection and use of PPE will be eligible to receive equipment.

This equipment is only to be used in the event that a chemical accident or incident involving chemical weapon agents has occurred. Upon determination that a chemical accident or incident has occurred, the U.S. Army will notify State and local emergency response operations.

A protective suit, hood, gloves, apron, overshoes, and PAPR will be kept available in the ready bag for each worker in the event of an emergency situation. Sets of backup and training PPE will also be made available for emergency workers.

Upon termination of involvement with the CSEPP, the worker shall return his/her protective suit, hood, gloves, apron, overshoes, ready bag, and PAPR as outlined in the State and local plan.

### **Respirator Fit Testing for the Tight-Fitting PAPR**

Tight-fitting PAPRs are effective only if a good seal is maintained between the respirator and the wearer's face. Because of this, these PAPRs are to be worn only by people who do not have facial hair or any other condition that interferes with the seal or with valve function. In addition, fit testing is required to ensure that each wearer is assigned the proper style and size of respirator. Fit testing may be provided by the respirator manufacturer, by the U. S. Army Defense Ammunition Center and School (USADACS), by the State, or by local personnel properly qualified [as required by Code of Federal Regulations (CFR) 1910.134 Appendix A] to perform fit testing. 29 CFR 1910.134 (f) states that respirators shall be fitted properly and shall be tested for their facepiece-to-face seal and shall not be worn when conditions prevent a good face seal. The 29 CFR 1910.134 Appendix A outlines the mandatory testing procedures to be followed for qualitative and quantitative fit testing.

Fit testing should be repeated at least annually. One suggestion would be to issue respirator fit cards, which each emergency worker would carry in order to confirm his/her fit-test certification and to serve as a reminder when it is time to repeat the fit-test. 29 CFR 1910.134 Appendix A states fit testing should be repeated immediately when the worker has:

- Obvious change in body weight
- Significant facial scarring in the area of the facepiece seal
- Significant dental changes; i.e., multiple extractions without prosthesis, or acquiring dentures
- Reconstructive or cosmetic surgery, or
- Any other condition that may interfere with facepiece sealing

Fit testing shall be done while wearing protective equipment, such as corrective spectacles and hood, which will be worn during work activities and which could interfere with the fit and/or wearer acceptance.

## **Medical Evaluation**

According to 29 CFR 1910.134 (g), all people who will be assigned any type of respirator must be medically evaluated to determine their ability to use a respirator. Each person must provide pertinent information to a physician, either through a direct examination or by filling out a medical questionnaire. The required questionnaire (29 CFR 1910.134, Appendix C) is included in the Study Guide as Appendix E. A physician or other licensed health care professional will evaluate the results of the questionnaire and provide a written determination of the person's ability to use a respirator, including any restrictions on such use. In some cases, a medical examination may be necessary.

Additional, follow-up medical evaluations are required under any of the following conditions: the person reports medical signs and symptoms that affect the ability to use a respirator; a health care professional or supervisor recommends reevaluation; a need for reevaluation is noted during respirator fit testing or program evaluation; or there is a relevant change in the duties the person would perform while wearing the respirator.

## **Work Rules Based on State/Local Decisions**

At least two options have been identified for work rules, either of which can be adopted in State and local emergency plans.

### Option 1 – Plan Specifies That Emergency Workers Must Wear PPE When They Enter Any Area Where Protective Actions Have Been Determined For Public

Since the process of determining public protective actions is conservative in every jurisdiction, this policy will preclude emergency workers from being exposed to chemical agent without PPE. This includes those personnel (i.e., traffic control, decontamination stations, and emergency medical response) who assist in implementation of these protective actions.

### Option 2 – Plan Requires That Emergency Workers Wear PPE When They Enter Any Area Where Accident Conditions Indicate Chemical Agent May Be Present As Vapor Or Deposited On The Ground

In contrast to requiring PPE whenever public protective actions are specified, this strategy would require PPE only where there is reason to believe agent may be present, thus minimizing the risk of heat stress to emergency workers who otherwise might be required to wear PPE in areas where public protective actions are precautionary rather than on projected exposure.

**It will be necessary for the instructor to determine which Work Rules Option is chosen by the State and local government in order to customize this portion of the instruction to State and local needs.**

## Training in the Use of Chemical Agent Detection Kits

Depending on their CSEPP work rules, some states may elect to provide responders with M256/M256A1 series chemical agent detection kits. These military kits allow emergency responders to sample the environment in which they are working to determine if chemical agent is present. The kits can detect vapors of agents GB and VX at levels that are immediately dangerous to life and health (IDLH), but cannot detect agents H and HD at this level. For states that wish to develop training on the use of the detector kits, the Army's instructions for the use of the chemical detector kits are included in Appendix E of this Instructor's Guide.

## TRAINING STRATEGY

To ensure off-site emergency workers are prepared to the maximum extent possible, training materials have been developed on the use and maintenance of PPE, the nature of the threat, ergonomic considerations, and work practices [e.g., adjustment for working under varying climatic conditions (heat/cold/humidity), exertion, monitoring of workers, etc]. In addition, PPE equipment is being made available to emergency workers through appropriate State and local organizations. Before training, a medical evaluation should be performed. The capabilities of individual emergency workers to properly use the PPE will, as a minimum, be evaluated as part of the training program.

Training alone cannot ensure readiness in the event of a chemical accident or incident. Therefore, in addition to this PPE training, the PPE must be adequately maintained and should be available at all times. Regular drills and training sessions designed to maintain familiarity with the equipment should be incorporated into emergency response protocols.

The PPE training can be used for formal classroom review, or for step-by-step detailed demonstration of the skills needed for PPE use. However, in the initial training sessions, step-by-step detailed demonstration of PPE skills is required, and must be documented, using the Checklists provided in the course materials. The following sections of this Instructor's Guide also provide handouts, vu-graphs or slides, and review questions.

If you are using these training materials in a stand-alone environment, as opposed to teaching them as a part of the *Agent Characteristics and Toxicology First Aid and Special Treatment (ACT FAST)* or *Chemical Awareness* courses, you may wish to use the CSEPP video *Chemical Stockpile Agent Characteristics and Effects* as a part of your training in order to refresh the participants' knowledge on the potential health effects of the nerve and blister agents.

## **Time Schedule**

- General Information (15 min)
- Clothing Lecture/Demonstration (30 min)
- Powered Air-Purifying Respirator (PAPR) Lecture/Video/Demonstration (30 – 45 min)
- Review Questions (30 min)
- Skills Review and Fit Testing (up to 30 min/per person, based on number of trainees, number of instructors and availability of equipment)

## **Description of Required Equipment**

Vu-Graph or Slide Projector  
Video Projector  
Flip Charts or Chalk Board  
Pencils  
Protective Suits  
Hoods  
Aprons  
Vinyl Overshoes  
Glove Sets  
Powered Air-Purifying Respirator (PAPR) Unit  
Candle (Fit-testing)  
Probe 7 Fit Test Unit (Probe visors)  
Port-A-Count Fit Test Unit  
PAPR Spectacle Kit  
Volt meter

## **List of Materials Needed**

Personal Protective Equipment Study Guide  
Donning Protective Clothing Wall Charts  
Removal of Protective Clothing Wall Charts  
Checklists on Clothing  
3M R-Series Hood: User Instructions for BE-10 (provided with each PAPR ordered or available from the 3M website)  
3M R-Series Full Facepiece: User Instructions for BE-7 (provided with each PAPR ordered)  
3M Breathe Easy™ Turbo PAPR Assembly: User Instructions (provided with each turbo blower unit purchased or available from the 3M website)  
Respirator Cards  
Checklists on PAPRs

## **COURSE CONTENT**

### **Study Guide**

The Study Guide summarizes the elements of information required to fulfill the learning objectives. The Study Guide content is listed below:

Objectives

Introduction

What is PPE

- Definition

- Function

- Governmental PPE Requirements

Who Needs PPE and Training

Types of PPE

CSEPP Protective Equipment Components

- Availability of PPE

- Protective Suits

- Gloves

- Overshoes

- Apron

- Ready Bag

- Respirator Equipment

Required Medical Evaluation

Respiratory Fit Testing for the Tight-Fitting PAPR

- Facepiece Fit

- Quantitative Fit Test

- Qualitative Fit Test

Storage of PPE

- Protective Clothing

- Respiratory Equipment

Using PPE

- Donning the Tight-Fitting PAPR and Responder Suit

- Removing the Tight-Fitting PAPR and Responder Suit

- Donning the Loose-Fitting PAPR and CPF3 Suit

- Removing the Loose-Fitting PAPR and CPF3 Suit

Work Rules

- Introduction

- Basis for Work Rules

- State and Local Government Decisions on Work Rules

- Basis and Timing of Working in PPE

- Clothing

Work Rules Summary  
Bibliography  
Appendix A. Checklists for Protective Clothing and Respirator Use  
Appendix B. PPE Regulations and Guidance  
Appendix C. PAPER- and Clothing-Limited Stay Times  
Appendix D. PPE: Levels of Protection  
Appendix E. Mandatory Medical Evaluation of Personnel Required to Use  
Respirators

## **Handouts**

Because it is basically a step-by-step listing of what to do, information on use of the PPE has been developed as short checklists that describe these steps (see Appendix A).

## **Vu-Graphs or Slides**

A set of vu-graphs or slides is included for use in this training course. Full size copies are included in Appendix C, and color slides are available as PowerPoint™ files.

## **Effect of State or Local Decisions on Course Content**

The instructor must also check with State and local program management to learn what decisions are made on the work rules applicable in the State or local program (see Option 1 or Option 2 under Factors Controlling Training). State or local decisions that could affect this training include:

- Are there State or local decisions on work rules, such as Option 1 or Option 2?
- Are there State or local regulations that specify types of PPE or appropriate levels of protection for specific tasks (e.g., police, medics, firefighters)?
- Are there State or local decisions on medical exam requirements for emergency workers required to wear respirators (see Appendix E, Study Guide)?
- Are there State or local decisions on where PPE will be stored?
- Are there State or local decisions that might affect the stay times based on the capabilities of the protective clothing and/or the PAPRs?

## **EVALUATION**

Evaluation will take place in the classroom, consisting of measurement of the objectives by various methodologies and techniques including review and demonstration of skills. This evaluation serves two purposes: to evaluate the participants' degree of understanding and to determine any revisions necessary in future courses.

Demonstration of skills is required, and checklists are enclosed to facilitate demonstration of skills and to document understanding the work rules and practices. Trainees must use the checklists which are found in Appendix A. The Review Questions can be used as a self-study review or as examination questions on the knowledge base of this unit. It is recommended that only persons demonstrating an adequate understanding of the materials on these review questions be permitted to use PPE. The Answer Key for the Review Questions can be found in Appendix B.

In addition, evaluation of the course is recommended by the participants and instructors, using the general form usually included in CSEPP courses, or the supplemental one included in this Guide.

## Review Questions

Assess understanding of the material presented in this training course by completing the following questions.

