

GENERIC RESPIRATORY PROTECTION PROGRAM - POLICY AND SOPS

The following documents are provided as models for command respirator policies and standard operating procedures (SOPs). This Generic SOP reflects Navy respirator policies in OPNAVINST 5100.23 Series, which are based on 29 CFR 1910.134. Every attempt was made to make these SOPs as comprehensive as possible. The intent is for Respiratory Protection Program Managers to review this document and tailor sections that are applicable to the needs of their program.

The first document is a model for establishing command respiratory protection program instructions. Subsequent enclosures cover individual facets of the program.

Comments and suggestions are encouraged and should be directed to:

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From: Commanding Officer, (Name of Command)

Subj: RESPIRATORY PROTECTION PROGRAM

- Ref:
- (a) 29 CFR 1910.134, Occupational Safety and Health Administration Respiratory Protection Standard
 - (b) OPNAVINST 5100.23 Series, Navy Occupational Safety and Health Program Manual
 - (c) NAVMCPUBHLTHCEN Technical Manual, Industrial Hygiene Field Operations Manual, latest revision
 - (d) NAVMCPUBHLTHCEN Technical Manual OM 6260, Occupational Medical Surveillance Procedures Manual and Medical Matrix, latest edition
 - (e) BUMED Notice 6110, Tracking and Reporting Individual Medical Readiness Data

- Encl:
- (1) Worksite Standard Operating Procedures
 - (2) Respiratory Protection Program Manager Appointment Letter
 - (3) Respirator Selection Criteria
 - (4) Respirator Maintenance
 - (5) Respirator Inspection Procedures
 - (6) Respirator Training, Fit Testing and Medical Clearance Record
 - (7) Training
 - (8) Fit Testing
 - (9) Respiratory Protection Program Audit
 - (10) Respiratory Protection Program Site Evaluation
 - (11) Respirator Qualification Cards
 - (12) Appendix D, 29 CFR 1910.134
 - (13) Respirator Cartridge Change Out Schedules

1. Purpose. To establish a respiratory protection program at the _____ (name of command) _____ as required by references (a) and (b).

2. Basic Policy. It is this command's policy to provide a safe and healthful work environment in compliance with all Navy and Federal standards. To protect employees from inhalation hazards produced during worksite operations, engineering controls will be used whenever possible to control air contaminants at their source of generation.

3. Scope

a. This command has made a commitment to establish and maintain a respiratory protection program for the protection of employees where respirators are used: (1) as an interim measure until proper engineering controls can be installed; (2) where engineering controls are not feasible; (3) where emergency respirators are required; and (4) where respiratory protection must be worn in addition to engineering controls.

b. The respiratory protection program will include written Standard Operating Procedures (SOPs) for each program element, including hazard assessment; respirator selection and issue; cartridge change out schedules; fit testing; medical surveillance; equipment cleaning, storage, inspection, and maintenance; and program evaluation.

c. Standard operating procedures shall be developed for the specific respiratory protection requirements of each workplace. Workplace SOPs will be posted in the work areas and will include applicable attachments to enclosure (1), which include: a summary of the command respiratory protection program standard operating procedures; shop-specific details concerning respirator selection, maintenance and inspection procedures; breathing-air quality, if applicable; emergency use respirators and respirator cartridge change out schedules.

4. Responsibilities

a. Commanding Officer. The Commanding Officer is responsible for establishing a respiratory protection program and appointing a qualified respiratory protection program manager. (Enclosure (2) is a sample appointment letter).

b. Respiratory Protection Program Manager (RPPM). The RPPM must complete a training course as specified in paragraph 1512. of reference (b).

(1) The responsibility for administration of this program rests with the respiratory protection program manager.

(2) The specific duties of the program manager include, but are not limited to:

(a) Selecting and purchasing appropriate, approved respiratory protection based on industrial hygiene survey reports, references (a), (b), and (c), and available literature.

(b) Develop respirator cartridge change out schedules.

(c) Training personnel in the proper use, limitations and maintenance of respirators.

(d) Conducting respirator fit testing.

(e) Developing procedures for regular cleaning and inspection.

(f) Designating appropriate storage locations and procedures.

(g) Developing procedures for inventory control.

(h) Establishing a medical surveillance program based on Bureau of Medicine (BUMED) industrial hygiene surveys and medical recommendations.

(i) Annual evaluation (audit) and modification of the written respirator program and standard operating procedures.

These responsibilities are further described in the enclosures.

c. Shop Supervisors. Shop supervisors must have a thorough understanding of every aspect of the command SOP and of Chapter 15 of reference (b). They shall ensure that:

(1) Respirators are properly worn and maintained by shop personnel.

(2) A copy of the command SOP is kept in each shop office.

d. Respirator Issuers. Respirator issuers have responsibility for issuing, inspecting, maintaining, and inventorying respirators. Additional information is provided throughout this instruction and in enclosures (1), (4) and (5).

e. Employees. Employees are responsible for inspecting their respirators and notifying the RPPM of any defects. Each employee must perform positive and negative user seal checks on tight fitting respirators before each use per enclosure (1), Attachment I-3. Employees shall also maintain and store their respirators according to procedures established in this instruction.

f. Bureau of Medicine (BUMED) (or Commanding Officer, Medical Treatment Facility). BUMED is required by reference (b) to provide the following services:

(1) Perform periodic industrial hygiene survey according to Appendix 8-B of reference (b) to identify the workplace hazards and recommend respiratory protection.

(2) Provide the RPPM with a written evaluation of the effectiveness of the respirator program at the time of the periodic industrial survey.

(3) Medically evaluate personnel identified to wear respiratory protection.

5. Respiratory Protection Program Elements

a. Respirator Selection

(1) Respirator selection is based on the hazards to which the employees are exposed, as determined by annual industrial hygiene surveys. Respirators are selected by the RPPM using the guidelines in enclosure (3).

(2) Only respirators jointly approved by the National Institute for Occupational Safety and Health (NIOSH) or NIOSH and Mine Safety and Health Administration (MSHA) will be worn.

b. Cleaning, Disinfecting, Issuing, and Inventory Control. Procedures for cleaning, disinfecting, issuing and inventorying respirators are in enclosure (4).

c. Inspection, Repair and Storage

(1) Inspection. Respirator inspection will be conducted by the respirator issuer as they disassemble respirators for cleaning. Detailed procedures for inspecting half mask, full facepiece, gas mask, airline, SCBA, and hooded respirators are provided in enclosure (5). These procedures will be included in individual worksite SOPs, as appropriate.

Employees shall inspect their respirators prior to donning them. They are also responsible for ensuring that cartridges are inserted correctly into the respirator (e.g., not cross-threaded). Defective or dirty respirators shall not be used.

(2) Repair. The RPPM shall ensure that respirator issuers are trained to perform respirator repairs. Respirator issuers will make no attempt to replace components or make adjustments beyond the recommendations of the manufacturer. Reducing or admission valves, alarms, and regulators must be returned to the manufacturer or to a factory certified, trained technician for adjustment or repair.

(3) Storage. Each employee will store their respirator in a clean plastic bag in their locker. Storage in tool boxes is prohibited. Respirators will be laid flat in a natural position, and will be protected from sunlight, chemicals or excessive temperatures. Emergency respirators will be stored in the shop location specified in the shop's SOP. (See enclosure (1), Attachment D).

(4) Emergency Respirators. Emergency respirators will be cleaned and inspected after each use according to the manufacturer's instructions (See enclosure (1), Attachment E). Emergency respirators will be inspected monthly and a written record (enclosure (1), Attachment D) will be maintained with the respirator.

d. Breathing Air Quality. Sources of compressed breathing air for atmosphere supplying respirators will be tested quarterly to ensure that air quality meets the minimum Grade D requirements of the Compressed Gas Association Commodity Specification for Air, Pamphlet G-7.1-2004.

(1) name of activity personnel or name of contractor, etc. is responsible for testing the breathing air with Dräger Aerotest Kit, for testing breathing air for carbon monoxide (CO), carbon dioxide, oil, and water along with the Biosystems four-gas Analyzer for testing oxygen levels (Note: These products are mentioned only for illustrative purposes. Mention of these products does not constitute an endorsement by the Navy and Marine Corps Public Health Center or the Department of the Navy. Results of these tests will be recorded in enclosure (1), Attachments F and F-1, for each shop using breathing air compressors.

(2) Name of person in building number is responsible for recording the breathing air test results and ensuring that the air compressor CO alarm systems, high temperature alarms, sorbent beds and filters are maintained and inspected before each use; CO monitor and alarm systems are calibrated per manufacturer's recommendations; and that the inspection results are recorded on enclosure (1), Attachment G. Name of person can be reached by telephone at phone number. Current copies of enclosure (1), Attachments F-1 and G will be kept at the applicable shop offices.

(3) (Applicable to ships only) Use of ship's low pressure (LP) air as a breathing air source is prohibited unless the air is tested and certified as Grade D as required in paragraph 5.d. of this instruction.

e. Medical Evaluation. BUMED (Commanding Officer, Medical Treatment Facility (MTF)) will make all decisions regarding the medical evaluation and determination of the employees' physiological and psychological ability to wear a respirator according to the protocols for respirator users (Medical Matrix Program 716) in reference (d).

(1) Each individual must be medically qualified by BUMED before initial fit testing.

(2) For civilians, shop supervisors will complete the top portion of the medical clearance form (enclosure (1), Attachment H), and shop personnel will hand carry the form with them to their respirator medical evaluation at the name of MTF MTF. Upon completion of the medical evaluation, attending medical treatment personnel will complete the medical clearance form, and shop personnel will hand carry the form back to the shop supervisor, who gives a copy to the RPPM.

(3) The RPPM will record the medical clearance information on the employees' record (enclosure (6)).

