CHAPTER 18 – RESPIRATORY PROTECTION

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A. INTRODUCTION

1. The purpose of a Respiratory Protection Program is to protect those SI employees performing tasks/operations for which inhalation exposures cannot be controlled by use of engineering or administrative controls.
2. This Chapter applies to all Smithsonian Institution (SI) tasks/operations that may require the use of respiratory protection, including Immediately Dangerous to Life and Health (IDLH) and emergency conditions. This Chapter also addresses the voluntary use of respirators.
3. This Chapter also serves as the SI written Respiratory Protection Program, as required by the Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) Standard 1910.134, "Respiratory Protection," and as such, requires that respiratory protective equipment be selected, used, maintained, and stored in accordance with this Standard.
4. SI will provide the recommended and approved respirator equipment at no cost to employees enrolled in the respiratory protection program.

B. CHAPTER-SPECIFIC ROLES AND RESPONSIBILITIES

1. Safety Coordinators shall:

a. Assist supervisors identify employees and job tasks that may pose respiratory hazards.

b. Coordinate with the Office of Safety, Health and Environmental Management (OSHEM) to conduct employee exposure assessments and determination of controls needed, including the use of respirators.

c. As necessary, based on OSHEM recommendations, forward "Respiratory Authorization Requests" (Attachment 1) to OSHEM for enrollment into the SI Respiratory Protection Program. Coordinate with OSHEM to ensure supervisors and affected employees participate in respiratory protection program and maintain current with their training and medical certifications.

2. Supervisors shall:

a. Conduct Job Hazard Analyses (JHAs) in accordance with Chapter 4, Safety Risk Management Program", of this *Manual* to identify tasks and employees with inhalation hazards that may require exposure assessments and control recommendations.

b. Coordinate, through the Safety Coordinator, for OSHEM to conduct employee exposure monitoring of these tasks. If respirator use is recommended, initiate a "Respiratory Authorization Request" (Attachment 1) and route the request through the Facility Safety Coordinator for approval.

c. Ensure employees are approved by OSHEM to wear a respirator (i.e., receive a medical evaluation, training and fit testing) prior to working at tasks where respirators are required.

d. Ensure appropriate respiratory protective equipment is available for each affected employee, per OSHEM fit-testing recommendations, and document this on the "PPE Issuance Sheet," in accordance with Chapter 17, "Personal Protective Equipment," of this *Manual*.

e. Ensure affected employees are wearing respiratory protective equipment during all tasks where it is required and are performing regular cleaning, maintenance, and inspection of the respirators.

g. Implement a Respirator Cartridge Change Schedule (See Attachment 2).

h. Notify the Safety Coordinator concerning any hazard or process change that may affect respiratory protection requirements, so that OSHEM may re-evaluate exposures and control requirements.

3. Employees shall:

a. Participate in medical evaluations, respiratory protective equipment training and fit-testing.

b. Wear respiratory protective equipment as directed by the supervisor, based on results of a Job Hazard Analysis and exposure monitoring.

c. Inspect, clean, and maintain assigned respiratory protective equipment.

d. Notify the supervisor when new or replacement respiratory protective equipment may be needed due to wear or damage.

e. Notify the supervisor of changes to work processes, which may affect the effectiveness of the issued respirator or of medical conditions that may limit the ability to wear a respirator.

4. Office of Safety, Health and Environmental Management (OSHEM) shall:

a. Serve as the SI respiratory program administrator in accordance with OSHA Standard 1910.134.

b. Conduct work place exposure monitoring and provide the Safety Coordinator and supervisors with assistance in the evaluation of respiratory hazards.

c. Evaluate "Respiratory Authorization Requests" and select appropriate respiratory protective equipment for requestor.

d. Conduct medical evaluations to determine employee's ability to wear respiratory protective equipment. Provide a written recommendation of the medical evaluation and maintain all medical records in accordance with 29 CFR 1910.134.

e. Conduct required training in the proper use and care of respiratory protective equipment and fit testing in accordance with 29 CFR 1910.134.

f. Select and recommend respiratory protective equipment that properly fits each affected employee and communicate results to each affected employee, supervisor, and Safety Coordinator.