### Multiple Choice

1. Knowing the correct way to use CSEPP-approved PPE is important because
  - a. it is not possible to be partially protected from nerve or blister agents; a person is either protected or not protected
  - b. funding depends on compliance with Federal PPE regulations
  - c. the equipment must be used one way to protect against blister agents and another way to protect against nerve agents
  - d. it isn't important; the equipment protects the wearer regardless of how it is used
  
2. The PPE approved for use by CSEPP responders includes the following chemical protective items:
  - a. PAPR and protective suit
  - b. PAPR, protective suit, and gloves
  - c. PAPR, hood, protective suit, gloves, overshoes, and apron (for decontamination personnel)
  - d. any of the above, depending on severity of the hazard
  
3. The CSEPP protective equipment is to be used
  - a. in the event that an accident involving transportation of hazardous materials has occurred
  - b. only in the event that a chemical accident or incident involving chemical weapon agents has occurred
  - c. whenever workers must approach the boundaries of an Army installation where chemical warfare agents are stored
  - d. all of the above
  
4. If visual inspection of a DuPont/Kappler Responder or CPF3 suit reveals any damage or weakness in the suit material or seams, the suit should be
  - a. repaired using the kit provided by the manufacturer
  - b. patched with duct tape
  - c. discarded or used only for training purposes
  - d. returned to the manufacturer for a refund

5. The DuPont/Kappler Responder and CPF3 suits used by CSEPP responders should be stored
  - a. anywhere it's convenient
  - b. on a hanger or in an open shipping bag inside the Ready Bag
  - c. on hangers or in shipping bags inside a refrigerated compartment
  - d. in the trunk of a vehicle
  
6. The tight-fitting and loose-fitting PAPRs approved for CSEPP differ in that
  - a. the tight-fitting PAPR provides greater respiratory protection but is more complex to use
  - b. only the loose-fitting PAPR will accommodate beards and eyeglasses
  - c. fit testing is required for the tight-fitting PAPR but is not needed for the loose-fitting PAPR
  - d. all of the above
  
7. Before putting on a PAPR, it is essential to
  - a. remove all obstructions (including packaging, plugs and caps) to the free flow of air into the air-purifying elements (filter cartridges)
  - b. take a deep breath and hold it
  - c. ensure the initial flow test for the PAPR is performed satisfactorily
  - d. both a and c above
  
8. Pre-operational checks of the PAPR must be performed
  - a. monthly and after each time the PAPR is used
  - b. only when the manufacturer advises that it is necessary
  - c. annually
  - d. annually only if the PAPR has been used in the preceding year
  
9. A CSEPP responder wearing an approved PAPR and protective clothing should immediately return to a non-contaminated area if
  - a. the taste or smell of contaminants is detected
  - b. the eyes, nose, or throat become irritated
  - c. the flow of air through the respirator slows or stops
  - d. any of the above

10. A PAPR's air-purifying elements (filter cartridges) should be replaced
- before the expiration date stamped on the cartridge
  - once a month
  - when they become plugged with particulates or saturated with gases or vapors
  - either a or c
11. Workers wearing CSEPP-approved PPE
- are automatically protected from the effects of heat and cold
  - will take about 1.5 times longer than normal to perform most tasks
  - can safely remain in a contaminated environment indefinitely
  - all of the above
12. When removing protective clothing after responding to a chemical agent incident, it is important to
- remove the overshoes first
  - keep the protective suit whole to be worn again
  - decontaminate first if the suit has been exposed to a chemical agent
  - none of the above
13. The response to a CSEPP chemical agent release will differ from the response to most hazardous materials releases in that
- off-post responders will be responsible only for public safety and related measures, such as facilitating the flow of evacuation traffic and conducting search and rescue
  - off-post responders will be responsible only for containing the release and cleaning up any remaining chemical agent
  - the chemical warfare agents are much less toxic than most hazardous materials
  - the Army will be in charge of the off-post response efforts, such as controlling evacuation traffic and providing emergency medical services.

14. Off-post emergency responders may enter an area where chemical agent is known or suspected to be present
- when necessary to contain the chemical agent leak and clean up any remaining agent
  - at any time if members of the public are thought to be at risk in the contaminated area
  - only after the Army installation has determined that the release of agent has stopped and that the responders' PPE will protect them from the concentration of agent that may be present
  - immediately after notification that a release has occurred and the public is in danger
15. Emergency workers must wear PPE
- when they enter any area where protective actions have been recommended for the public
  - when they enter any area where accident conditions indicate that chemical agent may be present as vapor or deposited on the ground
  - either a or b, depending on State and local decisions
  - none of the above
16. To ensure that CSEPP emergency workers are protected from contamination and excessive exposure, they must
- not be sent into environments which are known or suspected to be immediately dangerous to life or health (IDLH)
  - not remain in a potentially contaminated area long enough to exceed the agent absorption capacity of the cartridges used in their PAPRs
  - not be exposed to agent deposition density levels exceeding the maximum capability of their protective suits
  - all of the above
17. The accumulation of body heat due to working in PPE may lead to heat stress. The amount of heat accumulation depends upon
- the amount of physical activity, level of hydration, and clothing worn
  - weather conditions
  - both a and b above
  - none of the above

18. Several things can be done during rest periods outside the hazard area to reduce the level of heat stress, including
- a. drinking large quantities of hot liquids
  - b. unzipping the protective suit, unbuttoning and loosening overshoes, and rolling back the PAPR hood
  - c. eating salty foods
  - d. consuming foods and drinks high in sugar content
19. If you suspect that your buddy is suffering from heat illness, you should immediately
- a. shake your buddy's shoulder and tell him or her to shape up
  - b. get your buddy into shade (outside the hazard area), remove heavy clothing, and give drinking water if the buddy is alert
  - c. put in a call to your commander and wait for assistance to arrive
  - d. take no action since the problem will probably go away by itself
20. Cold can affect workers wearing PPE by
- a. breaking the air hoses
  - b. freezing garments until work cannot be performed
  - c. lowering body temperature, resulting in injuries and impaired performance
  - d. all of the above

## PPE COURSE EVALUATION

Check the words that describe your reactions to today's session:

- slow-moving
- illuminating
- overwhelming
- fun
- well-organized
- inappropriate

Complete the following sentence:

Something I am still confused about is: \_\_\_\_\_

---

---

---

What was the most important thing you learned today? \_\_\_\_\_

---

---

---

What ONE WORD best describes your reaction to today's session: \_\_\_\_\_

What would you like less of in this program? \_\_\_\_\_

---

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## INSTRUCTOR SUGGESTIONS

After conducting this course, you may provide direct comments on the course and course materials by using this form if you wish.

1. List any questions from the participants that you could not answer:
2. List any additional information that participants would have liked to have covered in the course:
3. List any information that instructor or participants believed to be incorrect or inadequate:
4. List those features of the training course package that you found to be most useful:
5. Any other comments:

Name\_\_\_\_\_ Course\_\_\_\_\_

Phone Number\_\_\_\_\_ Date Taught\_\_\_\_\_

Address\_\_\_\_\_

**Return to CSEPP State Training Officer to be forwarded to the CSEPP Training Management Team, FEMA Headquarters**

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***APPENDIX A***  
***CHECKLISTS FOR PROTECTIVE CLOTHING AND RESPIRATOR***  
***USE***



## CHECKLIST FOR DONNING THE TIGHT-FITTING PAPR WITH THE DUPONT/KAPPLER RESPONDER SUIT

States are responsible for developing acceptable procedures for using PPE. While there are incorrect procedures, there are also multiple variations of acceptable procedures. This checklist is an example of an acceptable procedure. Use of the buddy system is required for this procedure.

- \_\_\_\_\_ 1. Wear underclothing as a minimum. The manufacturer recommends wearing either a long sleeve shirt and long pants or long underwear under the suit.
- \_\_\_\_\_ 2. If regular clothing is worn under the suit, empty pockets of all personal effects that could damage the suit.
- \_\_\_\_\_ 3. Tuck pants legs into socks to make it easier to put on coverall legs.
- \_\_\_\_\_ 4. While wearing shoes, place the legs into the suit (most easily done while seated).
- \_\_\_\_\_ 5. Don the vinyl overshoes.
  - \_\_\_\_\_ a. Place both feet into overshoes.
  - \_\_\_\_\_ b. Button overshoes.
  - \_\_\_\_\_ c. Pull down elastic cuffs of the suit over the tops of the overshoes.
  - \_\_\_\_\_ d. Tape the suit's pant legs to the overshoes. (A folded-over tab on the tape end will help when removing the tape later.)
- \_\_\_\_\_ 6. Stand up and pull the suit up to the waist.
- \_\_\_\_\_ 7. Don communication equipment and life vest, if appropriate, following state-developed procedures.
- \_\_\_\_\_ 8. Don the gloves.
  - \_\_\_\_\_ a. Put on the cotton glove liners.
  - \_\_\_\_\_ b. Insert the hands through the arms of the suit.
  - \_\_\_\_\_ c. Place the butyl rubber gloves over the elasticized wristbands of the suit.
  - \_\_\_\_\_ d. With the arms raised and the elbows bent, tape the gloves to the suit.

- \_\_\_\_\_ 9. Close the zipper of the suit and secure the covering velcro flap or adhesive strip.
- \_\_\_\_\_ 10. Have buddy tape the Responder hood to the back of the suit. (This step is not performed with the loose-fitting PAPR.)
- \_\_\_\_\_ 11. Don the tight-fitting PAPR
  - \_\_\_\_\_ a. Place the PAPR motor-blower back cover against the lower back with the breathing tube extended upward.
  - \_\_\_\_\_ b. Fasten the belt with the motor-blower around the waist.
  - \_\_\_\_\_ c. Turn on the battery to the motor-blower unit.
  - \_\_\_\_\_ d. Hang the PAPR facepiece around the neck.
  - \_\_\_\_\_ e. Loosen the head harness straps.
  - \_\_\_\_\_ f. Place the thumbs inside the straps and the chin in the chin cup inside the facepiece.
  - \_\_\_\_\_ g. Pull the harness over the back of the head.
  - \_\_\_\_\_ h. Tighten the harness straps, beginning with the lower straps, then the side straps, then the top strap.
- \_\_\_\_\_ 12. Pull hood over the head and fasten straps.
- \_\_\_\_\_ 13. Perform positive pressure fit test.
  - \_\_\_\_\_ a. Inhale.
  - \_\_\_\_\_ b. Place palm of hand over the exhalation valve cover.
  - \_\_\_\_\_ c. Exhale slowly.
  - \_\_\_\_\_ d. Notice if a slight positive pressure builds up inside the facepiece indicating a good seal.
  - \_\_\_\_\_ e. If any leakage is detected, readjust the headstraps and repeat test.
  - \_\_\_\_\_ f. If you cannot maintain a seal by adjusting the headstraps, check the facepiece for leaks.

- \_\_\_\_\_ 14. Perform negative pressure fit test.
  - \_\_\_\_\_ a. Use the palm of your hand to block off the breathing tube.
  - \_\_\_\_\_ b. Breathe in and hold your breath for 10 seconds.
  - \_\_\_\_\_ c. Notice if the facepiece collapses and remains collapsed against the face indicating a good seal.
  - \_\_\_\_\_ d. If the facepiece does not remain collapsed or if you notice any leakage, readjust the headstraps and repeat test.
  