(4) Military personnel, who have been confirmed as "Fit for Full Duty" and having a current annual Periodic Health Assessment (PHA), are deemed medically qualified for use of all types of respirators. The phrase "Fit for Full Duty" is interpreted as having no deployment-

limiting conditions. This is consistent with a “fully or partially medically ready status” of the Individual Medical Readiness (IMR) classification described in reference (e). PHA screening, IMR and deployment readiness tracking for activity military personnel is accomplished and verified by the IMR point of contact at the local MTF. The name and phone number of the IMR point of contact is name of IMR POC and their phone number IMR POC Phone number. This information is recorded on (enclosure (6)). Questionable cases will be referred to the MTF for a Respirator User Certification exam (Medical Matrix Program 716).

f. Training. Respirator training requirements are specified in enclosure (7). Shop SOPs for training are in enclosure (1), Attachment I.

g. Fit Testing. Fit testing procedures shall be performed as stated in enclosure (8). Fit test operator training and evaluation will be conducted according to enclosures (8-3) and (8-4).

h. Workplace Surveillance and Program Evaluation

(1) Workplace Surveillance. Personal air samples must be collected to determine 8 hour time weighted average (TWA) exposures and short term exposures. Air sampling is performed by BUMED industrial hygienists. Air sampling results will be made known to the employees within five days after they are received by this command.

(a) Shop supervisors will immediately contact the cognizant BUMED industrial hygienist when there are any changes in operations. The industrial hygienist will reevaluate the process and collect additional air samples if necessary.

(b) Shop supervisors will immediately notify the cognizant BUMED industrial hygienist when ventilation systems are installed or changes to the systems implemented. The industrial hygienist will evaluate the system and reevaluate the requirements for respiratory protection.

(2) Program Evaluation. The RPPM will:

(a) Conduct an annual audit of the respirator program. Enclosure (9) is provided as guidance.

(b) Conduct periodic random, inspections of work areas where respirators are worn to ensure that the correct respirators are being used, that they are being worn properly and that they are in good working condition. The RPPM will maintain a record of inspection dates and findings using enclosure (10) and ensure that copies are provided to the appropriate shop supervisors.

(c) Per paragraph 1513.b.(2)(a) of reference (b), BUMED will provide a written evaluation on the effectiveness of the respirator program to the program manager based on occupational medicine and industrial hygiene reviews. In agreement with the local BUMED

industrial hygienist, this evaluation will be provided along with the periodic industrial hygiene survey.

(d) The RPPM shall act immediately to correct all faults found in the program and/or procedures.

i. Record Keeping. The program manager will document the medical clearance, training, and fit testing, to include the type of respirator, brand name and model, size, method of fit test, test results, test date, and person performing the fit test (enclosure (6)). Completed Medical Clearance Forms (enclosure (1), Attachment H) and printouts from quantitative fit testing must be attached to enclosure (6). Employees will be issued a card (enclosure (12)) indicating which model and size respirator(s) they are qualified to wear. This card must be presented at the time of respirator issue. Employees will immediately report lost or stolen cards to the RPPM so that a replacement can be issued.

j. Facial Hair, Contact Lenses and Voluntary Use of Respirators.

(1) Facial hair. Per paragraph 5.a.(1)(b) of reference (c), no respiratory protection, except for loose fitting positive pressure supplied-air respirators, or loose fitting powered air purifying respirators, where appropriate, will be worn by personnel when conditions such as beards, sideburns, etc., may prevent a good face seal.

(2) Contact Lenses, Corrective Eye Glasses, and Spectacle Kits. Wearing contact lenses in contaminated atmospheres with respiratory protection is permitted as long as eye and face protection is worn as appropriate for workers exposed to eye injury hazards. If wearing corrective eye glasses with half mask respirators, lenses shall meet the ANSI Standard Z87.1 requirements. Corrective eye glasses must not interfere with the fit of half mask respirators. Spectacle kits will be provided for personnel needing vision correction who are required to wear full face respirators.

(3) Voluntary use of Respirators. Per paragraph 1503.g. and page 20 of the Glossary in reference (b), the command RPPM may issue NIOSH approved filtering facepiece respirators for voluntary use. Voluntary respirator use is defined as personnel choosing to wear respirators when their use is not required to control exposures or when respirators are not required by this command. NIOSH approved filtering facepiece respirators (dust masks) may be issued under the control of the RPPM without medical screening and fit testing for all perceived particulate hazards. Voluntary respirator users will be trained annually on the limitations stated on the respirator approval label and the information contained in Appendix D of 29 CFR 1910.134 (Enclosure (12)). The RPPM must ensure these respirators are not dirty or contaminated and that they do not interfere with working safely. When the perceived contaminant is a gas or vapor, NIOSH approved elastomeric respirators equipped with appropriate chemical cartridges may be issued for voluntary respirator use. All respirators issued for voluntary use, other than filtering facepiece respirators, require enrollment in the complete respirator program.

k. Respirator Cartridge Change Out Schedules. Reference (a) no longer allows reliance on odor thresholds and other warning properties as the sole basis for determining that an air-purifying respirator will afford adequate protection against exposure to gas and vapor contaminants. When available, respirator cartridges with end-of-service-life-indicators (ESLI) shall be worn. The ESLI must be visible either on the cartridge from eye level or ESLI cartridges must be worn on plenum respirators that are attached to the belt for visibility. Reference (a) requires basing change out schedules for chemical cartridges on objective information or data that will ensure that cartridges are changed before the end of their service life. The preamble to reference (a) states that the basis for cartridge change out schedules should ideally be based on tests of breakthrough studies that are conducted under worst-case conditions of contaminant concentration, humidity, temperature and breathing rate. Standard operating procedures for establishing, verifying, and implementing respirator cartridge change out schedules are in enclosure (13). Chemical cartridge air-purifying respirators may be used (up to their maximum use concentration) for protection against substances without good warning properties, as long as a cartridge change out schedule is developed and implemented.

WORKSITE STANDARD OPERATING PROCEDURES

Attachment A - Respirator Standard Operating Procedure

Attachment B - Respirator Selection Criteria

Attachment C - Respirator Maintenance

Attachment D - Emergency Use Respirators - Inspection Record

Attachment E - Emergency Use Respirators - Manufacturer's Inspection Instructions

Attachment F - Results of Quarterly Air Quality Testing of Breathing Air Compressors

Attachment G - Inspection of Breathing Air Compressors - Carbon Monoxide Monitor, Carbon Monoxide And High Temperature Alarms, Filters, Desiccant & Sorbent Beds

Attachment H - Medical Clearance for Respiratory Protection

Attachment I - Respirator Training

Attachment J - Respirator Cartridge Change Out Schedule Worksheet

Enclosure (1)

RESPIRATOR STANDARD OPERATING PROCEDURE

SHOP number/name

Type of respirators respirators were chosen as protection against contaminant during the type of operation operation. Rationale for selecting the respirators used in this operation is in Attachment B.

The respiratory protection program manager (RPPM) will conduct inspections of this shop to ensure that the correct respirators are being used; that they are being worn properly; and that they are in good working condition. The Respiratory Protection Program Manager's written record of inspection dates and findings shall be maintained with the shop SOP.

Before wearing respirators, all shop number/name personnel must be medically qualified, fit tested, and trained. It is the responsibility of shop number/name personnel to notify the respiratory protection program manager of any of the changes listed below or other circumstances that might interfere with the facial seal of the respirator.

1. weight change of 20 lbs.
2. facial scarring in area of face seal.
3. any dental changes
4. any reconstructive surgery or cosmetic surgery.

Each employee is responsible for properly wearing and maintaining their respirator. Respirator maintenance procedures are in Attachment C.

If airline respirators are used, refer to the shop's records (Attachments F, F-1, and G) to ensure that grade D breathing air quality and compressor integrity have been maintained.

The RPPM is RPPM's name. He (she) is located in building number and can be reached at telephone number.

Enclosure (1) (Attachment A)

RESPIRATOR SELECTION CRITERIA

SHOP number/name

Air sampling has revealed contaminant concentrations of number times the number (mg/m³ or ppm) Navy Occupational Exposure Limit (OEL) during the type of operation operation.

Name of contaminant CAUSES biological effect. The physical and chemical properties of contaminant include incompatibilities with names of incompatible chemicals.

This particular hazard will be corrected by implementing appropriate engineering controls, which will include an exhaust ventilation system. *As an interim measure until the system can be installed, respiratory protective equipment will be used. (or Engineering controls are not feasible and respiratory protection is required during this operation. or Despite engineering controls, respiratory protection is still required during this operation.)*

For less than IDLH or non-oxygen deficient atmospheres, the minimum protection factor needed will be calculated by the hazard ratio, which is determined by dividing the time-weighted average (TWA) exposure concentration, which is TWA concentration of contaminant by the OEL for the contaminant value of the OEL. For contaminants with a ceiling or short term limit, divide the contaminant concentration by the ceiling or short term limit. The required protection factor is value of protection factor.

Respirators approved by either NIOSH or NIOSH/MSHA must be used. Class of respirators respirators were selected based on their assigned protection factor of number as set forth in Table 9-1 of reference (c). This will provide protection up to number times the PEL. Name of manufacturer and/or name of manufacturer respirators were selected based on successful employee fit testing. The respirators available to employees for the type of operation operation are as follows:

Name of manufacturer Type of respirator respirator, TC- number model number (Small) (Medium) (Large)

Name of manufacturer Type of respirator respirator, TC- number model number (Small) (Medium) (Large)

Example:

North N95 respirator, TC-84A -1099 model 7706N95 (Medium)

Enclosure (1) (Attachment B)

RESPIRATOR MAINTENANCE

SHOP number/name

General

Respirator inspection is performed by the respirator issuer in building number while disassembling the respirators for cleaning. The name of the respirator issuer and their phone number are name of respirator issuer and phone number, respectively.

In addition, each employee is responsible for inspecting their respirator and notifying the respirator issuer of any defects.

Each employee must perform positive and negative user seal checks on tight fitting respirators before each use. Respirators on which user seal checks (see enclosure (1), Attachment I-3) can not be performed must not be worn.