C. HAZARD IDENTIFICATION

1. Initial Assessment:

a. Each supervisor will assess the job, task, or work areas under their control (with assistance from the Safety Coordinator) for operations that may require the use of respiratory protection equipment. Information to be used in this analysis will include:

(1) The JHA process, MSDS review, and other tasks assessments (see Attachment 1, 'Potential Inhalation Hazards').

(2) Recognized regulated operations (e.g., asbestos/lead based paint / pesticide mixing-application / spray painting and abrasive blasting).

(3) Results of exposure monitoring (refer to Chapter 39, "Exposure Assessment and Medical Surveillance", of this *Manual*).

b. To assist in the identification of inhalation hazards, the Safety Coordinator and/or the supervisor are to request employee exposure monitoring from OSHEM.

c. OSHEM shall provide, to the supervisor and Safety Coordinator, written results of employee exposure monitoring and recommended control measures, which may include enrollment into the respiratory protection program.

2. Follow-up Assessments: Changes to work place operations or tasks may require an exposure re-assessment to determine continued need for, or changes in type of, respiratory protection.

D. HAZARD CONTROL

1. Engineering and Administrative Controls. Engineering controls shall be the primary means to control airborne inhalation hazards in the work place, by isolation or removal (exhaust), whenever feasible. Administrative controls may be used, separate from or in conjunction with engineering controls, to limit employees' exposure to airborne inhalation hazards.

2. Respirator Selection

a. The organization shall provide respirators to employees identified as requiring enrollment in the respiratory protection program.

(1) Only respirators approved by the National Institute of Occupational Safety and Health (NIOSH) shall be used.

(2) Respirators shall be selected based on the following criteria of the "NIOSH Respirator Decision Logic 2004." NIOSH Publication No. 2005-100:

(a) Regulated requirements

(b) Nature and duration of operation or process.

(c) Types and concentrations of airborne contaminates including conditions that are immediately dangerous to life and health (IDLH).

(d) Emergency or escape situations

(e) Employee restrictions

b. Adequate supplies of cartridges/filters and parts shall be available. All cartridges and filters used in Air Purifying Respirators (APR) will be approved by NIOSH and will match the type and model of mask in use.

(1) If the cartridge does not have an 'End of Service Life Indicator' (ESLI), a cartridge/filter change-out schedule must be determined (see Attachment 2).

(2) Cartridges/filters must be selected to protect the user from the specific hazard identified. These cartridges will have a label its indicating approved uses.

3. Respirator Use

a. Employees shall be issued respirator models and sizes that match those identified by OSHEM on the fit test record, and recommended by OSHEM in its written report of training and fit-testing.

b. Special eyeglass inserts designed for the respirator shall be provided by the facility and at no cost to the employee, if an employee must wear eyeglasses with a full face-piece respirator (see Chapter 17, "Personal Protective Equipment," of this *Manual* for SI procedures on obtaining safety eyewear.)

c. Contact lenses may be worn when wearing a full face-piece respirator.

d. Facial hair is prohibited where the respirator-sealing surface meets the wearer's face.

e. Employees are required to perform a positive and negative fit check each time a tight fitting respirator is worn.

f. Employees shall be responsible for inspecting, cleaning, and maintaining assigned respiratory protective equipment. Employees may also be held accountable for respiratory protective equipment that is lost, stolen, or damaged due to neglect.

g. Inspection Before Each Use: Before each use, ensure the right respiratory protective equipment is being used for the job. Inspect it for wear, damage and check to see if the filters or cartridges are clogged or not filtering properly. Refer to section E, Required inspections and self assessments, for inspection requirements.

h. Employees must not remove their respirators for any reason while still in the hazardous work area. Employees are to leave the area with the respirator on:

(1) Before removing the respirator for any reason.

(2) To change cartridges/canisters.

(3) If any of the following is detected: Vapor/gas breakthrough, nausea, weakness, coughing, or shortness of breath.

i. Recognizing an Emergency: If the respiratory protective equipment has an indicator or alarm, ensure it is operating properly. Be alert for the following danger signals, and leave the area immediately if any of these problems develop:

(1) Breathing becomes more difficult. The filter or cartridge may be clogged.