- \_\_\_\_\_ 15. Attach the breathing tube to the outlet on the motor-blower.

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Trainer or Authorized Representative

## CHECKLIST FOR REMOVING THE TIGHT-FITTING PAPR WITH THE DUPONT/KAPPLER RESPONDER SUIT

States are responsible for developing acceptable procedures for using PPE. While there are incorrect procedures, there are also multiple variations of acceptable procedures. This checklist is an example of an acceptable procedure. Use of the buddy system is required for this procedure.

- \_\_\_\_\_ 1. Decontaminate if the suit has been exposed to a chemical agent.
- \_\_\_\_\_ 2. Loosen the PAPR hood straps, but don't remove the hood.
- \_\_\_\_\_ 3. Remove and set aside the motor-blower.
- \_\_\_\_\_ 4. Remove the Responder suit and the gloves and boots.
  - \_\_\_\_\_ a. Unseal and unfasten the front of the suit touching only the outside of the suit. (This may require assistance from a buddy.) Do not remove the tape from the sleeve cuffs.
  - \_\_\_\_\_ b. Remove the arms from the rubber gloves through the sleeves, touching only the inside of the suit. (The white glove liners can be left on but should never touch the outside of the suit.)
  - \_\_\_\_\_ c. Have the buddy remove the tape from the overshoes and unfasten the buttons.
  - \_\_\_\_\_ d. Remove the entire suit by pushing the suit downward over the overshoes.
  - \_\_\_\_\_ e. Step out of the overshoes into a clean area.
- \_\_\_\_\_ 5. Remove the tight-fitting PAPR.
  - \_\_\_\_\_ a. Place your hands beneath the hood and turn the hood wrong-side-out over the front of the PAPR.
  - \_\_\_\_\_ b. Holding your breath, loosen the bottom side straps and pull the PAPR away from your face while lifting it over your head.

- \_\_\_\_\_ 6. If the suit has been exposed to a chemical agent, ensure that it is bagged for proper disposal.
- \_\_\_\_\_ 7. Take a shower, making sure that all skin crevices and hair are cleaned thoroughly.

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Trainer or Authorized Representative

## CHECKLIST FOR DONNING THE LOOSE-FITTING PAPR WITH THE DUPONT/KAPPLER CPF3 SUIT

States are responsible for developing acceptable procedures for using PPE. While there are incorrect procedures, there are also multiple variations of acceptable procedures. This checklist is an example of an acceptable procedure. Use of the buddy system is required for this procedure.

- \_\_\_\_\_ 1. Wear underclothing as a minimum. The manufacturer recommends wearing either a long sleeve shirt and long pants or long underwear under the suit.
- \_\_\_\_\_ 2. If regular clothing is worn under the suit, empty pockets of all personal effects that could damage the suit.
- \_\_\_\_\_ 3. Tuck pants legs into socks to make it easier to put on the suit legs.
- \_\_\_\_\_ 4. Wear shoes. (If donning a suit with booties, wear a lightweight shoe under the booty.)
- \_\_\_\_\_ 5. Place both legs into the suit (most easily done while seated).
- \_\_\_\_\_ 6. Don the vinyl overshoes.
  - \_\_\_\_\_ a. Place both feet, with shoes on, into the overshoes.
  - \_\_\_\_\_ b. Button the overshoes.
  - \_\_\_\_\_ c. Pull down the splashguards over the tops of the overshoes.
  - \_\_\_\_\_ d. On suits without booties, tape the pant legs to the overshoes. (A folded-over tab on the tape end will help when removing the tape later.)
- \_\_\_\_\_ 7. Stand up and pull the suit up to facilitate putting on the motor-blower.
- \_\_\_\_\_ 8. Place the motor-blower back cover against the lower back with the breathing tube extended upward.
- \_\_\_\_\_ 9. Fasten the belt with the motor-blower around the waist.
- \_\_\_\_\_ 10. Turn on the battery.
- \_\_\_\_\_ 11. Verify air flow to the hood.

- \_\_\_\_\_ 12. Don life vests or communication equipment, if appropriate, following state-developed procedures.
  
- \_\_\_\_\_ 13. Don the gloves.
  - \_\_\_\_\_ a. Remove the arms from the suit.
  - \_\_\_\_\_ b. Put on the cotton glove liners and the rubber gloves.
  - \_\_\_\_\_ c. Insert the arms into the suit, leaving the suit open.
  - \_\_\_\_\_ d. Tape suit cuffs to the outside of the gloves, taking care not to tape so tightly as to restrict arm movement.
  
- \_\_\_\_\_ 14. Pull the hooded respirator over the head.
  
- \_\_\_\_\_ 15. Adjust the headband wraps.
  
- \_\_\_\_\_ 16. Adjust the elastic neck seal so it fits under the chin, making sure the breathing tube is not twisted.
  
- \_\_\_\_\_ 17. Fully zip up the suit and make sure the velcro flap or adhesive strip over the zipper is sealed.

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## CHECKLIST FOR REMOVING THE LOOSE-FITTING PAPR WITH THE DUPONT/KAPPLER CPF3 SUIT

States are responsible for developing acceptable procedures for using PPE. While there are incorrect procedures, there are also multiple variations of acceptable procedures. This checklist is an example of an acceptable procedure. Use of the buddy system is required for this procedure.

- \_\_\_\_\_ 1. Decontaminate if the suit has been exposed to a chemical agent.
- \_\_\_\_\_ 2. Remove the hooded PAPR, turning the hood inside out while touching only its outside surface.
- \_\_\_\_\_ 3. Remove the motor-blower unit.
- \_\_\_\_\_ 4. Unbuckle the overshoes.
- \_\_\_\_\_ 5. With the rubber gloves on, unseal and unfasten the front of the suit, touching only the outside of the suit.
- \_\_\_\_\_ 6. Remove one arm from the rubber gloves through the sleeve, touching only the inside of the suit. The white glove liners may be left on but should never touch the outside of the suit.
- \_\_\_\_\_ 7. Remove the other arm in the same manner.
- \_\_\_\_\_ 8. Roll the suit down your body from the inside out to the ankles, touching only the inside of the suit.
- \_\_\_\_\_ 9. Remove one foot from the suit and overshoe and place the foot in a clean area.
- \_\_\_\_\_ 10. Remove the other overshoe and step into the clean area.
- \_\_\_\_\_ 11. Remove the glove liners and toss them back out of the clean area.

- \_\_\_\_\_ 12. If the suit has been exposed to a chemical agent, ensure that it is bagged for proper disposal.
- \_\_\_\_\_ 13. Take a shower, making sure that all skin crevices and hair are cleaned thoroughly.

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## MONTHLY INSPECTION FOR PROTECTIVE CLOTHING

An inspection program must be established to ensure the protective qualities of the clothing. Inspection should be performed only by responsible and trained individuals. The program is to include the following elements:

### ***DUPONT/KAPPLER RESPONDER OR CPF3 COVERALL***

- \_\_\_\_\_ 1. Lay suit on a clean, flat surface.
- \_\_\_\_\_ 2. Inspect exterior of suit carefully. The suit should be discarded or used only for training if any abrasions, rips, tears, cracks, or pinholes are found. White spots may indicate ozone damage, which could compromise the integrity of the suit, and the suit should be discarded.
- \_\_\_\_\_ 3. Examine the inside of the suit for damage and inspect the seam tapes for lifts or delamination. A flashlight may be used to facilitate the inspection. If any damage is observed the suit should be discarded or used only for training.
- \_\_\_\_\_ 4. Inspect the zipper. Discard the suit if the zipper is broken or inoperable. The zipper can be lubricated with a small amount of paraffin, if needed.

### ***GLOVES, HOOD, AND APRON***

- \_\_\_\_\_ 1. Replace gloves, hood, and apron if:
  - \_\_\_\_\_ a. exposed to any petroleum-based products
  - \_\_\_\_\_ b. cracks, tears or punctures are present

**NOTE:** The hood should be stored on the PAPR.

## **OVERSHOES**

\_\_\_\_\_ 1. Replace the overshoe if there are:

- \_\_\_\_\_ a. cracks
- \_\_\_\_\_ b. tears
- \_\_\_\_\_ c. punctures

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## PRE-OPERATIONAL TIGHT-FITTING PAPR INSPECTION CHECKLIST

*Do the following preoperational inspection to ensure proper operation.*

- \_\_\_\_\_ If any components are missing or damaged, replace them prior to using the PAPR.
- \_\_\_\_\_ Ensure the filter cartridges are properly fitted to the PAPR in accordance with manufacturer's instructions.
- \_\_\_\_\_ Confirm that the battery pack is:
  - \_\_\_\_\_ a. fully charged,
  - \_\_\_\_\_ b. the power lead is plugged into the battery pack,
  - \_\_\_\_\_ c. the battery pack is turned on, and
  - \_\_\_\_\_ d. air flows through the system.

*Check the airflow using the airflow indicator as follows:*

- \_\_\_\_\_ 1. With the breathing tube assembly disconnected from the turbo unit and the system still running, insert the base of the airflow indicator into the blower unit outlet.
- \_\_\_\_\_ 2. Ensure that the center of the float rests at or above the appropriate mark as indicated for the filter cartridge being used.
- \_\_\_\_\_ 3. Make sure the head harness straps are not torn, and there are no pinpoint holes in the facemask fabric.
- \_\_\_\_\_ 4. Make sure the gasket is fitted in the threaded cavity in the front of the facemask.
- \_\_\_\_\_ 5. Make sure the inhalation and exhalation valves are not worn, torn, bent, dry or sticky.
- \_\_\_\_\_ 6. The visor is not cracked and is properly installed in the facemask.
- \_\_\_\_\_ 7. There are no holes, cracks, breaks, tears or other damage in the breathing tube.

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## PREOPERATIONAL BATTERY USE CHECKLIST

A completely exhausted battery pack should be charged for 16-24 hours using a 3M smart charger. Battery charging is accomplished as follows:

- \_\_\_\_\_ 1. Place the battery charger horizontally on a flat surface.
- \_\_\_\_\_ 2. Plug the battery charger AC power cord into a regulated 120v – 60 Hz outlet. The green LED light will turn on.
- \_\_\_\_\_ 3. Insert the charging lead into the battery pack. The LED will turn off, indicating that the battery pack is being charged in a high rate mode. After approximately 8 hours, the LED will turn back on, indicating that the charger has switched to a trickle rate mode to prevent damage to the battery from overcharge.

3M battery packs have a service life of up to 500 charge/discharge cycles. However, the life of the batteries will be significantly reduced when they are exposed to high heat over an extended period of time. When the battery pack's useful service life has ended (no longer holds charge), the battery pack must be recycled or disposed of properly. Consult your local and state guidelines or 3M's Customer Service Department for proper disposal procedures.

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PPE Wearer

## PRE-OPERATIONAL CHECKLIST FOR FITTING CARTRIDGES

**NOTE:** All contaminant-filtering canisters, cartridges, and filters will be referred to as Filter Media to avoid confusion.