Respirators will be returned to the respirator issuer in building number for cleaning and disinfecting according to the schedule indicated by the following code number: number.

Where: 1 = Daily 3 = Monthly
 2 = Weekly 4 = Other

Inspection

Respirators used in this shop will be inspected as follows:

(Insert procedure(s), as appropriate, from enclosure (5)).

Storage

Each employee will store their respirator in a clean plastic zip-lock bag in their locker. Storage in tool boxes is prohibited. The respirator will be laid flat in a natural position, and will be protected from sunlight, chemicals or excessive temperatures. Emergency respirators will be stored in the shop location specified in enclosure (1), Attachment D.

Employees must present a valid Respirator Qualification Card (Enclosure 11) when requesting issue of a respirator.

Enclosure (1) (Attachment C)

EMERGENCY USE RESPIRATORS

INSPECTION RECORD, SHOP number/name

Name of manufacturer Type of respirator respirator, TC - number, model number.

The emergency respirator will be stored location of emergency respirator.

Date	Inspection Findings	Repairs/ Comments	Inspector's Signature

Enclosure (1) (Attachment D)

**EMERGENCY USE RESPIRATORS
MANUFACTURER'S INSPECTION INSTRUCTIONS**

SHOP number/name

Name of manufacturer Type of respirator respirator, TC - number, model number

(Attach manufacturer's inspection instructions here or staple to this page).

Enclosure (1) (Attachment E)

**COMPRESSOR
BREATHING AIR QUALITY REPORT**

Compressor Model: _____

Date: _____

Serial No: _____

<u>COMPONENT ANALYZED</u>	<u>SPECIFICATION</u>	<u>RESULTS</u>
Oxygen	19.5 - 23.05 %	%
Carbon Dioxide	1000 PPM Max	ppm
Carbon Monoxide	10 ppm Max	ppm
Oil	5 mg/m ³	mg/m ³
Water Vapor	18 mg/m ³ (24 ppm v/v)	mg/m ³ or ppm
	Or moisture content corresponding to the dew point at 1 atm. that is at least 10° F lower than the temperature in which the respirator will be worn (see note 3 to Table 1 and Table 3 of CGA G-7.1-2004)	
Odor	Not Objectionable	

This is to certify that the above referenced sample DOES/DOES NOT meet the Grade D air purity standards for compressed breathing air per CGA G-7.1-1997.

Sample Taken By: _____

Next Sample Due on _____

Enclosure (1) (Attachment F)

**RESULTS OF QUARTERLY AIR QUALITY TESTING OF
BREATHING-AIR COMPRESSORS**

SHOP number/name

Date	Passed/Failed Grade D Air	Air Line Pressure Measured at Respirator	Signature

Enclosure (1) (Attachment F-1)

INSPECTION OF BREATHING-AIR COMPRESSORS

**CARBON MONOXIDE MONITOR, CARBON MONOXIDE AND HIGH TEMPERATURE ALARMS,
FILTERS, DESICCANT & SORBENT BEDS**

SHOP number/name

Date	CO/High Temp. Alarm Operational? Calibration?	CO Monitor Reading	Condition of Air Purifiers	Air Purifiers Changed (date)	Signature

Enclosure (1) (Attachment G)

**REQUEST FOR MEDICAL CLEARANCE
FOR RESPIRATOR USE QUESTIONNAIRE**

SHOP number/name

Note: Combine this page with Enclosure (6) to provide a complete respirator history record.

EMPLOYEE: _____ SSN: _____ Position: _____

Supervisor: _____ Phone: _____ Code: _____ Department: _____

CIRCLE THE TYPE OF RESPIRATOR(S) TO BE USED:

- | | |
|------------------------------|---|
| AIR-SUPPLIED (tight fitting) | AIR-PURIFYING (POWERED) (tight fitting) |
| AIR-SUPPLIED (hooded) | AIR-PURIFYING (POWERED) (hooded) |
| OPEN-CIRCUIT SCBA | AIR-PURIFYING (NON-POWERED) |
| CLOSED-CIRCUIT SCBA | Filtering facepiece or elastomeric |
| COMBINATION AIRLINE/SCBA | N, R, P 95, 99, 100 |
| | Type of chemical cartridge: _____ |

WORK EFFORT: (CIRCLE ONE)

Light Moderate Heavy Strenuous

EXTENT OF Usage: (CIRCLE ONE)

1. On a daily basis
2. Occasionally - but more than once a week
3. Rarely - or for emergency situations only

LENGTH OF AVERAGE WORK DAY IN RESPIRATOR:

SPECIAL WORK CONDITIONS: (i.e., confined spaces, high places, temperature/humidity extremes, hazardous materials, other protective clothing worn, climbing, etc.)

MEDICAL WRITTEN EVALUATION

1. No restrictions on the respirators circled above
2. Respirator use with some restrictions
3. No respirator use allowed
4. Alternate respirator recommended

Comments/Restrictions:

Routine Follow-up medical evaluation required: (under 35) (35-45) (over 45)
5 yrs 2 yrs 1 yr

Or due to medical findings return: Date: _____

Employee has been given a copy of this recommendation.

Health care professional's Signature: _____ Date: _____

Sections 133, 1071-87, 3012, 5031, and 8012, Title 10
USC & Exec. Order 9397 (Privacy Act of 1974) Apply

Enclosure (1) (Attachment H)

RESPIRATOR TRAINING

SHOP number/name

1. Respirators are required to be worn because the contaminant concentration in the work area is above the occupational exposure limit (OEL).
2. contaminant CAUSES biological effect.
3. Respirators are only an interim measure until proper ventilation can be installed to capture the contaminant at the source of generation (**or** Engineering controls are not feasible and respiratory protection is required during this operation. **or** Despite engineering controls, respiratory protection is still required during this operation.)
4. contaminant concentration is number to number times the OEL and the respirators were chosen because they provide a protection factor that is number times the OEL.
5. Limitations of different respirators:
 - a. Air-purifying respirators do not provide protection against oxygen deficiency and cannot be worn when there is less than 19.5% oxygen in the air.
 - b. Air-purifying respirators cannot be used in IDLH atmospheres.
 - c. Particulate filters remove particles in the air.
 - (1) N series filter respirators cannot be worn in oil aerosol atmospheres, R series filter respirators can be worn eight hours in oil aerosol atmospheres, and P series filter respirators can be worn in oil aerosol atmospheres up to a time limit set by the respirator manufacturer.
 - (2) Particulate filters cannot remove gas and vapor contaminants.
 - d. Chemical cartridges remove gases and vapors but will not remove particulates.
 - (1) Chemical cartridges have a maximum use concentration that is calculated by multiplying the OEL by the assigned protection of the respirator.
 - e. Airline respirator hoses are limited to a maximum hose length of 300 feet but not all airline respirators have been approved for 300 feet of hose.
 - (1) Airline respirators are not approved for IDLH atmospheres. Loss of the breathing air source eliminates any protection to the respirator wearer.

Enclosure (1) (Attachment I)

- f. SCBAs are limited by service time of the air cylinder and weight of the unit.
6. Explain how to don the respirator, how to maintain and inspect the respirator, and how to perform positive and negative pressure user seal checks according to enclosure (1), Attachment I-3.
 7. Filters must be changed when increased breathing difficulty is first experienced and chemical cartridges must be changed according to the cartridge change out schedule.
 - a. Explain chemical cartridge change out schedule and breakthrough (smelling the vapor/gas of concern inside the respirator).
 - b. Give any odor characteristics that may help employees identify when breakthrough occurs (e.g., isoamyl acetate smells like bananas; hydrogen sulfide smells like rotten eggs).
 - c. Change your cartridge _____time interval_____. Chemical cartridges must be changed if break-through is experienced before scheduled change out time.
 8. Inform employees what to do in emergency situations.
 9. Explain shop-specific respirator problems concerning:
 - a. Communications
 - b. Vision
 - c. Use in excessive heat or cold
 - d. IDLH and oxygen deficient atmospheres
 - e. Confined spaces.
 10. Explain command policies concerning:
 - a. Medical evaluation
 - b. Facial hair
 - c. Contact lenses
 - d. Issue of voluntary use respirators.
 11. Emergency rescue teams and all personnel required to enter IDLH atmospheres will receive training in the use of the emergency respirators by the manufacturer's technical representatives.
 - a. The gas free engineer will teach these individuals emergency IDLH atmosphere entry procedures and provide emergency practice scenarios.
 12. Breathing air from closed-circuit escape only respirators can be very hot and dry. The temperature allowed by NIOSH for 10 minute escape devices is 135° F. Breathing this air will be uncomfortable but is a small trade off for escaping from an IDLH atmosphere.

Enclosure (1) (Attachment I-2)

USER SEAL CHECKS

The user shall check the seal of the respirator by using positive and negative pressure user seal checks every time a respirator is donned. These pressure checks are NOT substitutes for quantitative or qualitative fit tests. It is essential to adequately train respirator users to perform these checks. User seal checks should be done according to the manufacturer's recommendations, or by using the following procedures:

Negative pressure user seal check.

The inlet opening of the respirator's canister(s), cartridge(s), or filter(s) is closed off by covering with the palm of the hand(s) or by squeezing a breathing tube or blocking its inlet so that it will not allow the passage of air.

The wearer is instructed to inhale gently and hold their breath for at least 10 seconds.

If the facepiece collapses slightly and no inward leakage of air is detected, the respirator has been properly donned and the facepiece is not leaking.



Negative Pressure User Seal Check

Positive pressure user seal check.

The exhalation valve or breathing tube, or both, is closed off and the wearer is instructed to exhale gently.

If a slight positive pressure can be built up inside the facepiece (e.g., facepiece bulges slightly outward) without detecting any outward leakage of air between the sealing surface of the facepiece and the wearer's face, the respirator has been properly donned.