(2) Detecting any odor, taste, or irritation that may indicate the contaminant is getting inside your respirator.

(3) The respirator becomes severely uncomfortable.

(4) Experiencing symptoms of illness, such as dizziness,

j. Supervisors shall maintain surveillance of work area conditions and the degree of employee exposure or stress. When there is a change in work area conditions or degree of employee exposure or stress that may affect respirator effectiveness, the supervisor shall reevaluate the continued effectiveness of the respirator.

4. Air Supplied Respirators

a. Air used for atmosphere-supplying respirators must meet or exceed the requirements for Type 1 - Grade D breathing air. Oxygen must never be used.

b. A certificate of analysis must accompany bottled air.

c. Compressors used to supply breathing air must:

(1) Prevent entry of contaminated air into the air supply.

(2) Minimize moisture content.

(3) Have suitable in-line sorbent beds and filter to provide appropriate air quality.

(4) Have a high carbon monoxide alarm that sounds at 10 ppm.

d. Couplings on air hose lines must be incompatible with other gas systems.

5. Respirators for Immediately Dangerous to Life and Health (IDLH) Atmospheres.

a. All oxygen-deficient atmospheres (less than 19.5% oxygen), are considered IDLH. The following respirators shall be used in IDLH atmospheres:

(1) A full-face-piece pressure-demand self-contained breathing apparatus (SCBA) certified by NIOSH for a minimum service life of thirty minutes, or

(2) A combination full-face-piece pressure-demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

b. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

6. **Voluntary Use of Respiratory Protective Equipment** Whenever a hazard is recognized and respiratory protective equipment is required, employees shall be provided with the appropriate respiratory protective equipment. *However, if respiratory protective equipment is not required, respirator use must first be approved by OSHEM after consultation with the employee, supervisor and safety coordinator.* If voluntary use is approved, the individual must comply with the requirements, roles and responsibilities of this Chapter including medical evaluation, fit testing and training**.**

   Filtering Facepieces- Employees voluntarily using dust masks may choose a dust mask for comfort. Training is required on the appropriate uses for the filtering facepieces; but, no medical evaluation or fit testing is required unless the filtering facepiece is being required by SI for an identified or potential work place hazard. Training on voluntary use will be conducted by OSHEM. Refer to Attachment 3 and 4.

This section applies to the voluntary use of disposable filtering face-pieces (dust masks), provided by the supervisor.

7. **Cleaning and Storage**

   a. When respiratory protective equipment is not properly cleaned and/or maintained, its fit and operation may be adversely affected. Respiratory protective equipment shall be inspected, cleaned, maintained, and stored by employees as specified by the manufacturer and OSHA standards.

   b. The care of respiratory protective equipment shall include:

      (1) Cleaning;

      (2) Sanitizing;

      (3) Rinsing;

      (4) Drying;

      (5) Reassembly; and

      (6) Inspection prior to use.

      (7) Cleaning may be performed as often as required.

   c. Atmosphere supplying and emergency use respirators shall be cleaned and sanitized after each use. Respirators must be cleaned and sanitized before it may be transferred to another individual.

   d. When storing a respirator, even overnight, first flex the rubber parts to make sure they are not twisted or bent. Then seal the respirator in a plastic bag and store the bagged respirator where it will be protected. Protect the respirator from dust, sunlight, extreme heat and cold,

moisture, damaging chemicals and physical damage. Clean and secure storage facilities shall be provided.

E. MEDICAL MONITORING

1. Employees who are assigned respiratory protective equipment shall first be medically qualified, trained and fit-tested before using the equipment.

2 **Program Entry Process**:

   a. Supervisors shall be responsible for identifying employees who may require entry into the SI Respiratory Protection Program, based on results of the JHA. A "Respiratory Authorization Request" (Attachment 1) shall be initiated and forwarded by the Safety Coordinator to OSHEM for exposure assessment and respirator equipment recommendation.

   b. A medical evaluation shall be scheduled through OSHEM Occupational Health Services Division (OHSD) to determine the employee's ability to wear respiratory protective equipment.