- \_\_\_\_\_ 1. Remove the packaging from the three filter media packs.
  - \_\_\_\_\_ a. Discard filter media that show signs of damage. Consult the User Instructions provided with each filter media pack for information pertinent to its use.
  - \_\_\_\_\_ b. Check the expiration date stamped on the filter media pack.
  - \_\_\_\_\_ c. Check color-coding to ensure filter media is for organic vapors (black).
  
- \_\_\_\_\_ 2. Remove the packaging, plugs and caps, if present, from each of the filter media and retain them in a safe place for later use.
  - \_\_\_\_\_ a. Ensure that a circular plastic air inlet insert is seated inside each air inlet on the turbo PAPR assembly.
  - \_\_\_\_\_ b. Screw the filter media loosely into each of the three threaded adaptors.
  - \_\_\_\_\_ c. When all three media are in place, hand-tighten them so that an airtight seal is achieved between the neck of each filter medium and the air inlet molding in its adaptor.

**WARNING:** Do not overtighten the filter media. Over tightening may distort or displace the seal and may expose the user to the risk of serious injury or death.

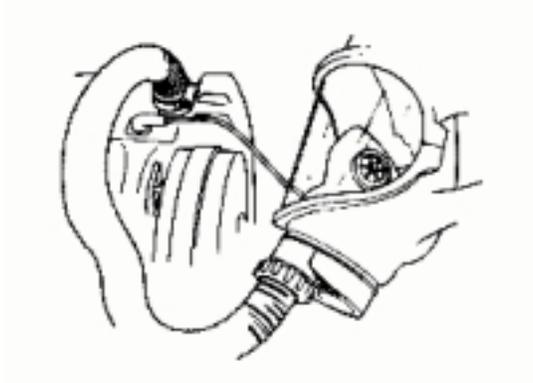
- \_\_\_\_\_ 3. Stretch each canister strap over the body of its filter medium, release the strap, and ensure that it grips the filter medium tightly.
  - \_\_\_\_\_ a. Repeat this procedure for the remaining two until all filter media are secured with the canister straps. (NOTE: Use of canister straps is optional.)

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## PRE-OPERATIONAL INSPECTION CHECKLIST FOR BLOWER UNIT

Before beginning each work shift, do the following Pre-Operational Inspection to ensure proper operation. If any components are missing or damaged, replace them prior to using the blower unit. Ensure that the filter media are properly fitted to the blower unit.



Confirm that the battery pack is fully charged, the power lead from the blower unit is plugged into the battery pack, the battery pack is turned on, and air flows through the system. Check the airflow using the airflow indicator as follows:

- \_\_\_\_\_ 1. With the breathing tube assembly disconnected from the blower unit and the system running, insert the base of the flow meter into the blower unit outlet. Be sure the blower unit and flow meter are resting in a vertical position. The blower unit may need to be propped up so that the lower filter media opening is not blocked.
- \_\_\_\_\_ 2. Ensure that the center of the float rests at or above the appropriate mark. The blower unit must maintain at least 6 cfm.

**NOTE:** If the flow meter float is below 6 cfm, install new filter media and dispose of used filter media in accordance with local and State guidelines. Check the flow rate again. If it is still below 6 cfm, refer to Troubleshooting section of the manufacturer's User Instructions.

- \_\_\_\_\_ 3. Verify that the respirator headpiece is connected to the blower unit and that air is flowing before donning the respirator headpiece.

**CAUTION:** If this system will be exposed to a large amounts of water, the battery pack **must be placed** in a water repellent battery cover (available from 3M) or in a water proof plastic bag prior to use to avoid corrosion, deterioration, and possible battery failure.

**WARNING**

*To ensure adequate protection, the performance of this system must be monitored in a non-hazardous environment. During user break periods, confirm sufficient airflow by performing the airflow check. When the user notices a decrease in the airflow, refer to the Troubleshooting section of the turbo PAPR assembly User Instructions.*

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PPE Wearer

## RESPIRATOR CLEANING AND DISINFECTING

Federal regulations (29 CFR 1910.134 [h]) require that respirators be cleaned and disinfected as often as necessary to maintain them in a sanitary condition. Respirators issued to more than one employee must be cleaned and disinfected before being used by different individuals. Respirators must be cleaned and disinfected after each use, whether for fit testing, training, or in an actual emergency. All washing, disinfecting, and rinsing should be performed in warm water solutions at a temperature not over 43° C (110° F).

- \_\_\_\_\_ 1. Remove filter media.
- \_\_\_\_\_ 2. Disassemble facepiece by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.
- \_\_\_\_\_ 3. Wash components in warm water using a mild detergent or a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt. Do not clean facepieces with strong solvents (such as MEK, acetone, or toluene) or with detergents that contain lanolin or other oils. These substances may soften or distort the face shield.
- \_\_\_\_\_ 4. Rinse components thoroughly in clean, warm, preferably running water. Drain.
- \_\_\_\_\_ 5. If the cleaner used in step 3 does not contain a disinfecting agent, the respirator components should be immersed for two minutes in one of the following:
  - \_\_\_\_\_ a. Hypochlorite solution made by adding approximately one milliliter of laundry bleach to one liter of water; or
  - \_\_\_\_\_ b. Aqueous solution of iodine made by adding approximately 0.8 milliliters of tincture of iodine to one liter of warm water. (Tincture of iodine consists of 6-8 grams of ammonium and/or potassium iodide per 100 cc of 45% alcohol.); or
  - \_\_\_\_\_ c. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.

- \_\_\_\_\_ 6. Rinse components thoroughly in clean, warm, preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.
  
- \_\_\_\_\_ 7. Components should be hand-dried with a clean lint-free cloth or air-dried.
  
- \_\_\_\_\_ 8. Reassemble facepiece, replacing filter media.
  
- \_\_\_\_\_ 9. Test the respirator to ensure that all components work properly.

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## POST-OPERATIONAL MAINTENANCE FOR BLOWER UNIT

### **WARNING**

Avoid contaminant entry into the blower unit; respiratory protection may be compromised.

Water must not enter the blower unit or the battery pack. Any filter media, which have been directly exposed to water, must be disposed of in accordance with local and State guidelines.

To preserve the system's integrity, gasoline, organic-based solvents, or chlorinated degreasing fluids (such as trichloroethylene) must not be used to clean any part of this system.

### **CLEANING**

- \_\_\_\_\_ 1. Clean the outer surfaces of the blower unit and battery pack with a soft cloth dampened in a mild solution of clean, warm water and mild detergent. Abrasive cleaners must not be used.
- \_\_\_\_\_ 2. The surfaces of the filter media should be wiped clean with care to prevent contaminants from entering the filter media.
- \_\_\_\_\_ 3. Detach the breathing tube from the blower unit, and wipe the connection sites.

### **INSPECTION**

After cleaning the system,

- \_\_\_\_\_ 1. Inspect the individual parts.
- \_\_\_\_\_ 2. Ensure that all components and connection sites, including the handwheel threads, are clean and in good condition.
- \_\_\_\_\_ 3. The filter media must be removed and stored or disposed of in accordance with local and State guidelines. Check with your local safety professional to determine the proper course of action.
- \_\_\_\_\_ 4. Examine the parts of the system and replace any parts found to be damaged.
- \_\_\_\_\_ 5. Recharge the battery pack.

- \_\_\_\_\_ 6. Perform the respirator cleaning and disinfecting as detailed in the appropriate checklist.

***AFTER CLEANING AND INSPECTING THE SYSTEM***

- \_\_\_\_\_ 1. Allow all components to dry away from sunlight and direct heat.
- \_\_\_\_\_ 2. Store the system in a clean area, away from moisture, heat and direct sunlight.
- \_\_\_\_\_ 3. Storage temperature must not exceed 120°F (49°C).

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## PAPR TROUBLE-SHOOTING

If airflow over your face reduces or stops, leave the contaminated environment immediately and perform the following troubleshooting procedures. Make sure that:

- \_\_\_\_\_ 1. There are no pinpoint holes in the facemask fabric, tears in the head harness straps, or cracks in the visor.
- \_\_\_\_\_ 2. The visor has been installed properly and no gaps exist between the visor and the visor clamps.
- \_\_\_\_\_ 3. A gasket is fitted in the threaded cavity in the front of the facemask.
- \_\_\_\_\_ 4. The inhalation or exhalation valves are not worn, torn, bent, dry, or sticky.
- \_\_\_\_\_ 5. The breathing tube is securely connected to the facemask and blower unit, and is not twisted.
- \_\_\_\_\_ 6. There are no holes, cracks, breaks, tears, or other damage to the breathing tube.
- \_\_\_\_\_ 7. Enough air is available at the air inlet of the facemask using the airflow check. If adequate airflow is not maintained, the problem may be in the blower unit, battery pack, filter media, or a combination of these components.

If any components are not functioning properly, remove and replace them, and perform the Pre-Operational Inspection.

Always make sure sufficient airflow is maintained before reentering the contaminated work environment.

## TROUBLE-SHOOTING CHECKLIST FOR BLOWER UNIT

If the airflow over the face reduces or stops, leave the contaminated environment immediately and perform the following trouble-shooting procedures. Make sure:

- \_\_\_\_\_ 1. Battery pack has not been turned off.
- \_\_\_\_\_ 2. Battery pack has a sufficient charge (5 volts or greater).
- \_\_\_\_\_ 3. Battery pack fuses have not blown.
- \_\_\_\_\_ 4. No physical damage has occurred to any part of the blower unit.
- \_\_\_\_\_ 5. Filter media are not exhausted (substitute fresh media).
- \_\_\_\_\_ 6. Sufficient air flows through the system (perform the airflow check).
- \_\_\_\_\_ 7. Headpiece is functional (perform the trouble-shooting procedures).

### **WARNING**

The user must ensure that the center of the airflow indicator float rests at or above the mark specified for his/her system prior to re-entering the work area. Failure to do so may expose the user to the risk of serious bodily injury or death.

If, at any time during operation, an odor or taste of gas in the filtered air is detected, or eye or throat irritation is felt, leave the contaminated environment immediately, perform the trouble-shooting procedures on the blower unit and the headpiece, and if necessary, replace all filter media. Failure to do so may expose the user to the risk of serious bodily injury or death.

## MONTHLY PAPR INSPECTION CHECKLIST

Federal regulations (29 CFR 1910.134 [h]) require that all respirators maintained for emergency use be inspected at least monthly following the manufacturer's recommendations. Repair of any component of a PAPR should be performed only by persons thoroughly familiar with the device and who have been instructed in the type of repair to be performed. No attempt shall be made to replace components or to make adjustments or repairs beyond the manufacturer's recommendations. The PAPR manufacturer's website should be checked periodically for information on product recalls.