For some respirators, this test method requires that the respirator wearer first remove the exhalation valve cover from the respirator and then replace it after completion of the test. These tasks are often difficult to carry out without disturbing the fit of the respirator. OSHA states in the preamble to reference (a) that there are respirators that user seal checks can not be performed on and that these respirators can not be used to control exposure.



Positive Pressure User Seal Check

Enclosure (1) (Attachment I-3)

CARTRIDGE CHANGE OUT SCHEDULE WORKSHEET

Operation: _____ Location: _____

Respirator Model: _____ Cartridge: _____

Chemical	Exposure Limit	Concentration	Boiling Point*

*Chemicals with boiling points less than 65° C (149° F) may be desorbed from sorbent during periods of non-use.

OPERATION PARAMETERS:

Frequency per week: _____ Duration of respirator wear: _____

Estimated work rate: Light Moderate Heavy

ENVIRONMENTAL DATA:

Highest temperature: _____ Highest humidity: _____

CALCULATE BREAKTHROUGH TIME OF COMPONENTS BASED ON THEIR PROPORTION OF THE MIXTURE				
Mixture Component	UTL _{95%, 95%} Concentration (ppm)	Mole Fraction ¹	Cartridge Service Life Calculator Estimated Breakthrough Time for Single Component (Hours)	Breakthrough Time of Components Based on Mixture (Hours)
		0.0		0
		0.0		0
		0.0		0
		0.0		0
		0.0		0
		0.0		0
		0.0		0
Total ppm	0			

¹Mole Fraction = ppm contaminant / total ppm of the mixture components

Change out schedule including safety factor of ten percent:

Every _____ hours After each shift Weekly Other (specify): _____

Enclosure (1) (Attachment J)

**RESPIRATORY PROTECTION PROGRAM MANAGER
APPOINTMENT LETTER**

From: Commanding Officer, (Name of Command)

To: Name of Appointee

Subj: RESPIRATORY PROTECTION PROGRAM MANAGER APPOINTMENT
OR CBRN RESPIRATORY PROTECTION PROGRAM MANAGER APPOINTMENT

Ref: (a) OPNAVINST 5100.23 Series
(b) 29 CFR 1910.134
(c) Command Respiratory Protection Program Instruction number

1. As required by reference (a), you are designated as the Respiratory Protection Program Manager (RPPM) for this command.
2. You will be familiar with all of the requirements of references (a) through (c) and ensure their implementation. Duties include, but are not limited to respirator selection; cartridge change out schedules; respirator purchase; personnel training and fit testing; respirator program oversight and evaluation; and maintenance/revision of command instructions and standard operating procedures for respiratory protection.

CBRN RPPM variation:

In addition to your responsibility for administering the industrial respirator program, you also have cognizance over the respirator program for first responders to chemical, biological, radiological, and nuclear (CBRN) incidents. The CBRN Respirator Program requires additional program requirements for respirator selection; respirator use and limitations; respirator inspection, cleaning, and decontamination; respirator training; fit testing; program evaluation; and respirator cartridge change out schedules. You must ensure that all of the prerequisite requirements for wearing respiratory protection, including medical evaluation, respirator selection, fit testing, and training, is completed for the command's first responders prior to responding to a CBRN incident. You are allowed to have as many assistants as necessary to implement this respirator program.

3. This appointment remains effective until your detachment or reassignment.

Enclosure (2)

RESPIRATOR SELECTION CRITERIA

The Assigned Protection Factors in Table 9-1 of reference (c) shall be used for selecting respirators for protection against hazardous substances and oxygen deficient atmospheres and for providing the necessary criteria to support this selection. Respirators will be NIOSH or NIOSH/MSHA approved. Respirator selection for specific types of hazards adheres to the following criteria:

1. Fire brigades must use NIOSH approved full face pressure demand self-contained breathing apparatus (SCBA) that meets NFPA 1981 requirements rated for at least 30 minutes.
2. Respirators used for entry into and escape from oxygen deficient or immediately dangerous to life and health (IDLH) atmospheres must be full face pressure demand SCBAs or combination full face pressure demand airline respirators with auxiliary SCBA.
3. For less than IDLH or non-oxygen deficient atmospheres, the minimum protection factor needed will be determined by the hazard ratio, which is calculated by dividing the time-weighted average (TWA) exposure concentration by the occupational exposure limit for the contaminant. For contaminants with a ceiling or short term limit, divide the contaminant concentration by the ceiling or short term limit.
 - (a) Select the appropriate class of particulate, gas/vapor, or combination particulate and gas/vapor respirator in Table 9-1 of reference (c). Make sure that the assigned protection factor is greater than the calculated hazard ratio.
 - (b) Airline respirators or cartridges with end-of-service-life indicators must be used for gas/vapor contaminants. The end-of-service-life indicators must be visible to the respirator wearer. Alternatively, a chemical cartridge change schedule out must be established according to Enclosure (13).

Chemical cartridge/canister air-purifying respirators may be used (up to their maximum use concentration) for protection against gas and vapor contaminants, including substances without good warning properties, including isocyanates, if a cartridge change out schedule is developed and implemented.

4. Special considerations must be made for escape only respirators, such as the distance to the nearest area with breathable air.

Respirators are selected on the basis of the hazards to which the employees are exposed, as determined by the BUMED industrial hygiene surveys. Documentation for shop specific respirator selection is provided in enclosure (1), Attachment B.

5. Follow Chapter 26 of reference (b) for CBRN respirator selection.

Enclosure (3)

RESPIRATOR MAINTENANCE

General Information

Cleaning, disinfecting, drying, issuing, and inventory of respirators will be conducted in building number. The respirator issuer is responsible for disassembling, cleaning, disinfecting, and reassembling all respirators. The respirator issuer will keep respirator manufacturer user manuals and inspect, clean, disinfect, store, maintain and repair respirators per manufacturers' instructions.

All respirators are cleaned and disinfected according to the following coded schedule:

- | | |
|------------|-------------|
| 1 = Daily | 3 = Monthly |
| 2 = Weekly | 4 = Other |

Cleaning codes are specified in each shop SOP (enclosure (1), Attachment C).

Emergency Respirators

Emergency respirators will be cleaned and inspected after each use. Emergency respirators will be inspected monthly and a written record (enclosure (1), Attachment D) will be maintained with the respirator. The manufacturer's instructions for cleaning, disinfecting and inspecting emergency respirators (enclosure (1), Attachment E) will be followed. Also inspect emergency use respirators for proper function before and after each use. Examining emergency respirator performance before and after each use is not intended to be as extensive and thorough a process as the monthly inspection, but includes a basic examination conducted prior to each use to assure the wearer that the respirator which they are about to don in an emergency situation will work properly (e.g., that the cylinders on the SCBA are charged, that air is available and flowing).

Disassembling Half Mask and Full Face Respirators

1. Remove filter and filter housing; discard filters.
2. Remove both inhalation valves.
3. Remove exhalation valve and exhalation valve guard.
4. Remove elastic straps and set aside for separate cleaning.

Note: Some manufacturers recommend immersion of head straps along with the facepiece.

Cleaning

1. Use warm soap and water solution, not to exceed 110°F.
2. Immerse all parts, excluding straps, in the solution.
3. Remove all dirt and grime.
4. Rinse in warm water, not to exceed 110°F, to remove all soap residue.

Enclosure (4)

Disinfecting

1. Use a 72 ppm hypochlorite ion (OCl⁻) solution by mixing 2 ml 5.25% bleach per liter of water, or by mixing 2 teaspoons 5.25% bleach per gallon of water.
2. Immerse all parts, excluding straps, in the solution for 2 minutes.
3. Wipe straps, using a cloth dampened in the disinfectant solution.
4. Rinse all parts, excluding straps, in warm water (not to exceed 110°F) to remove disinfecting solution.

Note: Some manufacturers recommend immersion of head straps along with the facepiece.

Drying

1. Place parts in the drying unit at a temperature not exceeding 110°F. (**OR** Let respirators air dry for several hours.)
2. Place respirators such that there is no distortion of the rubber and other elastomeric parts.
3. Reassemble the respirator when parts are completely dry. (or Ensure respirators are dry by wiping with a clean, dry lint-free towel or cloth.)

Issuing and Inventory Control

The respirator issuer is designated to issue respirators and is responsible for inventory control. The respirator issuer must be trained and thoroughly knowledgeable in the following areas:

1. Respirator selection for each shop listed in enclosure (1), Attachment B
2. Respirator cleaning, disinfection, and storage
3. Respirator inspection (enclosure (5))
4. Respirator inventory

Shop personnel will present their respirator qualification card (enclosure (11)) to the respirator issuer when requesting respirators.

Respirator issuers will ensure that:

1. The correct brand and type of air purifying cartridge is issued with the respirator (i.e., North organic vapor cartridges are issued with North respirators).
2. Cartridges are free of dents and cracks.
3. Cartridge shelf life has not expired.

Enclosure (4-2)

RESPIRATOR INSPECTION PROCEDURES

HALF MASK

Name of manufacturer Type of respirator respirator, TC 84A- number model number (Small) (Medium) (Large)

Name of manufacturer Type of respirator respirator, TC 84A- number model number (Small) (Medium) (Large)

1. Visually inspect facepiece for cracks, deformities, tears, dirt, and any modifications.
2. Inspect straps. They must be elastic, pliable and unfrayed. Straps must have points of attachment for the facepiece. No modifications are allowed.
3. Inspect inhalation and exhalation valves for tears, cracks, distortion, and foreign materials (e.g., hair, lint, or dirt). Make sure valves lay flat on valve assembly. Assure that exhalation valve cover is in place and not cracked or broken.
4. Inspect cartridges, cartridge holders, O-rings, threads, etc.