3. Medical Evaluation. Employees shall not be assigned a task requiring the use of respiratory protective equipment, and employees shall not be certified as a respirator user until OSHEM/OHSD has determined that the employee is medically fit to wear respiratory protective equipment while performing work. This determination shall be made by a physician or licensed health care professional (PLHCP). The scope and content of the medical evaluation shall comply with the mandatory medical questionnaire set forth in OSHA 29 CFR 1910.134, Appendix D, and shall include an evaluation of significant interim changes in the employee's health history from previous evaluations.

F. TRAINING:

Training on the correct fit, use, care, and maintenance of respiratory protective equipment is crucial. If training is not completed, protection will not be provided or will be minimized and exposure to hazards may result.

1. Upon completion of the medical evaluation certification, OSHEM shall conduct respiratory protection training and fit-testing. Refer to Section G for fit test information. Fit-testing shall not be conducted for staff that has not completed medical certification requirements

2**. Initial Training.** Respiratory protective equipment training shall be provided by OSHEM for each employee who is required to use respiratory protective equipment. As a minimum, employees shall receive the following training:

   a. Explanation of planned engineering controls, and/or why it may not be feasible to use engineering controls to reduce or eliminate the need for respiratory protective equipment.

b. Why respiratory protective equipment is necessary, and what type should be selected.

c. The limitations and capabilities of each class of respiratory protective equipment.

d. Recognition of situations where cartridges/canisters/filters need to be replaced (e.g., tasting/smelling contaminants, manufacturer's expiration date, increased breathing resistance, ESLIs and change out schedule).

e. How to recognize emergency situations and how to use respiratory protective equipment effectively in an emergency situation

f. How to properly put on and wear respiratory protective equipment, and checking its fit and operation.

g. How to recognize medical signs and symptoms that may limit or prevent effective use of respiratory protective equipment.

h. The need to inform your supervisor of any problems experienced when wearing a respirator, and of any defects or broken parts in the respirator.

i. The proper care, cleaning, and maintenance of respiratory protective equipment;

j. Where to store respiratory protective equipment when not in use.

3 Respiratory Protective Equipment Retraining. Circumstances where retraining is required include (but are not limited to):

a. Changes in the workplace render previous training obsolete.

b. Changes in the types of respiratory protective equipment to be used render previous training obsolete.

c. Inadequacies in an employee's knowledge or use of assigned respiratory protective equipment indicate that the employee has not retained the requisite understanding or skill.

4. Annual Training Recertification, Training and Fit-testing. To remain current and approved to wear a respirator in the workplace, each employee shall be recertified as a respirator user through an annual medical certification examination and training and fit-testing through OSHEM.

5. Training Documentation and Verification. OSHEM shall send a written report of certification, training, fit-testing results, and certification expiration date to each employee and their supervisor and Safety Coordinator. The Safety Coordinator shall verify that each affected employee has received the required respiratory protective equipment and understood the training.

G. FIT-TESTING

1. Respirator users are to be fit-tested:

a. When the employee is assigned a respirator.

b. On an annual basis (no more than one year may elapse between fit tests)

c. When the employee is assigned a respirator of a different make, type or size from that previously tested.

2. Fit-testing will be performed by OSHEM.

3. A signed written copy of the fit test results shall be obtained by the employee, supervisor and Safety Coordinator. The fit test record shall include:

   a. Employee's name and social security number or employee number;

   b. Respirator brand, model and size fitted for;

   c. Date of fit-test;

   d. Method of fit-testing used;

   e. Manufacturer and serial number of fit testing apparatus if quantitative fit test is employed.

   f. Name and signature of fit-tester; and

   g. Statement that fit test protocol met the requirements of 29 CFR 1910.134.

H. RECORDS AND REPORTS

1. Medical evaluation certification, exposure assessment reports and related JHA information, will be maintained by OSHEM for duration of employment plus 30 years, for each employee required to wear respiratory protective equipment.

2. Training and fit-test records will be maintained by the facility for a minimum of 5 years.

3. All respirators maintained for use in emergency situations shall be inspected at least monthly in accordance with the manufacturer's recommendations. Documentation of inspections for respirators maintained for emergency use shall be provided on a tag or label attached to the storage compartment for the respirator, kept with the respirator, or included in inspection reports stored as paper or electronic files.