### Inspecting the Tight-Fitting PAPR

- \_\_\_\_\_ 1. Check facepiece for cracks, tears and dirt.
- \_\_\_\_\_ 2. Be certain facepiece, especially face seal area, is not distorted.
- \_\_\_\_\_ 3. Examine inhalation valves for signs of distortion, cracking or tearing.
- \_\_\_\_\_ 4. Make sure that head straps are intact and have good elasticity.
- \_\_\_\_\_ 5. Examine all plastic parts for signs of cracking or fatiguing.
- \_\_\_\_\_ 6. Make sure filter gaskets are properly seated and in good condition .
- \_\_\_\_\_ 7. Remove exhalation valve cover and examine exhalation valve and valve seat for signs of dirt, distortion, cracking or tearing. Replace exhalation valve cover.
- \_\_\_\_\_ 8. Inspect lens for any damage that may impair respirator performance or vision.
- \_\_\_\_\_ 9. Make sure all airway connections fit tightly.
- \_\_\_\_\_ 10. Confirm that the expiration date stamped on each filter medium will not have elapsed before the next monthly inspection.

### Inspecting the Loose-Fitting PAPR

- \_\_\_\_\_ 1. Check that there are no dents or cracks in the hood assembly. Look closely at the stitching. There should be no tears that could permit contaminated air to enter the hood.
- \_\_\_\_\_ 2. Look for scratches or other visual distortions that make it difficult to see through the face shield.

- \_\_\_\_\_ 3. Carefully examine the entire breathing tube. Look for tears, holes, or cracks. Bend the tube to verify that it is flexible.
- \_\_\_\_\_ 4. Make sure all airway connections fit tightly.
- \_\_\_\_\_ 5. Confirm that the expiration date stamped on each filter medium will not have elapsed before the next monthly inspection.

**Inspecting the Turbo Powered Air Blower/Filtration Unit**

- \_\_\_\_\_ 1. Remove the filter media cartridges from the blower unit.
- \_\_\_\_\_ 2. Examine the blower housing for cracks. Replace if cracked or damaged.
- \_\_\_\_\_ 3. Examine the inside of the blower intake manifold (note the red and white wires). The presence of dust or other particulate matter inside the manifold or on the wires may indicate a damaged filter, improper seating of the filter media cartridge or incorrect filter media selection. Contact 3M Technical Service for assistance.
- \_\_\_\_\_ 4. Examine the outside of the battery pack for cracks. Replace if damaged.
- \_\_\_\_\_ 5. Carefully examine the entire breathing tube. Look for tears, holes or cracks. Bend the tube to verify that it is flexible. Replace if punctured, cracked or worn.
- \_\_\_\_\_ 6. Confirm that the battery pack has a sufficient charge.

\_\_\_\_\_  
Date

\_\_\_\_\_  
PPE Wearer

***APPENDIX B. ANSWER KEY TO REVIEW QUESTIONS***

## ANSWER KEY TO REVIEW QUESTIONS

1. Knowing the correct way to use CSEPP-approved PPE is important because
  - a. it is not possible to be partially protected from nerve or blister agents; a person is either protected or not protected
2. The PPE approved for use by CSEPP responders includes the following chemical protective items:
  - c. PAPR, hood, protective suit, gloves, overshoes, and apron (for decontamination personnel)
3. The CSEPP protective equipment is to be used
  - b. only in the event that a chemical accident or incident involving chemical weapon agents has occurred
4. If visual inspection of a DuPont/Kappler Responder or CPF3 suit reveals any damage or weakness in the suit material or seams, the suit should be
  - c. discarded or used only for training purposes
5. The DuPont/Kappler Responder and CPF3 suits used by CSEPP responders should be stored
  - b. on a hanger or in an open shipping bag inside the Ready Bag
6. The tight-fitting and loose-fitting PAPRs approved for CSEPP differ in that
  - d. all of the above
    - a. the tight-fitting PAPR provides greater respiratory protection but is more complex to use
    - b. only the loose-fitting PAPR will accommodate beards and eyeglasses
    - c. fit testing is required for the tight-fitting PAPR but is not needed for the loose-fitting PAPR
7. Before putting on a PAPR, it is essential to
  - d. both a and c above
    - a. remove all obstructions (including packaging, plugs and caps) to the free flow of air into the air-purifying elements (filter cartridges)
    - c. ensure the initial flow test for the PAPR is performed satisfactorily

8. Pre-operational checks of the PAPR must be performed
  - a. monthly and after each time the PAPR is used
9. A CSEPP responder wearing an approved PAPR and protective clothing should immediately return to a non-contaminated area if
  - d. any of the above
    - a. the taste or smell of contaminants is detected
    - b. the eyes, nose, or throat become irritated
    - c. the flow of air through the respirator slows or stops
10. A PAPR's air-purifying elements (filter cartridges) should be replaced
  - d. either a or c
    - a. before the expiration date stamped on the cartridge
    - c. when they become plugged with particulates or saturated with gases or vapors
11. Workers wearing CSEPP-approved PPE
  - b. will take about 1.5 times longer than normal to perform most tasks
12. When removing protective clothing after responding to a chemical agent incident, it is important to
  - c. decontaminate first if the suit has been exposed to a chemical agent
13. The response to a CSEPP chemical agent release will differ from the response to most hazardous materials releases in that
  - a. off-post responders will be responsible only for public safety and related measures such as facilitating the flow of evacuation traffic and conducting search and rescue
14. Off-post emergency responders may enter an area where chemical agent is known or suspected to be present
  - c. only after the Army installation has determined that the release of agent has stopped and that the responders' PPE will protect them from the concentration of agent that may be present

15. Emergency workers must wear PPE

- c. either a or b, depending on State and local decisions
  - a. when they enter any area where protective actions have been recommended for the public
  - b. when they enter any area where accident conditions indicate that chemical agent may be present as vapor or deposited on the ground

16. To ensure that CSEPP emergency workers are protected from contamination and excessive exposure, they must

- d. all of the above
  - a. not be sent into environments which are known or suspected to be immediately dangerous to life or health (IDLH)
  - b. not remain in a potentially contaminated area long enough to exceed the agent absorption capacity of the cartridges used in their PAPRs
  - c. not be exposed to agent deposition density levels exceeding the maximum capability of their protective suits

17. The accumulation of body heat due to working in PPE may lead to heat stress. The amount of heat accumulation depends upon

- c. both a and b above
  - a. the amount of physical activity, level of hydration, and clothing worn
  - b. weather conditions

18. Several things can be done during rest periods outside the hazard area to reduce the level of heat stress, including

- b. unzipping the protective suit, unbuttoning and loosening overshoes, and rolling back the PAPR hood

19. If you suspect that your buddy is suffering from heat illness, you should immediately

- b. get your buddy into shade (outside the hazard area), remove heavy clothing, and give drinking water if the buddy is alert

20. Cold can affect workers wearing PPE by

- c. lowering body temperature, resulting in injuries and impaired performance

## ***APPENDIX C: VU-GRAPHS***

# PERSONAL PROTECTIVE EQUIPMENT



PPE1

# Objectives

**Required learning objectives are to be able to:**

- **Protect person from contamination by donning PPE**
- **Remove potentially contaminated PPE without contaminating person**
- **Recognize limitations of PPE**
- **Know State and local work rules, policies and procedures, as well as those established by CSEPP**

# **CSEPP Approach to PPE**

**CSEPP planning guidance does not provide for deployment of civilian emergency workers into areas which are known or suspected to be contaminated with chemical weapon agent until monitoring and sampling confirms that concentrations are within range for which PPE provides protection**

**To provide protection in event of entry into contaminated areas, individuals identified in state and local plans as initial off-site emergency workers will be issued PPE appropriate for prescribed job functions**

# On-Post Response Program

- **Guided by U.S. Department of Army Pamphlet 50-6, Chemical Accident or Incident Response and Assistance (CAIRA) Operations**
- **Pamphlet 50-6 describes Army functions, responsibilities, organizations, and procedures for responding to chemical weapon agent events**

# Off-Post Civilian Response

- **Actions limited to those that protect general population, as documented in State and local emergency plans**
- **Emergency plans describe functions, responsibilities, organizations, and procedures of off-site response to incidents involving Army chemical weapon agents from initial notification by Army that a release has occurred through end of incident**

## Off-Site Emergency Worker Functions

- **May perform variety of functions including:**
  - **Controlling evacuation traffic**
  - **Providing emergency medical services**
  - **Performing emergency decontamination**

# Work Intensities

- **Physical activities needed to perform duties vary in degree of complexity, movement and level of exertion**
  - **Emergency workers staffing traffic control points will be performing less strenuous tasks**
  - **Emergency workers assigned to a decontamination station or to medical services must perform more physical tasks**

# **Governmental PPE Requirements**

- **U.S. Government requires that employer provide you with PPE if it is required on your job**
- **Code of Federal Regulations (CFR) prescribes guidelines for training, protective clothing and equipment**
- **Other State and local regulations may specify types of PPE for specific positions or tasks in dealing with range of hazardous materials**
- **You should be familiar with local and job-specific requirements in your area**

# Who Needs PPE and Training

- **All persons (including volunteers) designated as part of the emergency response (e.g., police, medics, paramedics, firefighters, medical personnel) to a chemical agent release**
- **All persons who anticipate being active in potentially hazardous environments as part of CSEPP emergency response plan**
- **Before training, a medical evaluation shall be performed**
- **Regular drills and training sessions designed to maintain familiarity with equipment should be incorporated into emergency response protocols**

# What is PPE?



- **Personal Protective Equipment (PPE) is defined as articles worn or equipment used in order to protect wearer from harmful contaminants in environment**
- **Main function of PPE is to provide shield between you and agent contaminating environment**
  - **To be effective it must prevent you from being contaminated by airborne or surface agents**



# Proper Use Critical

*If PPE must be used, it must be used correctly*

- It is not possible to be partially protected from nerve or blister agents; you are either protected or not protected



# Recommended PPE

- **Potential nerve and blister agent contamination requires respiratory protection and protective covering for all parts of the body. Includes:**
  - **Powered air-purifying respirator (PAPR)**
  - **Hood**
  - **Protective suit**
  - **Overshoes**
  - **Gloves**
  - **Apron (if needed)**
- **This type of protection guards against skin, respiratory tract, and eye exposures**

# CSEPP Protective Clothing

- **CSEPP, in conjunction with the Centers for Disease Control and Prevention/National Center for Environmental Health, have conducted several studies and tests on PPE to select the appropriate PPE for CSEPP**



PPE13

# Availability of PPE

- **This equipment is only to be used in the event that an accident or incident involving chemical weapon agents has occurred**
- **Protective suit, hood, gloves, overshoes, PAPR, and apron (if appropriate) will be kept available in Ready Bag for designated emergency responders**
- **Backup and training suits will also be made available**
- **Upon termination from CSEPP, worker shall return protective suit, hood, gloves, apron, overshoes, Ready Bag, and PAPR as outlined in State and local plans**

# Protective Suit

- **4 suits approved for CSEPP use**
- **Only 2 suits being used by CSEPP Communities**
  - **DuPont/Kappler Responder**
  - **DuPont/Kappler CPF3**
- **This course focuses on the 2 suits being used**



## DuPont/Kappler Responder and CPF 3 Suits

- **One-piece coverall suits for wear over street clothes or long underwear**
- **Multiple layer, composite material provides protection**
- **Responder weighs less; CPF 3 is tougher**
- **Do not protect from heat and cold**