Enclosure (5)

RESPIRATOR INSPECTION PROCEDURES

FULL FACE

Name of manufacturer Type of respirator respirator, TC 84A-number model number (Small) (Medium) (Large)

Name of manufacturer Type of respirator respirator, TC 84A-number model number (Small) (Medium) (Large)

1. Ensure that the lens is not scratched, cracked, or broken.
2. Ensure that the lens is completely sealed.
3. Ensure the area where the lens holder comes in contact with rubber is not cut or torn.
4. If the respirator has a speaking diaphragm, ensure that it is in place and not punctured. Ensure the gasket is in place.
5. Straps must be elastic, pliable and unfrayed. Straps must have points of attachment for the facepiece. No modifications are allowed.
6. Make sure all the clips are present and the straps are attached securely to the mask.
7. Ensure that the inhalation valves are present and in good working order.

Enclosure (5-2)

RESPIRATOR INSPECTION PROCEDURES
GAS MASKS, AIRLINE RESPIRATORS AND SCBA_s

Name of manufacturer Type of respirator respirator, TC 84A-number model number (Small) (Medium) (Large)

Name of manufacturer Type of respirator respirator, TC 84A-number model number (Small) (Medium) (Large)

GENERAL

1. Ensure that the lens is not scratched, cracked, or broken.
2. Ensure that the lens is completely sealed.
3. Ensure the area where the lens holder comes in contact with rubber is not cut or torn.
4. If the respirator has a speaking diaphragm, ensure that it is in place and not punctured. Ensure the gasket is in place.
5. Straps must be elastic, pliable and unfrayed. Straps must have points of attachment for the facepiece. No modifications are allowed.
6. Make sure all the clips are present and the straps are attached securely to the mask.
7. Ensure that the inhalation valves are present and in good working order.

AIRLINE RESPIRATORS

1. Ensure that the correct airline hose is used with supplied-air respirators.
2. Ensure airline connections are correct.
3. Check hose integrity for cuts, deterioration, tears, etc.

Enclosure (5-3)

SCBA

1. Follow manufacturer's recommended inspection procedures, enclosure (1), Attachment E.

Have the technician, who is trained and certified by the SCBA manufacturer to use the Biosystems PosiChek3 equipped with software from the SCBA manufacturer to test SCBA per NFPA 1852 and SCBA manufacturer's requirements.

Have qualified technicians perform DOT hydrostatic test dates and other related air cylinder maintenance according to NFPA 1404 and NFPA 1500 and SCBA manufacturer's requirements.

CORRUGATED BREATHING TUBE

1. Stretch out the corrugated breathing tube. Inspect for cuts and abrasions. Ensure there are no pin holes in the corrugations.

GAS MASKS

Name of manufacturer Type of respirator respirator, TC 84A-number model number (Small) (Medium) (Large)

Name of manufacturer Type of respirator respirator, TC 84A-number model number (Small) (Medium) (Large)

1. Make sure that all required clamps are present.
2. Ensure gaskets are present in both ends of the breathing tube.
3. Check for cuts, gouges, and scratches on the threads.
4. Make sure that the canister is approved and that the shelf life has not expired.
5. Ensure that the back- and front-mounted canisters have a harness assembly.

Enclosure (5-4)

RESPIRATOR INSPECTION PROCEDURES

HOODS

Name of manufacturer Type of respirator respirator, TC 84A-number model number (Small) (Medium) (Large)

Name of manufacturer Type of respirator respirator, TC 84A-number model number (Small) (Medium) (Large)

1. Examine the hood and its shroud for rips, tears, and seam integrity.
2. For abrasive blasting hoods, examine the integrity of the protective headgear and the suspension inside the headgear.
3. Examine the protective face shield for cracks, breaks or impaired vision.
4. Abrasive blasting hoods must have a cape or a shroud that is not ripped or torn.
 - a. Ensure the buckles or snaps on the cape or shroud are present and in good working condition.
 - b. Ensure the collar is present under the shroud. It must fit tight around the neck by either a drawstring or an elastic collar.
 - c. The collar must be in good working condition with no tears or rips.
 - d. Inspect belts and hoses for tears or deterioration.
 - e. Check airline connections and valves.

Enclosure (5-5)

RESPIRATOR TRAINING, FIT TESTING, AND MEDICAL CLEARANCE RECORD

Employee: _____ SSN: _____ Shop: _____

Medical Clearance

Date	Clearance for Respirator Type	Restrictions

Fit Testing

Date	Respirator Make, Model, Size	Fit Test Method	Fit Test Operator	Pass/Fail/ Fit Factor

Training

Date	Type of Training	Instructor

Enclosure (6)

TRAINING

Respirator training is required to ensure that everyone required to wear a respirator is properly informed of respiratory hazards and the possible consequences resulting from not wearing their respirator; the reason for wearing a particular type of respirator; the capabilities and limitations of the respirator; the method of donning the respirator and checking its operation; methods of respirator maintenance; and recognizing and dealing with emergency situations.

Responsibility

The RPPM, designated by the Commanding Officer, will establish an SOP for all aspects of the training and the fit testing process.

The RPPM will ensure all training and fit testing is done according to this SOP. The RPPM is responsible for maintaining and repairing all fit testing equipment.

Training

RPPM will ensure employees required to wear respirators, their supervisors, and respirator issuers receive at least one hour of training developed specifically for using and maintaining the respirators selected for their shop operation(s). In addition, annual refresher training is required. Personnel who are required to wear respirators must be trained prior to initial fit testing.

Respirator wearers must receive the training specified in the shop specific respirator training (enclosure (1), Attachment I), which includes:

1. Why respirators are required, including specific workplace hazards and respirator selection for their shop.
2. Status of engineering controls.
3. Respirator capabilities and limitations.
4. How to don the respirator and perform positive and negative user seal checks and how improper fit, usage, or maintenance can compromise the protective effect of the respirator.
5. Respirator cleaning, disinfection, and storage procedures.
6. Respirator inspection.
7. Respirator issue.
8. Breathing air quality, inspection and maintenance (if atmosphere-supplying respirators are used in the shop).
9. When to change filters (if air-purifying respirators are used in the shop).

Enclosure (7)

10. Location of the shop respirator SOP in the workplace.
11. What to do in emergency situations.
12. Shop specific respirator problems, including communications, vision, use in excessive heat or cold, IDLH and oxygen deficient atmospheres, and confined spaces.
13. How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.
14. Wearing contact lenses in contaminated atmospheres with respiratory protection is permitted as long as eye and face protection is worn as appropriate for workers exposed to eye injury hazards
15. Use of emergency respirators for emergency rescue teams and for all personnel required to enter IDLH or oxygen deficient atmospheres. The gas free engineer will provide training on emergency IDLH atmosphere entry procedures and provide practice emergency scenarios.

Inform employees that Chapter 15 of OPNAVINST 5100.23 Series is the Navy regulation for respirator use, and inform them of general requirements. Also inform employees that a copy of Chapter 15 and of the Command Respirator SOP are located in each shop office.

Enclosure (7-2)

FIT TESTING

Employee Selection of Respirators

Each individual must be medically qualified and have enclosure (1), Attachment H completed before initial fit testing.

Employees will be instructed how to don respirators and perform positive and negative pressure user seal checks prior to respirator selection. Employees will wear the respirator at least five minutes prior to fit testing to assess comfort.

When safety glasses or goggles must be worn with half mask respirators the respirator will be fit tested while wearing the eye-ware. All other required personal protective equipment will be worn with the respirator during fit testing procedures.

The following respirators will be provided for employees to select the best fitting and most comfortable respirator:

Name of manufacturer Type of respirator respirator, TC-number model number (Small) (Medium) (Large)

Name of manufacturer Type of respirator respirator, TC-number model number (Small) (Medium) (Large)

Name of manufacturer Type of respirator respirator, TC-number model number (Small) (Medium) (Large)

Name of manufacturer Type of respirator respirator, TC-number model number (Small) (Medium) (Large)

Qualitative Fit Testing Protocol

Qualitative fit testing will be performed according to Appendix A of 29 CFR 9110.134.

If an employee cannot pass the threshold test for isoamyl acetate, then the irritant smoke fit testing protocol will be used.

Organic vapor cartridges will be used for the isoamyl acetate fit testing procedure.

HEPA filter cartridges (N, R, or P 100) will be used for the irritant smoke fit testing procedure.

Enclosure (8)

Quantitative Fit Testing Protocol

Full face air-purifying respirators are allowed to be worn in contaminated atmospheres up to 50 times the occupational exposure limit (OEL). Full face, negative pressure, air purifying respirators must be quantitatively fit tested to be worn in atmospheres between 10 and 50 times the OEL (minimum passing fit factor for full face respirators is 500). Either the controlled negative pressure Dynatec Fit Tester 3000; or the Portacount[®] condensation nuclei counter; or the TDA-99M (JSMLT) forward light scattering photometer will be used for fit testing. The fit tests will be performed as recommended by the manufacturer's instruction manual and per the quantitative fit test protocols in Appendix A of reference (a). Half mask respirators may be quantitatively fit tested at the discretion of the RPPM.

HEPA (N, R, or P 100) filters will be used for quantitative fit testing with the Portacount[®] and the TDA-99M. Filter cartridges are replaced with leak-tight test adapters when fit testing with the Fit Tester 3000 to seal the normal air pathways into the respirator.

The passing criteria for full face respirators is a fit factor of 500.

The passing criteria for half mask respirators is a fit factor of 100.

Fit Testing Frequency

Employees wearing respirators will be fit tested initially and annually. The RPPM will ensure employee fit testing is recorded on enclosure (6). Employees shall not be fit tested unless they have been medically evaluated.

Fit testing will also be performed when the employee has experienced:

1. weight change of 20 pounds or more
2. facial scarring or facial jewelry in area of face seal
3. any dental changes
4. any reconstructive surgery or cosmetic surgery

It is the employee's responsibility to notify their supervisor and the RPPM of any of the above changes or other circumstances that might interfere with the facial seal of the respirator.

Personnel with facial hair that could interfere with face seal or valve function will not be fit tested because the length and condition of facial hair changes daily and would necessitate daily fit testing.