I. REFERENCES

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2. CDC, NIOSH, “NIOSH Respirator Decision Logic 2004.” NIOSH Publication No. 2005-100. http://www.cdc.gov/niosh/docs/2005-100/default.html

3. D.L. Cyr and S.B. Johnson, Ph.D. National Ag Safety Database (NASD), University of Maine Cooperative Extension, “Care of Respirators.” NASD Review 04/2002. NASD: Care of Respirators
4. OSHA 29 CFR 1910.134, “Respiratory Protection Standard.”
5. OSHA, “Respiratory Protection Advisor: Respirator Change Schedules,’ www.osha.gov/SLTC/etools/respiratory/change_schedule.html
6. OSHA, “Respiratory Protection e Tool: Breakthrough Software.” www.osha.gov/SLTC/etools/respiratory/advisor_genius_wood/breakthrough.html
7. OSHA, “Respiratory Protection.” OSHA 3079, Revised 2002. www.osha.gov/Publications/OSHA3079/osha3079.html
8. NIOSH 42 CFR Part 84, “Respiratory Protective Devices.” June 2, 1995. www.cdc.gov/niosh/pt84abs2.html
9. University of Chicago, Occupational Safety and Health Programs, Safety *Manual*, “Section 3.6: Respiratory Protection Program.” Revised 03/23/06. http://safety.uchicago.edu/3_6.html
10. University of North Carolina at Chapel Hill, Environment, Health & Safety *Manual*. “Chapter 4: Respiratory Protection Program.” Last reviewed 1998. http://ehs.unc.edu/*Manual*s/ehs*Manual*//4-18.html

Smithsonian Institution Respirator Authorization Request

STEP 1 -- RESPIRATOR REQUEST

Employee Name_____

Occupation_____Initial Date of Employment_____

Location_____Phone #_____FAX #_____

Supervisor_____Phone#_____MRC_____

Explain why the Employee requires a Respirator:

_____

_____

_____

Supervisor Signature Date

_____

Safety Coordinator Signature Date

(Both signatures are required)

Safety Coordinator=s Instructions: Upon completion of step 1, send the form to the OSHEM/EMD, MRC 932.

****

STEP 2 - RESPIRATOR SELECTION CRITERIA REVIEW

Reason requested: ___Potential overexposure/or ___Odor/comfort*******Is this an Initial request?___YES ___NO

Type of Operation:

_____

Chemical Exposure (s): _____

_____

Exposure Data: _____

_____

PF needed (Min):_____

Asbestos Exposure? Yes___ No___ Confined space? Yes ___ No ___

Ventilation Controls: _____

Eye/Skin Irritation? _____Temperature limits? _____

Odor/warning properties_____O_2 Deficiency? _____

Circle each Model type: **SU HM/AP FF/AP PAPR SCBA SAR**

Face-piece: **Tight-fit Helmet/Hood Abrasive Blast**

Type Filter/Cartridge required:

_____

_____

_____ _____

Industrial Hygienist's Signature Date

****

ANNUAL RECERTIFICATION

No change in exposure data: _____ _____

Industrial Hygienist's Signature Date

No change in exposure data: _____ _____

Industrial Hygienist's Signature Date

STEP 3 - PREPARATION FOR MEDICAL CLEARANCE

Chart review completed by: **(1st)** _____
(2nd)_____
(3rd)_____

Chest X-ray required? **(1st)** Yes___ No___ Notice sent to Supervisor/Individual by: **(1st)** _____
(2nd) Yes___No___ **(2nd)** _____
(3rd) Yes___No___ **(3rd)** _____

Scheduled for clinic (OHS) on: **(1st)** _____ by _____
Date/Time Initials
(2nd) _____ by _____
Date/Time Initials
(3rd) _____ by _____
Date/Time Initials

Other information regarding this appointment: _____

****

Instructions: After Step 3 has been completed, the MSA will hold this form pending clinic appointment, at which time, the request will be attached to the medical file and given to the Nurse or Physician who will conduct the examination. **If Employee does not keep the clinic appointment and does not reschedule in advance, return the form to the Supervisor.**