## DuPont/Kappler Responder and CPF3 Suits

- **Store on hangers or in shipping bag**
- **Shelf life of 5 years**
- **Not repairable; discard if damaged or worn out**
- **Discard after exposure to chemical agent**



# Gloves

- **Outer glove for protection and inner glove for perspiration absorption**
- **Outer gloves impermeable, black, butyl rubber**
- **Inner gloves thin, white cotton**
- **Protect against liquid chemical agents and vapor hazards**
- **If become contaminated, replace within 24 hours**
- **Replace if exposed to any petroleum-based products**



# Overshoes

- **Military-issue vinyl overshoes with elastic fasteners**
- **Protect feet from contamination by all known agents for up to 24 hours following contamination; for up to 14 days if not contaminated**



# Apron



- Only those performing decontamination tasks need to wear aprons
- Wrap-around style, made of a front panel, two side panels, and raglan sleeves
- Designed to fit loosely and cover the wearer's arms and body from overshoes to neck
- Nylon cloth, coated with butyl rubber on both sides



PPE20

# Ready Bag

- **Canvas bag designed to carry all the protective equipment (protective suit, hood, gloves, apron, overshoes, PAPR, and detection kits)**



# Respiratory Equipment



- Prevents airborne contaminants from being inhaled
- Protects facial skin from exposure
- Must be only used in context of complete respirator program as described in OSHA regulations and NIOSH publications

# Powered Air-Purifying Respirator (PAPR)

- **Protects against**
  - **particulates**
  - **gases and vapors**



# PAPR Components



- **2 types of PAPR are approved for CSEPP**
  - **Tight-fitting PAPR**
  - **Loose-fitting PAPR**
- **Tight-fitting PAPR provides better respiratory protection**
- **Loose-fitting PAPR is easier to use; accommodates facial hair and eyeglasses**
- **Tight-fitting provides protection if batteries fail, while loose-fitting must be removed**

# PAPR Components

- **Both types of PAPRs consist of**
  - **Full facepiece**
  - **Butyl rubber-covered hood**
  - **Breathing tube**
  - **Motor-blower unit with filter cartridges**
  - **Battery**

## Powered Air-Purifying Respirator (PAPR)

- **Battery-operated blower delivers decontaminated air at slight positive pressure into full facepiece**
  - If leak occurs, air will flow from inside facepiece to outside air
- **Draws outside air through filters which remove contaminants and delivers the cleaned air through corrugated breathing tube into facepiece assembly on face of wearer**
- **Air flow also provides wearer comfort**



PPE26

# Why the PAPR Was Selected

- **Civilian air-purifying respirators approved by CDC/NCEH**
- **NIOSH confirmed cartridge tests were conducted in valid scientific manner**
- **Data support conclusion that commercial cartridges tested will remove up to 0.5 milligram per cubic meter of nerve agent GB for up to 16 hours**
  - **Concentration chosen because maximum predicted concentration to which emergency worker would be exposed**
  - **U.S. Army data on military gas masks indicate that nerve agent GB wears out filters more quickly than other agents**

## Spectacle Kit

- **Proper seal with tight-fitting PAPR cannot be established if the temple bars of eyeglasses extend through sealing edge of full facepiece**
- **3M has developed spectacle kits that mount corrective lenses inside full facepieces**
- **Personnel who wear eyeglasses should use a spectacle kit or wear a loose-fitting PAPR**

# Limitations of PAPRS

- **Do NOT use in atmospheres immediately dangerous to life or health (IDLH)**
- **Do NOT use in atmospheres containing less than 19.5% oxygen (confined spaces)**
- **Do NOT use the respirators in a flammable or explosive atmosphere**
- **Do NOT use air-purifying elements beyond useful life**
- **Use only fully charged battery packs when respirator is donned**
- **Protect batteries/battery packs from fire and heat at all times**

# Air-Purifying Cartridges

- **Most common filtration method for airborne particulates**
- **Often referred to as filter or canister**
- **Always read cartridge labels**
- **All cartridges in blower unit must be identical and must be replaced at same time**
- **Follow good industrial hygiene practices when replacing and disposing of cartridges**

# Cartridges

- **Identify cartridge by properly worded labels and color code**
  - Correct color code for organic vapor is black

**In each Ready Bag:**

- **3 sets of 3 cartridges**
  - 1 set for chemical accident/ incident
  - 1 set for backup
  - 1 set for training marked  
“For Training Purposes Only”

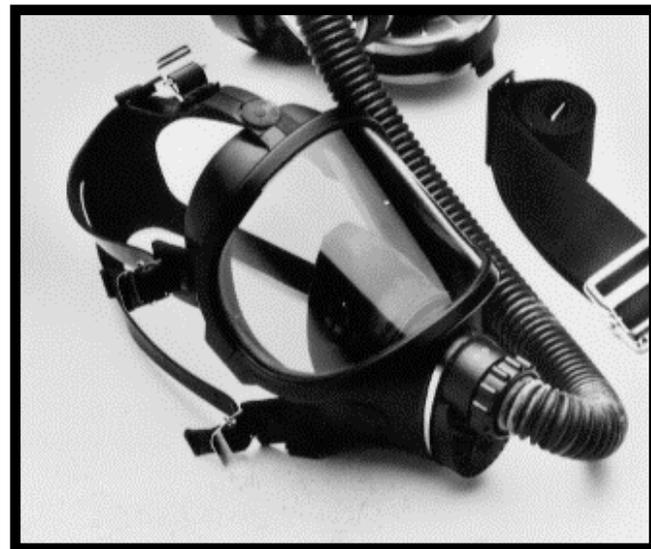
# Respirator Fit Testing

- **Shall be done while wearing all protective equipment that could interfere with fit and/or wearer acceptance**
- **Must be based upon 29 CFR 1910.134 Appendix A**
- **Must be repeated at least annually based on 29 CFR 1910.134(f)**
- **Medical evaluation required for wearer**
- **You should be familiar with State and local requirements**

# Storage of PPE

## RESPIRATOR

- **Before storing the facepiece, it should be**
  - **Inspected**
  - **Repaired, if necessary**
  - **Cleaned**
  - **Dried**
  - **Given final inspection**



# Storage of PPE

## RESPIRATOR

- **After preparing facepiece for storage:**
  - **Place facepiece in closed plastic bag**
  - **Bag and facepiece should be stored away from sunlight and direct heat**
  - **Store in clean, dry, cool place that is free from contaminating vapors, gases and particulates**
  - **Storage temperatures must not exceed 120°F (49°C)—don't store in vehicle!**
  - **Bag should be clearly labeled to indicate type of facepiece**

# Storage of PPE

## RESPIRATOR

- While in storage, facepiece should be protected from distortion from weight or pressure of surrounding objects or being placed in too small a place
- NEVER store PPE equipment in car or truck because of potential for heat damage but in a location easily accessible
- Fully charged battery pack should be stored in closed plastic bag in dry, cool place where atmosphere is uncontaminated
  - When sold, battery pack is not charged

# Storage of PPE

## RESPIRATOR

- **Use battery charger and AC/DC adapter to charge and recharge battery pack**
- **All parts in plastic bag should be connected together in manner of assembled respirator**
- **Facepiece and its subparts should be stored separately from remainder of PAPR**
- **Only fully operable facepieces should be stored**

# Storage of PPE

## PROTECTIVE CLOTHING

- **DuPont/Kappler Responder and CPF3 protective suits come sealed in a shipping bag**
- **The protective suit may be stored in the open shipping bag inside the Ready Bag along with, gloves, hood, overshoes, and apron**
- **Alternatively, the suits can be stored on hangers**
- **Store:**
  - **away from sunlight and direct heat**
  - **in a clean, dry, cool place that is free from contaminating vapors, gases and particulates**
  - **storage temperatures must not exceed 120°F (49°C)**

# Basis For Work Rules

- **CSEPP off-site emergency workers will not conduct aggressive spill containment or cleanup operations**
- **Modification of established State and local response plans may be required**
- **Basis of modifications will include**
  - **Technical information developed by Army over last 30 years about potential threat from chemical weapon agents**
  - **Ergonomic considerations**
  - **Capabilities of PPE to provide protection**

## **State and Local Government Decisions**

**Option 1 – Emergency workers must wear PPE when they enter any area where protective actions have been determined for public.**

- Includes traffic control, decontamination stations, and emergency medical responders who assist in implementation of protective actions
- Will preclude emergency workers from being exposed to chemical agent without PPE

**Option 2 – Emergency workers wear PPE when they enter any area where accident conditions indicate chemical agent may be present as vapor or deposited on the ground.**

- Would require PPE only where agent believed to be present, thus minimizing risk of heat stress to emergency workers where public protective actions are precautionary rather than based on projected exposure

## **Basis And Timing For Working In PPE**

- **Emergency workers who enter an area where PPE is required must limit their activities so that protection from contamination and excessive exposure is assured**

# Basis And Timing For Working In PPE

**This requires that emergency workers**

- **Not be sent into environments which are known or suspected to be immediately dangerous to life or health (IDLH)**
- **Not remain in potentially contaminated area long enough to receive agent dosage sufficient to affect health or ability to execute assigned tasks**
- **Not remain in potentially contaminated area long enough to exceed agent absorption capacity of canisters used in PAPR**
- **Not be exposed to agent deposition density levels exceeding maximum capability of protective suit**

**Airborne Agent Concentrations  
Immediately Dangerous to Life or Health (IDLH)**

<b>Agent</b>	<b>IDLH Concentration (mg/m<sup>3</sup>)</b>
<b>GA/GB</b>	<b>0.2</b>
<b>VX</b>	<b>0.02</b>
<b>HD/L</b>	<b>*</b>

**\*The U.S. Army Environmental Hygiene Agency proposed a value of 1.67 mg/m<sup>3</sup>. However, as of this date, the Office of the U.S. Army Surgeon General has not formally established IDLH levels for HD or L.**

# Exposure Limits

- **Simplest, most effective work rule to assure that respirator cartridges are used within capacity is to avoid sending emergency workers into areas where a plume containing airborne chemical agent may be present**
- **Activity of off-site emergency workers in areas where airborne chemical agent may be present must be limited**
  - **To ensure that workers are not exposed to average airborne agent concentrations greater than those established for agent workers, even when using respiratory protection**
  - **To ensure that agent absorption capacity of respirator cartridges is not exceeded**

# Respirator Cartridge Limits

- Have been determined to provide at least 16 hours of protection when exposed to an agent vapor concentration of  $0.5 \text{ mg/m}^3$
- Possible that under certain release and atmospheric conditions this dosage may be exceeded outside boundaries of several storage installations



# Respirator Cartridge Limits

- **Work rules must avoid possibility that emergency workers can be exposed to conditions in excess of cartridge's absorption capacity**
- **Once airborne agent concentration level has declined below IDLH level, combination of limited stay times and use of chemical detector kits can assist emergency workers in using PPE within its capabilities**

# PAPR-Limited Stay Times

**Depend on**

- **Concentration of chemical agent in the air**
- **Exposure limit for the chemical agent**
- **The protection factor for the respirator**
- **The dosage capacity of the filter cartridges**