QUALIFICATIONS FOR FIT TEST OPERATORS

The RPPM is responsible for ensuring fit test operators are properly trained and possess the necessary skills for performing fit testing, per ANSI Z88.10. The RPPM can either train fit test operators in-house or send them to commercially available training courses. The RPPM will use the Fit Test Operator Evaluation Form (Enclosure (8-4)), modified from Annex A of ANSI Z88.10, to evaluate and verify fit test operators' qualifications. Fit test operators must demonstrate mastery of the fit test procedures in Appendix A of reference (a) along with being proficient in the appropriate sections of the Command Respiratory Protection Instruction concerning respirator fit testing, inspection, cleaning, and storage. Fit test operators will receive training and demonstrate proficiency in the following areas:

Respiratory protective devices used in activity workplaces:

- * respirator components and their function
- * respirator inspection, cleaning and maintenance
- * brands and models of respirators worn
- * respirator capabilities and limitations
- * proper donning/doffing procedures along with positive and negative pressure user seal checks

Fit test methods:

- * purpose of fit testing (be able to explain the fit test purpose and procedures to personnel being fit tested)
- * fit testing procedures
- * limitations of the test methods (e.g., sensitivity tests and subjective responses of qualitative methods)
- * fit test results
- * proper respirator cleaning and sanitizing
- * proper cartridges/filters for each fit test method used
- * probes or fit test adapters used in quantitative fit testing
- * qualitative fit test materials
- * quantitative fit test equipment, including assembly and operational checks
- * understand when not to perform fit testing based on facial characteristics, features, jewelry, or other problems, such as facial hair, that would interfere with the facepiece sealing surface
- * evaluating and recording fit test results

FIT TEST OPERATOR EVALUATION FORM

Name of fit test operator evaluated: _____ Date: _____

Fit test method: _____

Evaluated by (RPPM): _____

Demonstration of knowledge and performance

Acceptable

Not Acceptable

5.2.2 Demonstrates knowledge of respirators to be fit tested:

- | | | |
|---|--------------------------|--------------------------|
| – Respirator components and their function. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Respirator inspection, cleaning, and maintenance. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Different make, model, style, & size respirators. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Respirator capabilities and limitations as related to respirator fit testing. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Proper donning and doffing procedures including user seal checks. | <input type="checkbox"/> | <input type="checkbox"/> |

5.2.3 Demonstrates knowledge of the fit test method:

- | | | |
|---|--------------------------|--------------------------|
| – Purpose of respirator fit testing. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Fit test procedures. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Limitations of the fit test method. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Questionable fit test results. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Health and safety hazards associated with the chemicals and equipment used in the fit test. | <input type="checkbox"/> | <input type="checkbox"/> |

5.2.4 Demonstrates ability to set up fit test equipment:

- | | | |
|---|--------------------------|--------------------------|
| – Selection of proper cartridges or filters for the fit test method. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Preparation of required equipment and materials. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Performance of operational checks. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Proper installation of probes or fit test adapters used in quantitative fit test methods. | <input type="checkbox"/> | <input type="checkbox"/> |

5.2.5 Demonstrates the ability to conduct the respirator fit test:

- | | | |
|--|--------------------------|--------------------------|
| – When to refuse to conduct a fit test. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Explanation of fit test purpose and procedures to person being fit tested. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Observation and evaluation of unassisted donning procedure. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Observation that user seal checks are performed according to manufacturer's recommended procedures. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Observes the person being fit tested throughout the entire fit test procedure to ensure it is conducted correctly. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Conducts the fit test method according to Appendix A of 29 CFR 1910.134. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Properly interprets and records results. | <input type="checkbox"/> | <input type="checkbox"/> |
| – Performs respirator cleaning, sanitizing, or disposal. | <input type="checkbox"/> | <input type="checkbox"/> |

5.2.6 Identifies likely causes of fit test failure.

●	●	●
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CHECKLIST FOR RPPM RESPIRATOR PROGRAM ANNUAL AUDIT

In addition to the checklist in this enclosure, the RPPM audit includes examination of respirators in the workplace. The RPPM performs a complete inspection of all workplaces where respirators are worn to ensure proper respirator use. Besides the annual audit, the RPPM performs frequent, random inspections to assure that respirators are properly selected, used, cleaned, and maintained. The RPPM shall keep records of these ongoing surveillance findings. In addition to workplace inspections, the RPPM performs an annual audit of all records associated with the respirator program including respirator training; medical evaluation; fit testing; cartridge change out schedules; monthly inspection of emergency respirators; and compressor inspection and maintenance, including testing for Graded D air quality. Included in this audit is a review of the periodic BUMED Industrial Hygiene Surveys, which contains the written records documenting hazard assessment and the logic on which respirator selection is based. All problems identified during the RPPM audits and the periodic BUMED program evaluations shall be corrected as soon as possible.

Enclosure (9)

CHECKLIST FOR RPPM AUDIT

PROGRAM ELEMENT		YES	NO	N/A
PROGRAM ADMINISTRATION:				
A.	Is an RPPM appointed in writing by the commanding officer or officer in charge? Section 1513.a. of OPNAVINST 5100.23 Series			
B.	Does the RPPM maintain a roster of individuals that require respiratory protection? Section 1503.d. of OPNAVINST 5100.23 Series			
C.	Are there written SOPs governing all aspects of the respirator program, including worksite SOPs posted in the general area? Section 1513.a.(2) of OPNAVINST 5100.23 Series			
D.	Do SOPs include emergency and rescue guidance, as necessary? Section 1513.a.(2) of OPNAVINST 5100.23 Series			
E.	Do SOPs include cartridge change out schedules as appropriate? Section 1513.a.(2) of OPNAVINST 5100.23 Series			
F.	Is there an annual audit performed by the RPPM? Section 1513.a.(8) of OPNAVINST 5100.23 Series			
G.	Does the cognizant BUMED industrial hygiene office provide review/ evaluation of the respirator program according to the periodicity specified in Appendix 8-B? Section 1513.b.(2)(a) of OPNAVINST 5100.23 Series			
SPECIAL PROBLEMS:				
A.	Are personnel not allowed to wear tight fitting respirators with any personal protective equipment or condition that interferes with the facepiece seal or exhalation valve, including facial hair? Section 1503.e. of OPNAVINST 5100.23 Series			
B.	Are provisions made for respirator use in hot or cold environments, such as use of nose cups to control lens fogging and reduce physiological stress, special gaskets that retain elasticity at low temperatures, and use of vortex tubes for heating or cooling? Annexes 11 and 12 of ANSI Z88.2			
C.	Does vision correction not interfere with the respirator seal? Clause 7.5 of ANSI Z88.2			
D.	Are contact lenses allowed to be worn with respirators? Clause 7.5.3.3 of ANSI Z88.2			
E.	Have personnel practiced with and demonstrated that they can successfully wear contact lenses with respirators? Clause 7.5.3.3 of ANSI Z88.2			
VOLUNTARY USE RESPIRATORS:				
A.	Are voluntary use respirators only issued where there is no risk of over exposure? Glossary and Section 1503.g. of OPNAVINST 5100.23 Series			
B.	Are only NIOSH approved filtering facepieces issued for voluntary use? Glossary and Section 1503.g. of OPNAVINST 5100.23 Series			
C.	Are personnel who are issued voluntary use respirators other than filtering facepieces enrolled in the complete respirator program? Section 1503.g.(2) and Glossary of OPNAVINST 5100.23 Series			
RESPIRATOR USE:				
A.	Are engineering controls being used to control workplace exposure? Section 1501.b. of OPNAVINST 5100.23 Series			
B.	Do contractors provide their own respirators and respirator programs for their employees? Section 1502.b.(1) of OPNAVINST 5100.23 Series			
C.	Are all Navy employees, such as employees, inspectors, and visitors, who must enter an area requiring respirators provided with appropriate respiratory protection, medical evaluation, fit testing, and training? Section 1503. of OPNAVINST 5100.23 Series			
D.	Are all personnel assigned to areas where escape only respirators are required medically evaluated and trained in the use of escape only respirators? Section 1503.c. of OPNAVINST 5100.23 Series			
E.	Are visitors and personnel not assigned to areas where escape only respirators are			