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STEP 4 - OCCUPATIONAL HEALTH SERVICES CLEARANCE

Approved to wear a respirator? Yes ___ No___ **Expiration Date** upon Approval: **(1st)** _____
(2nd) Yes___ No___ **(2nd)** _____
(3rd) Yes___ No___ **(3rd)** _____

Physician or Licensed Health Professional Signature and Date:

_____ _____
Signature Date

_____ _____
Signature Date

_____ _____
Signature Date

****

Instructions: When the examination has been completed and if the Employee has been medically approved to wear a respirator; return a photocopy of this form to EMD for training and fit-testing. The original is to be filed in the employee's medical record. **If Employee is not medically approved to wear a respirator; return the form to the Supervisor.**

****

Identifying when a Respirator is Needed

Work Area Location:	Date:
Project/Task:	

Answer the questions below for the project/task to be performed. If a "yes" response is checked, consult with the Facility Safety Coordinator to determine:

- If a respirator is truly needed for the job, as well as,
- The type of respirator needed for the job.

MATERIAL USED OR PROCESS TO BE PERFORMED	YES Respirator may be needed	NO	NOTES
Abrasive Blasting • Abrasive blasting (with any type of grit or material) will be performed. • Employee will fill abrasive blasting pots or perform clean-up activities. • Employee will be in a contained area where abrasive blasting is taking place.			
Acids • Liquid or powder acids will be used in a situation where acid vapors, mists or dust may be breathed.			
Adhesives • Aerosol-propelled adhesives are to be used in areas where there is no or insufficient local exhaust ventilation. • Two-part adhesives (mix part one with two, let set then use) are to be used in areas where there is limited ventilation.			
Alkalis/Bases/Caustics • Powdered alkalis will be used in a situation where an airborne dust may be breathed.			
Asbestos Abatement • Asbestos will be removed, repaired or sampled. • Employees will be inspecting or overseeing areas where asbestos will be removed or disturbed.			
Cleaning Compounds • Degreasers or carbon removers will be used in areas where local exhaust ventilation is not provided. • Aerosol propelled cleaning compounds will be used in areas where there is no local exhaust ventilation. • Degreasers or carbon removers will be used in voids, tanks, or other confined spaces.			
Corrosion Preventive Compounds			

• Corrosion prevention compounds, including chemical conversion compounds and corrosion inhibitors, will be used in areas where there is no local exhaust ventilation.			
Detergents/Soaps • Ammonia based detergents will be used in large quantity (more than five gallons) in areas where local exhaust ventilation cannot be provided. • Large quantities (5 or 55 gallon containers) of high pH powder detergent/soap will be used in a situation where dust may be breathed.			
Fuels (including regular or unleaded gasoline, kerosene, diesel fuel, JP-5) • Employees will be inside unventilated fuel cells or other confined spaces containing fuels.			
Grinding, Cutting, Sanding • Cutting, grinding or sanding surfaces that have coatings containing lead, cadmium, chromium, zinc or beryllium. • Cutting, grinding or sanding surfaces that are concrete or glass without use of ventilation or water.			
Hazardous Waste Sites • Employees will be performing tasks on a hazardous waste site that requires the use of respirator (as indicated in the site safety & health plan). • Employees will be performing site assessments on potential hazardous waste sites.			
Hydraulic Fluids (including petroleum-based fluids, synthetic fire-resistant fluids, and water based fire resistant fluids) • Hydraulic fluids and the vapors generated will not be exhausted using local exhaust ventilation. • Synthetic fire-resistant fluids or water-based fire-resistant fluids will be used in an area where the air is contaminated with visible mist or spray from hydraulic fluids.			
Inspection Penetrants (including Flouro-finder, water indicating pastes, and penetrant removers) • An aerosol-propelled inspection penetrant will be used in an area where local exhaust ventilation cannot be provided, or in a situation where the solvent vapors can be breathed.			
Lead Abatement Activities • Lead containing materials will be disturbed, removed or sampled. • Employees will be inspecting or overseeing areas where lead will be removed or disturbed.			