# Work Intensity

- **Along with ambient temperature, work intensity is major contributing factor to heat stress**
- **Work/rest cycles should be instituted to control heat stress. Cycles need to be flexible because of**
  - **Variability in work intensity**
  - **Differences in individuals susceptibility to heat stress**
  - **Unique demands of each emergency situation**

# Clothing-Limited Stay Times

## COOL TEMPERATURES

50 – 70°F (10 – 21°C) [Wet Bulb/Globe Temperature (WBGT)]

Work 30 – 45 minutes

Followed by 10 – 15 minutes rest

## WARM TEMPERATURES

70 – 85°F (21 – 29°C) [Wet Bulb/Globe Temperature (WBGT)]

Work 20 – 30 minutes

Followed by 40 – 60 minutes rest

## HOT TEMPERATURES

85 – 100°F (29 – 38°C) [Wet Bulb/Globe Temperature (WBGT)]

Work 15 – 20 minutes

Followed by indefinite rest

# Heat Stress Factors

- **PPE restricts heat loss mechanisms because of low permeability to water vapor**
- **Amount of heat accumulation depends upon**
  - **Amount of physical activity**
  - **Level of hydration**
  - **Clothing worn**
  - **Load carried**
  - **State of heat acclimatization**
  - **Physical fitness and fatigue**
  - **Terrain and climatic conditions**

# Dehydration

- **Because of higher body temperatures, individuals in PPE sweat considerably more than usual, often more than 1.5 quarts of water every hour during work**
- **Water must be consumed to replace lost fluids or dehydration will follow**
- **Inability to drink in full PPE increases likelihood of dehydration**
- **Dehydration and need for regular and timely fluid replacement in workers is limiting factor on stay time in full PPE**

# Psychological Factors

- **Wearing full PPE reduces ability to see and hear clearly**
- **Makes it more difficult to recognize and communicate with others**
- **Creates or increases feelings of isolation and confusion**
- **Causes frustration in many and claustrophobia in others**
- **Experience in wearing and exercising in PPE can reduce these feelings**

## Effects of Heat Stress on Performance in PPE

- **Workers wearing PPE will take about 1.5 times longer to perform most tasks**
- **Performance is affected by stress in a variety of ways:**
  - **Reaction times and decision times are longer**
  - **Routine tasks are done more slowly**
  - **Errors of omission are more common**
- **Use the buddy system whenever possible; a buddy can check for signs of stress and fatigue**
- **Critical jobs should be shared and work should be double-checked**

# Cold Stress Factors

- **Can directly affect an individual's health and performance while wearing PPE**
- **Can lower body temperature, resulting in cold injuries and impaired performance**
- **Often accompanied by wind, rain, snow and ice, which can worsen the effects of cold**
- **Cold weather clothing and PPE are difficult to integrate**

# Buddy System Recommended

- **Good industrial hygiene practice recommends buddy system be used if resources permit**
- **Can assist other workers in dressing out in PPE**
- **Can ensure that all workers are regularly checked for signs of stress and agent exposure**
- **Pair an experienced worker with inexperienced “buddy” whenever possible**



# Work Rules Summary

## Plan Ahead

- **Follow guidance for working in PPE**
- **Ensure serviceability of equipment through regular inspections of PPE equipment**
- **Plan work/rest cycles appropriate to environment and situation**
- **Use standard operating procedures to reduce command, control, and communication tasks**
- **Keep plans and operations simple**

# Work Rules Summary

## Think Teamwork

- Use methods of individual identification
- Encourage small talk while in PPE
- If resources permit, use the buddy system to ensure that all workers are regularly checked for signs of stress and agent exposure
- Pair experienced worker with inexperienced “buddy” whenever possible

# Work Rules Summary

## Work Smart

- Provide relief from PPE outside hazard area as soon as situation allows
- Use work/rest ratios, slow work rate, and minimize work intensity
- Work in the shade whenever possible
- Rotate jobs and people during long periods of relative inactivity
- Provide relief from extreme temperatures (hot or cold) as soon as possible
- Remember that even short breaks from total encapsulation are effective in sustaining performance
- Enforce drinking of water to reduce dehydration and heat casualties

## ***APPENDIX D: PPE REGULATIONS AND GUIDANCE***

In addition to the obvious need to protect yourself, the Occupational Safety and Health Administration (OSHA) requires that your employer provide you with PPE if it is required on your job. The *Code of Federal Regulations* (CFR) prescribes guidelines for protective clothing, emergency response, equipment and training under Title 29-Labor. The table below summarizes several of the relevant regulations.

<b>CFR Reference</b>	<b>Requirement</b>
1910.120(q) 3-7-96	<p>Emergency response to hazardous substance releases. Requirements for:</p> <ul style="list-style-type: none"> <li>• emergency response plan</li> <li>• elements of an emergency response plan</li> <li>• procedures for handling emergency response</li> <li>• skilled support personnel</li> <li>• specialist employees</li> <li>• training (number of hours/general content required)</li> <li>• trainers</li> <li>• refresher training</li> <li>• medical surveillance and consultation</li> <li>• chemical protective clothing</li> <li>• post-emergency response operations.</li> </ul>
1910.132(a) 7-1-94	PPE (including respirators, eye and face protection and protective clothing) shall be provided, used and maintained in sanitary and reliable condition.
1910.132(f)(1) 7-1-94	<p>Employer shall provide training for PPE. Employee will know:</p> <ul style="list-style-type: none"> <li>• when is PPE necessary</li> <li>• what PPE is necessary</li> <li>• how to properly don, doff, adjust and wear PPE</li> <li>• limitations of PPE</li> <li>• proper care, maintenance, useful life and disposal of PPE.</li> </ul>
1910.132(d)(1) 7-1-94	Select the PPE that properly fits each employee. After PPE is selected, communicate selection decisions to each employee.
1910.132(f)(4) 7-1-94	<p>Employer shall verify each employee received and understood required training through written certification containing:</p> <ul style="list-style-type: none"> <li>• name of employee trained</li> <li>• the date(s) of training</li> <li>• subject of certification.</li> </ul>

CFR Reference	Requirement
1910.134(a)(2) 4-23-98	Respirators shall be provided when such equipment is necessary to protect health of employee. Respirators shall be applicable and suitable for purpose intended.
1910.134(c) 4-23-98	Requirements for a Respiratory Protection Program. Develop written standard operating procedures (selection and use) <ul style="list-style-type: none"> <li>• respirators based on hazards</li> <li>• breathing air quality and use</li> <li>• instruction and training on proper use and limitations</li> <li>• regularly cleaned and disinfected</li> <li>• storage location requirements</li> <li>• routine inspections (monthly)</li> <li>• training for emergencies</li> <li>• regular program evaluation</li> <li>• medical requirements</li> <li>• fit testing requirements (tight-fitting)</li> <li>• must be NIOSH approved</li> </ul>

In addition, State and local regulations may specify types of PPE and appropriate levels of protection for specific positions or tasks (e.g., firefighters, EMTs, hazardous materials management teams, etc.) in dealing with a wide range of hazardous materials. Be familiar with State and local regulations in addition to State OSHA requirements where applicable.

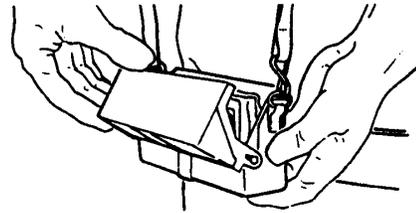
Checklists for the inspection, donning, removal, storage, and monthly inspection of PPE are provided in Appendix A of this document. If a CSEPP participant is contaminated, decontamination procedures as outlined in the *Planning Guidance for the Chemical Stockpile Emergency Preparedness Program, Appendix L, Planning Standards for Decontamination*, should be followed. Completed checklists from Appendix A of this document, can be used to meet certification requirements by documenting that the employee has received and understood the requisite training and that the requirements specified by the CFR have been fulfilled. In addition, a Review Examination will be given. Each State will determine their passing score, and only those persons will be permitted to use PPE.

***APPENDIX E. INSTRUCTIONS FOR USE OF CHEMICAL  
DETECTOR KIT***

This appendix is reprinted from Operator's Manual for Chemical Agent Detector Kit M256 (6665-01-016-8399) and M256A1 (6665-01-133-4964), Department of the Army Technical Manual TM 3-6665-307-10, Headquarters, Department of the Army, Washington, DC, September 1985.

## INSTRUCTIONS FOR USE OF CHEMICAL DETECTOR KIT – TESTING FOR TOXIC AGENT VAPORS

A set of 3 or 4 instruction cards are included in the kit. This checklist deals only with the agents of concern: blister and nerve agents.



### **WARNING**

Do not expose the sampler-detector to direct flame or other high heat source. Some of the chemicals in the ampoules are flammable and/or explosive.

Do not use an outdated sampler-detector because it will give test results you cannot trust.

**Do not use kit if you do not see colors correctly.** Color combinations and comparison are used during tests. A wrong reading of results might cause you to remove protective equipment while toxic agent are actually present, and you could become a casualty.

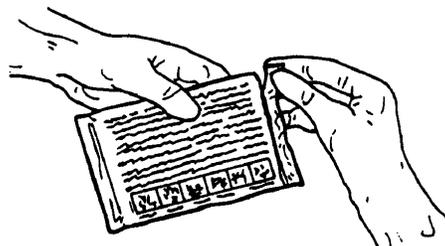
**NOTE:** Kit operator will simulate the waiting times—10 minutes, 5 minutes, etc. Operator cannot wear or use a watch while wearing protective clothing.

### ***Perform the following steps:***

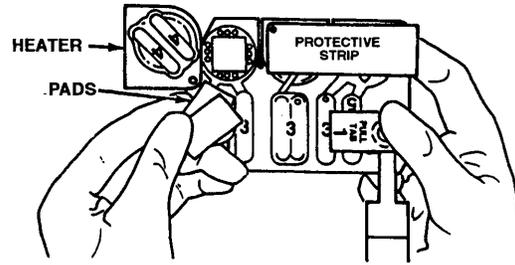
1. Open kit, take out instruction cards and read them.



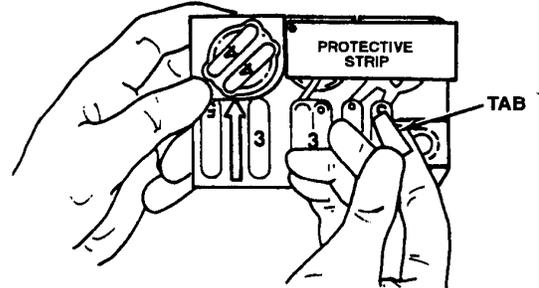
2. Take out a sampler-detector. Read both sides of sampler-detector protective bag; then tear protective bag along line marked by arrows. Carefully pull out sampler-detector and save bag for reference to instructions.



- Before breaking glass ampoules (except heater ampoules), place one heater pad on each side of the sampler-detector, covering the ampoule to be broken. These pads will prevent pieces of glass from cutting your gloves or hands.