PROGRAM ELEMENT		YES	NO	N/A
	required briefed in the use of the escape respirator and escorted at all times by personnel assigned to that area, but exempted from medical evaluation? Section 1503.c. of OPNAVINST 5100.23 Series			
F.	Are employees permitted to leave the hazardous area for respirator related reasons such as respirator malfunction, increased breathing resistance, or unusual discomfort from wearing the respirator? Clause 4.3.4 of ANSI Z88.2			
G.	Are cartridge change out schedules established and implemented for chemical cartridge air-purifying respirators? Section 1505. of OPNAVINST 5100.23 Series			
H.	Is the cartridge change out schedule logic based on objective information and documented in the written standard operating procedures? Section 1505. of OPNAVINST 5100.23 Series			
I.	Do respirator users perform user seal checks upon each donning of their respirator? Section 1513.c.(2) of OPNAVINST 5100.23 Series			
J.	Are only respirators used upon which user seal checks can be performed? Section 1513.c.(2) of OPNAVINST 5100.23 Series			
K.	Do medical personnel who wear respirators comply with Chapter 15 of OPNAVINST 5100.23 Series? Section 1507.f. of OPNAVINST 5100.23 Series			
TRAINING:				
A.	Has the RPPM been trained by one of the following courses: (1) OSHA Training Institute Course 222 or 222A; (2) NIOSH Course 593; (3) Navy RPPM course, Respiratory Protection Program Management (A-493-0072); or (4) any respiratory protection course that has at least 32 hours of training including, but not limited to, the topics listed Section 1512? Section 1512 of OPNAVINST 5100.23 Series			
B.	Does the RPPM keep up-to-date with current respiratory protection information? Section 1512.c. of OPNAVINST 5100.23 Series			
C.	Are personnel assigned by the RPPM to conduct respirator fit testing trained and evaluated according to clause 5 and Annex A1 of ANSI Z88.10-2001? Section 1512.e. of OPNAVINST 5100.23 Series			
D.	Are supervisors, respirator issuers, and emergency rescue teams trained according to ANSI Z88.2? Section 1511 of OPNAVINST 5100.23 Series			
E.	Are respirator users trained annually in a manner that is understandable and that respirator wearers can demonstrate knowledge of the topics outlined in Section 1511 of OPNAVINST 5100.23 Series? Section 1511 of OPNAVINST 5100.23 Series			
MEDICAL EVALUATION:				
A.	Are civilians who must wear respirators medically evaluated according to the Medical Surveillance Procedures Manual/ Medical Matrix? Section 1508 of OPNAVINST 5100.23 Series			
B.	Are military personnel who have been confirmed by their region or activity as having no deployment limiting medical conditions, and with a current annual Preventive Health Assessment per OPNAVINST 6120.3 considered qualified to wear any type of respiratory protection? (How does the region or activity confirm that military personnel are fit for full duty?) Section 1508 of OPNAVINST 5100.23 Series			
C.	Does either a physician, or the following individuals under the supervision of a physician, conduct respirator medical evaluations: a nurse practitioner, an occupational health nurse, a physician's assistant, a preventive medicine technician or an independent duty hospital corpsman? Section 1513.b.(1) of OPNAVINST 5100.23 Series			
D.	Does the activity provide their medical treatment facility with information about the operation and the respirator to be worn by completing the top portion of Appendix 15-A for each civilian employee requiring a medical evaluation for respirator use? Section 1513.a.(5) of OPNAVINST 5100.23 Series			
E.	Does the cognizant health care professional fill out the lower portion of Appendix 15-A and return a copy to the RPPM and to the employee indicating the worker's ability to wear respiratory protection or any limitations on respirator use? Section 1513.b.(1) of OPNAVINST 5100.23 Series			

PROGRAM ELEMENT		YES	NO	N/A
COMPRESSED BREATHING AIR:				
A.	Are compressed breathing air sources tested quarterly for Grade D air quality? Section 1506.b. of OPNAVINST 5100.23 Series			
B.	Are records of air quality monitoring maintained for five years? Section 1506.b. of OPNAVINST 5100.23 Series			
C.	Are all new and/or upgraded breathing air compressors equipped with continuous carbon monoxide monitor and alarm systems? Section 1506.c. of OPNAVINST 5100.23 Series			
D.	Are carbon monoxide monitor and alarm systems calibrated according to manufacturers' instructions? Section 1506.c. of OPNAVINST 5100.23 Series			
RESPIRATOR SELECTION:				
A.	Is respirator selection based on the consideration set forth in Section 1507.c. of OPNAVINST 5100.23 Series? Section 1507.c. of OPNAVINST 5100.23 Series			
B.	Are only respirators approved by NIOSH or NIOSH/MSHA issued? Section 1507.a. of OPNAVINST 5100.23 Series			
C.	Are only NIOSH approved SCBA or combination airline/ SCBA allowed to be worn during entry into oxygen deficient or IDLH atmospheres? Section 1507.d. of OPNAVINST 5100.23 Series			
D.	During entry into IDLH atmospheres, is one employee or more, when needed, located outside the IDLH atmosphere in communication with the employee inside the IDLH atmosphere; and are they trained and equipped with appropriate PPE and rescue equipment to perform effective rescue in the IDLH atmosphere? Section 1507.g. of OPNAVINST 5100.23 Series and Paragraph (g)(3) of 29 CFR 1910.134			
E.	Has the activity determined, in advance, as part of the written respirator program's worksite-specific standard operating procedures, the procedure that standby personnel will follow and whom they specifically need to notify in rescue situations? Section 1507.g. of OPNAVINST 5100.23 Series, Paragraph (g)(3)(iv) of 29 CFR 1910.134, and Page 33 of the OSHA QUESTIONS AND ANSWERS ON THE RESPIRATORY PROTECTION STANDARD of 3 Aug 98			
F.	For firefighting, are only NIOSH approved full face pressure demand SCBA (with at least 30 minute service life) meeting NFPA 1981 requirements allowed to be worn? Section 1507.e. of OPNAVINST 5100.23 Series			
G.	Is the 2 in - 2 out rule observed during structural firefighting? Section 1507.g. of OPNAVINST 5100.23 Series and Paragraph (g)(4) of 29 CFR 1910.134			
FIT TESTING:				
A.	Are all employees who wear tight fitting respirators fit tested before initial respirator issue and annually thereafter according to Appendix A of 29 CFR 1910.134 and ANSI Z88.2-2001? Section 1509 of OPNAVINST 5100.23 Series			
B.	Does the activity conduct additional fit testing whenever the employee has observable changes in their physical condition that could affect respirator fit, such as facial scarring in the area of the face seal, dental changes, cosmetic or reconstructive surgery, or a significant change in body weight (e.g., 10% or more)? Paragraph (f) (3) of 29 CFR 1910.134 and Clause 9.1.5 of ANSI Z88.2			
C.	Does the command allow employees to select respirators from a sufficient number of respirator models and sizes so that respirators correctly fit all respirator users? Paragraph (d)(1)(iv) of 29 CFR 1910.134			
D.	Are full face negative pressure air-purifying respirators worn in atmospheres between 10 to 50 times the occupational exposure limit quantitatively fit tested? Section 1509.b. of OPNAVINST 5100.23 Series			
E.	Are fit test records maintained? Section 1509.c. of OPNAVINST 5100.23 Series			

PROGRAM ELEMENT		YES	NO	N/A
RESPIRATOR CLEANING:				
A.	Are respirators cleaned and sanitized according to Appendix B-2 of 29 CFR 1910.134 as necessary to maintain a sanitary condition for exclusive individual issue; before being worn by different individuals; and after each use for emergency use respirators? Section 1510 of OPNAVINST 5100.23 Series and Paragraph (h)(1) of 29 CFR 1910.134			
B.	Are respirators used in fit testing and training cleaned and disinfected after each use? Section 1510 of OPNAVINST 5100.23 Series and Paragraph (h)(1)(iv) of 29 CFR 1910.134			
RESPIRATOR STORAGE:				
A.	Are respirators stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals, and are they stored in a manner to prevent deformation of the facepiece and exhalation valve? Section 1510 of OPNAVINST 5100.23 Series and Paragraph (h)(2)(i) of 29 CFR 1910.134			
B.	Are emergency use respirators stored according to manufacturer instructions in compartments or in covers clearly marked as emergency respirators and accessible to the work area? Section 1510 of OPNAVINST 5100.23 Series and Paragraph (h)(2)(ii) of 29 CFR 1910.134			
RESPIRATOR INSPECTION:				
A.	Are respirators inspected before each routine use and during cleaning? Section 1510 of OPNAVINST 5100.23 Series and Paragraph (h)(3)(i)(A) of 29 CFR 1910.134			
B.	In addition to inspection requirements in "A." above, are SCBA inspected monthly to ensure a fully charged state and that the regulator and warning devices function properly? Section 1510 of OPNAVINST 5100.23 Series and Paragraph (h)(3)(iii) of 29 CFR 1910.134			
C.	Are SCBA cylinders recharged when the pressure falls to 90% of the manufacturer's recommended pressure level? Section 1510 of OPNAVINST 5100.23 Series and Paragraph (h)(3)(iii) of 29 CFR 1910.134			
D.	Are emergency use respirators inspected at least monthly per manufacturer's instructions and inspection findings documented? Section 1510 of OPNAVINST 5100.23 Series and Paragraphs (h)(3)(i)(B) and (h)(3)(iv) of 29 CFR 1910.134			
E.	Are emergency escape-only respirators inspected before being carried into the workplace for use? Section 1510 of OPNAVINST 5100.23 Series and Paragraph (h)(3)(i)(C) of 29 CFR 1910.134			
RESPIRATOR REPAIR:				
A.	Are repairs to respirators made according to manufacturer's instructions by appropriately trained personnel, using only NIOSH approved parts for the respirators being repaired? Section 1510 of OPNAVINST 5100.23 Series and Paragraph (h)(4) of 29 CFR 1910.134			
B.	Are reducing and admission valves, regulators, and alarms adjusted or repaired only by the manufacturer or a technician trained by the manufacturer? Section 1510 of OPNAVINST 5100.23 Series and Paragraph (h)(4)(iii) of 29 CFR 1910.134			
CBRN RESPIRATOR PROGRAM:				
A.	Are all program elements of the industrial respirator program incorporated in the CBRN respirator program? Section 2606.a. of OPNAVINST 5100.23 Series			
B.	Has the RPPM having cognizance over the first responders been assigned as the CBRN RPPM? Section 2606.b. of OPNAVINST 5100.23 Series			
C.	Have all prerequisite requirements for wearing respiratory protection been accomplished, including medical evaluation, respirator selection, fit testing, and training so that first responders are ready to respond if needed in defense of naval facilities during terrorist attack? Section 2606.b. of OPNAVINST 5100.23 Series			
D.	For Level A protection, are only NIOSH CBRN approved SCBA or NIOSH approved SCBA meeting NFPA 1981 requirements worn under the encapsulating			