Lubricants/Oils • Aerosol lubricants/oils will be sprayed with no immediate exhaust ventilation.			
Oxidizers (materials that give off oxygen including chlorine laundry bleach, calcium hypochlorite, calcium oxide, oxygen candles, lithium hydroxide, hydrogen peroxide, and sodium dichromate) • Oxidizers containing organic chlorine will be used in a situation where the dusts/vapors may be breathed. • Powdered oxidizers will be used in a situation where airborne dust may be breathed.			
Paint Materials (including paints, primers, thinners, enamels, lacquers, strippers, coatings and varnishes) • Paint materials will be spray applied in areas where there is no local exhaust ventilation. • Two part (mix part a with part b, let set, then apply) polyurethane or epoxy polyamide paints will be brush or spray applied. • Paints containing lead, chromium, cadmium, beryllium, and zinc (refer to the MSDS). • Paint materials will be applied in confined spaces.			
Solvents (including hydrocarbon solvents such as acetone, methyl ethyl ketone, toluene, xylene, and alcohols, as well as mixed solutions like antifreeze, heat transfer fluid, turpentine, dope and naphtha thinner) • Local exhaust ventilation will not be provided and work will involve breathing solvent vapors. • Solvents will be used within confined spaces. • Solvents will be applied using aerosols.			
Thermal Insulation (including asbestos & non-asbestos materials like pipe lagging, fiberglass insulation, boiler insulation, packing materials and floor/ceiling tiles) • Insulation will be disturbed, removed or sampled.			
Water Treatment Chemicals (includes corrosive chemicals such as tri-sodium phosphate, hardness buffer, titrating solution, morpholine, caustic soda, citric acid and nitric acid as well as toxic chemicals such as mercuric nitrate, hydrazine, EDTA and sodium nitrate) • Morpholine, EDTA, or harness buffer/titrating solution is to be used in poorly ventilated spaces. • Powdered water treatment chemicals will be used in a situation where chemical dusts may be breathed.			

Welding/Brazing • Welding will be performed in confined spaces. • Welding galvanized metal or stainless steel. • Brazing with cadmium or lead. **For Any of The Above Listed Activities** • A employee will be in the immediate area - within 10 feet of the job or operation, or • Employee will be inside confined space where activities are taking place, or • Employee will be inside a "controlled area" such as found in asbestos abatement, lead abatement, radiation control area, or a hazardous waste site.			
Material Safety Data Sheets • For any chemical product used, a respirator is recommended.			
Product Labels • For any chemical or process that indicates respirators should be used.			
Product Use Instructions • For any product used, instructions indicate a respirator should be used.			
Standard Operating Procedures • A Standard Operating Procedure indicates the use of a respirator.			

Respirator Cartridge Change Schedule

A Respirator Cartridge Change Schedule must be developed for cartridges or canisters used with air purifying respirators that do not have an End of Service Life Indicator (ESLI). The purpose of this is to prevent contaminants from breaking through the respirator's sorbent cartridge(s), and thereby over-exposing employees. Examples of cartridges that have NIOSH approved ESLIs include:

Mercury vapor;
Carbon monoxide;
Ethylene oxide; and
Hydrogen sulfide.

Historically, respirator wearers have relied on the warning properties (e.g., odor, irritation) of a contaminant to dictate cartridge change. OSHA no longer allows the use of warning properties as the sole basis for changing respirator cartridges. The following factors shall be considered when developing a Respirator Cartridge Change Schedule:

Contaminants;
Concentration;
Frequency of use (e.g., continuously, intermittently) throughout the shift;
Temperature;
Humidity;
Work rate; and
The presence of potentially interfering chemicals.

The worst case conditions shall be assumed to avoid early breakthrough. The development of a Respirator Cartridge Change Schedule shall be documented in the Facility/Project-Specific Respiratory Protection Plan.

Sources of Help

Manufacturer - 3M has an interactive “Cartridge Service Life” program that may be downloaded for free: www.mmm.com/market/safety/ohes2/index.html

This program will estimate cartridge service life for 3M products against many contaminants. The program does not evaluate the service life against mixtures (multiple contaminants).