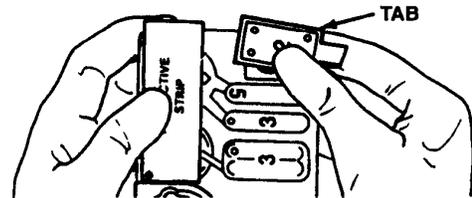


- Save pads under hinged heater. Swing out heater, remove and save two loose pads. Swing heater back in.



- Remove pull tab marked 1. Pull upward to expose lewisite detecting tablet.

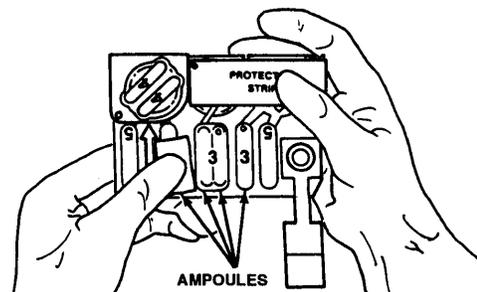
- Mark lewisite rubbing tab. Bend tab over lewisite detecting tablet and rub upper half of tab until a mark is visible.



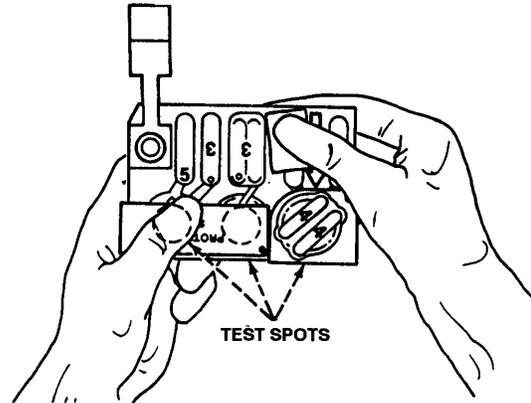
- Hold sampler-detector with test spots or arrow pointing up.

- Using heater pads, crush 4 ampoules in the 3 center pockets marked 3.

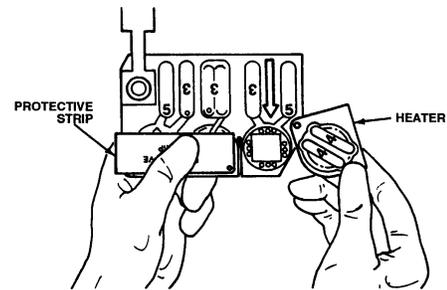
**NOTE:** Nerve spot may be difficult to wet with solutions as kit gets older. Work solutions into spot carefully while pressing protective strip over nerve agent test spot.



9. Turn sampler-detector upside down and insure wetting of test spots. Hold sampler-detector with test spots or arrow pointing down. Using heater pads, squeeze ampoules to force liquid through formed channels.



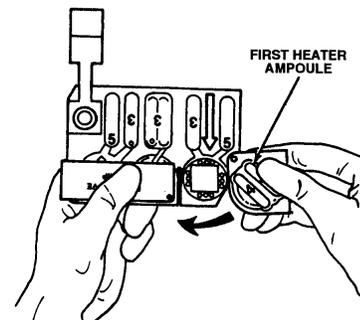
10. Hold sampler-detector. With test spots or arrow pointing down, put your thumb on the protective strip over middle test spot.



11. Swing heater away from test spot.

**WARNING:** Avoid hot vapors that may burn you when crushing heater ampoules. You will be facing into the wind. Hold sampler-detector down and to one side while vapors are venting.

12. Activate first heater ampoule marked 4. Being sure not to use heater pads, crush one green ampoule and swing heater immediately over test spot. Hold sampler-detector to one side while venting to avoid vapor.

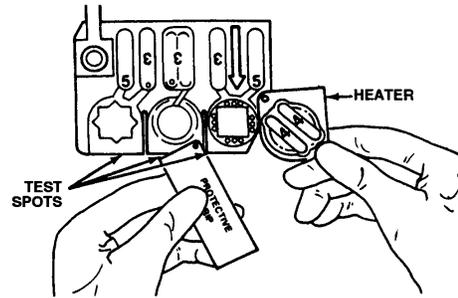


13. After about 2 minutes swing heater away from test spot, and protective strip away from test spots.

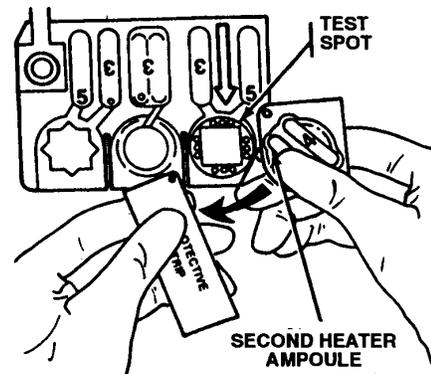
**WARNING:** Do not hold sampler-detector in direct sunlight while exposing test spots. You may not be able to trust the test results.

14. Expose test spots for about 10 minutes.  
Sampler-detector can be laid down or held by hinged protective strip.

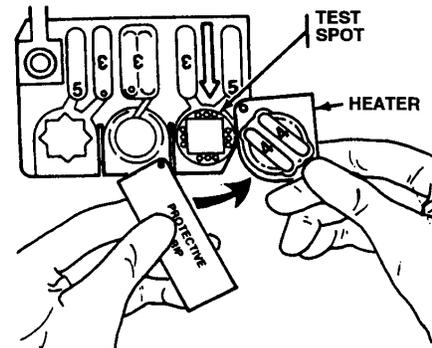
**WARNING:** Avoid hot vapors that may burn you when crushing heater ampoules. You will be facing into the wind. Hold sampler-detector down and to one side while vapors are venting.



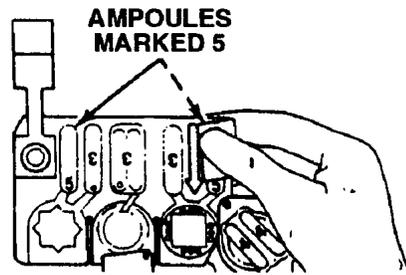
15. After about 10 minutes activate second heater marked 4. Being sure not to use heater pads, crush second green ampoule. Swing heater immediately over test spot.



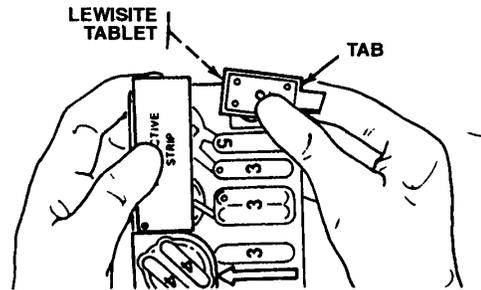
16. After about 1 minute, swing heater away from test spot.



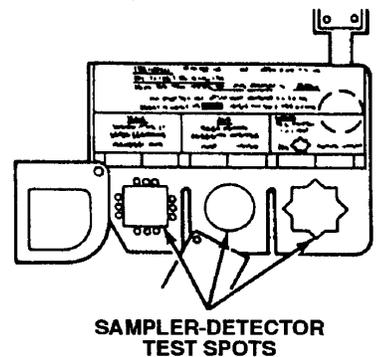
17. Hold sampler-detector with test spots or arrow pointing down.
18. Using heater pads, crush remaining ampoules marked 5. Be sure to wet test spots by squeezing ampoules to force liquid onto test spots.



19. Re-rub lewisite detecting tablet. Bend tab over lewisite detecting tablet and rub bottom half of tab until a mark is visible.



20. Compare colors to determine safe or danger conditions. Turn sampler-detector upside down and compare colors of test spots with those shown on sampler-detector. Look for a change in color or rub marks on lewisite detecting tab. If your kit has a fourth instruction card, use it to compare colors to determine safe or danger condition.



**WARNING:** Each sampler-detector contains 2.6 mg of mercuric cyanide and should be considered hazardous waste. It must be disposed of in an environmentally correct method.

**NOTE:** You can compare lewisite (rubbing tab) tests after about 10 minutes exposure time. Blister agent develop color immediately after all ampoules are broken. Nerve agent requires a waiting period of about 3 minutes. If no color develops for M256A1, a positive nerve test is indicated. If peach color develops for the M256, a positive nerve test is indicated.

Reprinted from *Operator's Manual for Chemical Agent Detector Kit M256 (6665-01-016-8399) and M256A1 (6665-01-133-4964)*, Department of the Army Technical Manual TM 3-6665-307-10, Headquarters, Department of the Army, Washington, DC, September 1985.

## INSTRUCTIONS FOR USE OF CHEMICAL DETECTOR KIT – TESTING FOR TOXIC AGENT ON SURFACES

A set of 3 or 4 instruction cards are included in the kit. This list deals only with the agents of concern: blister and nerve agents. NOTE: Lewisite is present only at Tooele Army Depot; the other locations do not have to be concerned with the Lewisite testing.

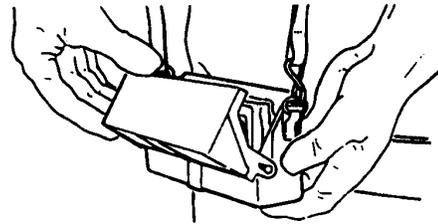
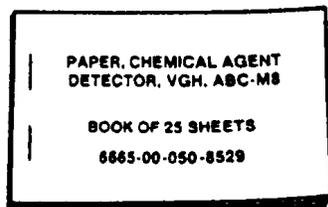
### **WARNING**

Do not use kit if you do not see colors correctly. Color combinations and comparison are used during tests. A wrong reading of results might cause you to remove protective equipment while toxic agents are actually present, and you could become a casualty.

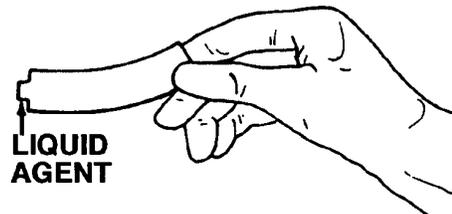
**NOTE:** Kit operator will simulate the waiting times—10 minutes, 5 minutes, etc. Operator cannot wear or use a watch while wearing protective clothing.

### **Perform the following steps.**

1. Open kit and remove and open M8 paper. Tear off and discard plastic bag.



2. Test liquid. Tear out a sheet of M8 paper (use half a sheet if it is perforated). Blot, do not rub, M8 paper where liquid agent is thought to be.
3. Compare color change. Check typical colors shown on inside cover of M8 paper.



**NOTE:** Red indicates presence of blister agents (H, L, or CX). Yellow indicates presence of G-agent. Dark green indicates presence of V-agent. Some G-agents give a red-brown color which is between H and G color.

Some decontaminants will give false positive tests on M8 paper. In an area where decontaminants have been used, positive results must be confirmed by tests with sampler-detector.

**Note:** Non-persistent agents (i.e., VX) can be present and would produce a positive reading on the M8 paper, but not produce a positive reading on the M256A1 kit because of the low vapor pressure. A solution to this problem is to rub the suspected liquid directly onto the test spot of the M256A1 kit to confirm or deny a positive M8 paper test.

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