PROGRAM ELEMENT		YES	NO	N/A
	suits until the activity is completely outfitted with NIOSH CBRN SCBA? Sections 2603.c.(1), 2606.c.(1)(a), and Table 2 of OPNAVINST 5100.23 Series			
E.	Do SCBA used for Level A protection have air cylinder service lives of 60 minutes? Section 2606.c.(1)(a) of OPNAVINST 5100.23 Series			
F.	For Level B protection, are only NIOSH CBRN approved SCBA allowed to be worn when liquid chemical warfare agent is present? Section 2606.c.(1)(b) and Table 3 of OPNAVINST 5100.23 Series			
G.	Are NIOSH approved SCBA meeting NFPA 1981 requirements allowed to be worn for Level B protection when liquid chemical warfare agent is not present until the activity is completely outfitted with NIOSH CBRN SCBA? Sections 2603.c.(1), 2606.c.(1)(b), and Table 3 of OPNAVINST 5100.23 Series			
H.	Are only NIOSH CBRN approved air-purifying respirators selected for Level C protection? Section 2606.c.(1)(c) and Table 4 of OPNAVINST 5100.23 Series			
I.	Do personnel stationed at military treatment facility secondary decontamination stations and decontamination corridor security personnel wear full-face rubber, PAPRs equipped with combination organic vapor, acid gas and HEPA filters during the interim period until NIOSH CBRN approved PAPRs are available? Section 2606.c.(1)(d) of OPNAVINST 5100.23 Series			
J.	Are NIOSH CBRN approved SCBA not allowed to be used beyond six hours after initial exposure to chemical warfare agents to avoid possible agent permeation? Section 2606.c.(2)(a) of OPNAVINST 5100.23 Series			
K.	In the absence of industrial hygiene air sampling data are respirator cartridges used by security guards changed after every eight-hour shift? Section 2606.c.(7)(b) of OPNAVINST 5100.23 Series			
L.	Are NIOSH CBRN approved air-purifying respirators not allowed to be worn into IDLH atmospheres or atmospheres containing less than 19.5% oxygen. Section 2606.c.(2)(b) of OPNAVINST 5100.23 Series			
M.	Are NIOSH CBRN approved air-purifying respirators not allowed to be used beyond eight hours after initial exposure to chemical warfare agents or only two hours if exposed to liquid chemical warfare agent? Section 2606.c.(2)(b) of OPNAVINST 5100.23 Series			
N.	Are CBRN respirators inspected monthly according to manufacturer's instructions? Section 2606.c.(3)(a) of OPNAVINST 5100.23 Series			
O.	Are personnel wearing CBRN respirators quantitatively fit tested by an OSHA accepted quantitative fit test method? Section 2606.c.(5) of OPNAVINST 5100.23 Series			
P.	Is the minimum passing quantitative fit factor 500? Section 1509.(b) of OPNAVINST 5100.23 Series			
Q.	In the absence of industrial hygiene air sampling data are PAPR cartridges used by personnel assigned to secondary decontamination stations at medical treatment facilities and by security guards stationed at the decontamination corridor changed every two and a half hours? Section 2606.c.(7)(b) of OPNAVINST 5100.23 Series			

SUGGESTED RESPIRATOR QUALIFICATION CARD

<u>Name of Command</u>	
photo	RESPIRATOR QUALIFICATION

	Name
Shop _____	ID Number _____
Expiration date _____	

Type of Respirator	_____	_____	_____
Brand of Respirator	_____	_____	_____
Model #	_____	_____	_____
Size	_____	_____	_____

**Appendix D to Sec. 1910.134 (Mandatory)
Information for Employees Using Respirators
When Not Required Under the Standard**

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirator's limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

RESPIRATOR CARTRIDGE CHANGE SCHEDULES

A copy of Enclosure (1), Attachment J will be filled out by the Command RPPM for every operation requiring a respirator cartridge change out schedule to ensure cartridges are changed before breakthrough occurs.

Establishing cartridge change out schedules for gas and vapor contaminants will require concerted efforts between RPPMs and BUMED industrial hygienists. The RPPM will provide a copy of Enclosure (1), Attachment J to local BUMED industrial hygienists to help with the collection of information needed to calculate cartridge change out schedules. The Command RPPM will make arrangements with the local BUMED Industrial Hygiene Office to:

- * Provide respiratory hazard exposure data in both mg/m^3 and in parts per million.
- * Calculate threshold limit values for mixtures when appropriate.
- * Provide environmental data concerning workplace temperature, humidity, and worker breathing rate.
- * Provide the boiling points of the chemicals of concern. (Chemicals with boiling points less than 65°C (149°F) may be desorbed from cartridge sorbent material during periods of non-use or be replaced by chemicals with higher boiling points.)
- * Verify cartridge change out schedules by collecting air samples behind the cartridges using air sampling methods supported by the Consolidated Industrial Hygiene Laboratories.

When command employees wear air-purifying respirators for protection against multiple contaminants follow the following guidelines for establishing change out schedules:

- * Calculate the mole fraction of each mixture component in the workplace environment.

Mole fraction is calculated by dividing concentrations of each mixture component in parts per million (ppm) by total ppm of the mixture.

- * Look up the cartridge service life calculator estimated breakthrough time for each mixture component on the respirator manufacturers' service life software.
- * Multiply mole fraction of each mixture component by its estimated breakthrough time to calculate breakthrough time based on each component's proportion in the mixture.

Enclosure (13)

* Base change out schedule on the shortest mixture component breakthrough time. Incorporate a safety factor, by establishing a change out schedule that is at least 10% less than the shortest mixture component breakthrough time.

These calculations are performed automatically using the built-in spread sheet capabilities of the table in Enclosure (1), Attachment J entitled "*Calculate Breakthrough Time Of Components Based On Their Proportion Of The Mixture.*" First, on computer, make a copy of this worksheet table and use a fresh copy for each breakthrough calculation. Fill in the "UTL_{95%}, 95% Concentration" and the "Cartridge Service Life Calculator Estimated Breakthrough Time for Single Component." Then block the "UTL_{95%}, 95% Concentration" column and press F9 - this calculates the total parts per million. Next, block the whole table, then press F9 to complete the mole fraction calculations and breakthrough time calculations.

To verify the estimated change out schedules in the field, make arrangements with local BUMED industrial hygienists to collect air samples behind the respirator cartridges using a Portacount[®] mask sampling adapter (Figure 1). These samples must be collected in the same environment where respirator use is required. The air sampling methods supported by the Consolidated Industrial Hygiene Laboratories are sensitive enough to detect concentrations at 25 % of the occupational exposure limits (OELs) of the mixture components. Air samples will be collected on sorbent tubes behind the cartridges at the highest flow rate allowed by Industrial Hygiene Sampling Guide For Consolidated Industrial Hygiene Laboratories, latest revision. This permits relatively quick collection of the lowest sample volume, allowed by the Sampling Guide, for laboratory analysis results that can be reported in concentrations down to the limit of detection. Most air samples can be collected behind cartridges in five to ten minutes. Workers will be instructed to take a break for 5 to 10 minutes while wearing the respirator in the worksite during air sample collection so breathing rate will not interfere with collection of the sample. The workers' normal breathing will not adversely influence detection of breakthrough. By the time of air sample collection, all of the varying air contaminant concentrations, varying temperature and humidity, and varying breathing rates throughout the day have already had their influence on respirator cartridge breakthrough. In other words, workers breathing normally right before cartridge change out time would not significantly influence breakthrough - breakthrough would have either already occurred or not occurred.

BUMED industrial hygienist will install the Portacount[®] mask sampling adapter between the respirator facepiece and the cartridge. They will detach the "Sample Tube" along with the "Suction Cup" and "Clip" and attach tubing to the outside fitting of the Portacount[®] mask sampling adapter (See Figure 1). They will close off the end of this tubing with a heavy wire paper clip to prevent contaminated air from entering. The worker will then redon the respirator.

When back in the workplace, the clip is removed and the sampling device is attached to the end of this tubing. In this arrangement, the air sample will be collected in the chamber between the inhalation valve of the Portacount[®] mask sampling adapter and the inhalation valve

of the facepiece. If there are no chemical contaminants detected in the samples then significant breakthrough (< 25% OELs) has not occurred and the change out schedule is confirmed. Change cartridges according to the estimated (now verified) change out schedule.

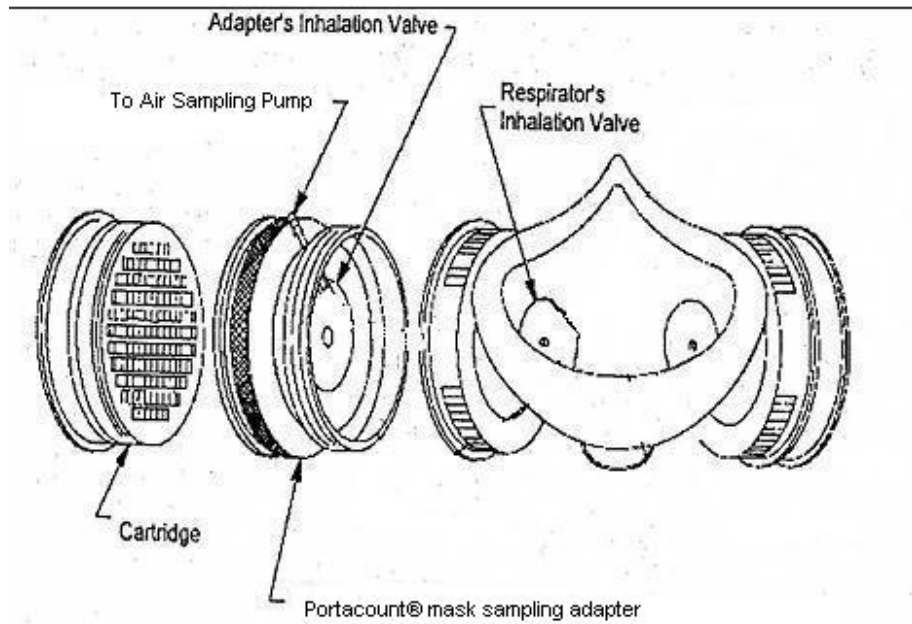


Figure 1

For single contaminants, use the respirator manufacturers' chemical cartridge service life calculators to determine the breakthrough time for the single component. Set a convenient change out schedule at least 10% less than the estimated breakthrough time. Arrange for BUMED Industrial Hygienists to collect an air sample behind the cartridge using a Portacount® mask sampling adapter to verify the change out schedule.