OSHA – OSHA provides a Math Model “eTool” in their “Respiratory Protection Advisor – Respirator Change Schedules,” which may be used to estimate cartridge service life. The Math Model may be downloaded for free: www.osha.gov/SLTC/etools/respiratory/change_schedule.html

General Respirator Cartridge Change Schedule Evaluation Information

If the chemical's boiling point is >70°C and the concentration is less than 200 ppm, a service life of 8 hours at a normal work rate may be expected.

Service life is inversely proportional to work rate.

Reducing concentration by a factor of 10 will increase service life by a factor of 5.

Humidity above 85% will reduce service life by 50 %.

Because of the complexity in evaluating mixtures, OSHA offers the following guidance:

> When the individual compounds in the mixture have similar breakthrough times (i.e., within one order of magnitude), the service life of the cartridge should be established assuming the mixture stream behaves as a pure system of the most rapidly migrating component with the shortest breakthrough time (i.e., sum up the concentration of the components).
>
> Where the individual compounds in the mixture vary by two orders of magnitude or greater, the service life may be based on the contaminant with the shortest breakthrough time.

OSHA Interpretation

The OSHA inspection procedures for the respiratory protection standard specifies that where contaminant migration is possible, respirator cartridges/canisters shall be changed after each work shift where exposure occurs, unless there is objective data to the contrary (e.g., desorption studies) showing the performance in the conditions and schedule of use/non-use found in the workplace.

Attachment 4

Information for Employees Using Filtering Facepiece Respirators (more commonly known as "disposable dust masks")

Prepared by the SI Office of Safety, Health and Environmental Management (OSHEM)

Respirators are an effective method of protection against specific hazards when properly chosen and worn. Even when your exposures are well below the maximum allowable health limits established by SI policy, the use of respirators may offer you an added level of comfort and protection. Most departments purchase "dust masks" without realizing that these simple devices are still part of the SI Respirator Program. Their use needs to be reviewed by your supervisor, safety manager and SI OSHEM to be sure that they are appropriate for the hazard. "Dust masks" that are purchased for a comfort reason, and not tracked by your safety manager or left in storage on a common shelf, are often mistakenly worn in a different, more hazardous operation, possibly resulting in injury or illness. Your supervisor is still responsible for the proper selection and use of any type of personal protective equipment…..even "disposables".

If your supervisor, Safety Coordinator, and OSHEM have approved the use of filtering facepiece respirators (FFP) or "dust masks" for your use in your job, you should know the following:

- ✓ If the FFP/dust mask is worn voluntarily, and not because there is an overexposure risk, your supervisor needs to identify the users to OSHEM. And, you need to wear it safely and keep it clean. Dispose of respirator after use, when soiled or at the end of the work shift.
- ✓ If the FFP/dust mask is <u>required</u> based on facility and OSHEM evaluation, you need to be medically evaluated and properly fitted for even the disposable respirator type. Your supervisor can arrange this through OSHEM.
- ✓ The FFP/dust mask is designed to filter exactly that: Dust and particulates. It will **NOT** protect you against gases or chemical vapors or odors such as from ammonia, chlorine, cleaning sprays or polishes. If those chemicals bother you during work, check with your supervisor so that better ventilation, different work methods, or a different respirator can be provided.
- ✓ Filters are rated for how well they holdup in oil-mist atmospheres and how well they capture particles. The most commonly used types are either a "N95" (95% efficiency) or "P100" (almost 100% particle capture). N95 might be appropriate for common cleaning tasks. P100 might be worn for protection against allergens or heavy dusting. ***NOTE: no filter will protect you if it doesn't provide a tight faceseal or is worn over a beard.***
- ✓ Read all instructions provided by the manufacturer on use, maintenance, and warnings as to the FFP/dust mask's limitations. The packaging for the FFP/dust mask will tell you what the respirator is to be used for, and **must state** that the FFP is certified by the National Institute for Occupational Safety and Health (NIOSH) of the U.S. Department of Health and Human Services.

I have read and understand this information on: _____ (date)

Employee's Name & Signature: _____