

California Institute of Technology

**RESPIRATORY PROTECTION
PROGRAM**



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January 20, 2014

RESPIRATORY PROTECTION PROGRAM

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PURPOSE

The purpose of the Respiratory Protection Program is to ensure protection to Institute employees from inhalation of harmful substances. Respirators may be necessary in some situations when effective engineering controls are not feasible. This program complies with Title 8 of the California Code of Regulations, § 5144, Respiratory Protection.

SCOPE

This program applies to all Institute faculty, staff, and students who need to wear respirators during normal and non-routine work operations.

RESPONSIBILITIES

SUPERVISORS

The Supervisors' responsibilities under the program include:

- Identifying employees and students subjected to hazardous conditions that may require the use of a respirator.
- Ensuring affected employees are aware of specific respirator requirements in their area.
- Ensuring employees comply with the program requirements.
- Implementing disciplinary procedures for employees who do not comply with the respirator requirements.
- Making respirators available for authorized users.
- Ensuring that training is administered to respirator users.

RESPIRATOR USERS

Respirator Users' responsibilities under the program include:

- Completing the appropriate medical evaluation, training and fit testing.
- Ensuring that the respirator is properly maintained, cleaned and stored.
- Wearing the respirator in an appropriate manner.
- Reporting any problems associated with wearing the respirator.
- Inspecting the respirator before each use.
- Reporting any malfunction of the respirator to his/her supervisor.

ENVIRONMENT, HEALTH, AND SAFETY OFFICE

The Environment, Health, and Safety Office (EH&S) oversees the Respiratory Protection Program. EH&S's responsibilities under the program include:

- Performing hazard assessments.
- Selecting and issuing suitable respiratory protection options.
- Conducting training and fit-testing.
- Maintaining training and fit testing records.
- Evaluating the effectiveness of the program.

LICENSED HEALTH CARE PROFESSIONAL (PLHC'P):

Pasadena Urgent Care and St. George's Medical Center are the occupational health providers responsible for:

- Evaluating the health of Institute employees.
- Performing initial and necessary follow-up examinations to determine ability to wear a respirator.
- Providing a written evaluation of the employee's ability to use a respirator to Caltech's EH&S Office.
- Maintaining records of such evaluations.

RESPIRATOR SELECTION

Caltech's EH&S Office determines the type of respirator necessary for a given task. The decision is based on a hazard assessment of the task (See [Appendix A - Hazard Assessment and Respirator Selection](#)). The hazard assessment takes into account the expected chemical hazard, exposure levels, and engineering controls in place. Respirator selection considers the elements:

- Effectiveness of the device against the substance(s) of concern.
- Estimated maximum exposure concentration.
- General environment.
- Known limitations of respirators.
- Comfort, fit, and worker acceptance.

Only respirators certified by the National Institute of Occupational Safety and Health (NIOSH) will be issued. A number of respirator sizes and models are provided through EH&S for selection purposes. Respirators may be half or full-face air purifying respirators, powered air purifying respirators (PAPR), supplied air respirators, or self-contained breathing apparatus (SCBA) (See [Appendix B - Types of Respirators](#)). When recommending an air-purifying respirator, the appropriate filter types will be selected. Cartridge change schedules will be issued as appropriate. Respirator selection is documented. Departments purchase and maintain appropriate respirators and supplies. Respirators and replacement cartridges and filters can be obtained from the EH&S Office.

MEDICAL EVALUATION

Employees are not allowed to wear respirators, even on a voluntary basis, unless they are physically able to perform their work while wearing the equipment. A licensed health care professional from one of the Caltech occupational health providers determines respiratory protection restrictions, if any, based on the individual's physical status (See [Appendix C - Physical Status Questionnaire](#)), supplemental information provided by the Institute, and medical tests, as appropriate. The occupational physician, in accordance with OSHA medical surveillance requirements, determines specific medical tests and procedures. Tests and procedures will be reviewed periodically. Follow-up medical examinations shall be provided for an employee whose initial medical questionnaire or medical examination demonstrates the need for a follow-up medical examination. Supplemental information provided to the health care professional by the Institute includes:

- The type and weight of the proposed respirator.
- The duration and frequency of respirator use.
- The expected physical work effort.
- Additional protective equipment and equipment to be worn.
- Temperature and humidity extremes that may be encountered.

The health care professional will provide the Institute and employee written recommendations regarding the employee's ability to use a respirator.

Future evaluations are made when there is a change to workplace conditions increasing an individual's physiological burden, the user reports related medical signs or symptoms, or if there is a recognized need for reevaluation.

Medical evaluations are not required to include those employees whose only use of respirators involves the voluntary use of filtering facepieces (dust masks) in a written respiratory protection program. (See [Appendix F - Information For Employees Using Respirators When Not Required Under The Standard](#)).

TRAINING

Individuals required to wear respirators must receive training and fit testing prior to using the respirator (See [Appendix D](#) - *Training and Fit Testing Record*).

The training program includes:

- Respiratory hazards to which employees are potentially exposed during routine and emergency situations.
- Elements of the program.
- Need for respiratory protection.
- Use and limitations of respiratory protection.
- User responsibilities.
- Medical surveillance.
- Maintenance and storage.
- Medical signs and symptoms limiting the effective use of respirators.

Retraining is administered annually as well as in response to changing conditions or other indications. Training completion is documented by the EH&S Office.

FIT TESTING

Individuals required to wear respirators must be properly fitted and tested to ensure an adequate seal prior to initial use. Respirator Fit Testing and Training are provided upon the successful completion of the Respirator Medical Evaluation. This Training, also known as “fit testing,” is provided through the EH&S Office. The employee or his/her supervisor should arrange with EH&S for an appointment for Respirator Training. Employee shall follow fit testing guidelines as outlined in [Appendix G](#) – *Respirator Fit Testing Guidelines*.

Fit tests are a determining factor in the type, model, and size selection of respirators. The EH&S Office performs fit testing to certify the ability of the user to obtain a satisfactory fit. Users must pass the fit test before final issuance of a respirator. Instructions for performing fit checks in the field are provided to users (See [Appendix E](#) *Respirator Fit Checks*). Additional fit testing is conducted annually and whenever there are changes in the users’ physical condition that could affect respirator fit.

MAINTENANCE AND USE

Inspection, Cleaning, and Repairs

Users who have facial hair or a condition that interferes with the face-to-facepiece seal or valve function cannot wear fitting respirators.

- Personal protective equipment (e.g., safety glasses) must not interfere with the seal of the facepiece to the face of the user.
- Fit checks must be performed prior to each use of a tight-fitting respirator.
- Respirators must be cleaned and disinfected as often as necessary to maintain a sanitary condition. Shared respirators require cleaning and disinfecting prior to each use by a different individual. Emergency respirators must be cleaned after each use.
- Store respirators in a sealed container when not in use. Do not store in such a way that the natural shape of the respirator becomes distorted.
- Respirators shall be inspected before each use and during cleaning. Respirator inspections shall be checked for function, tightness of connections, and the condition of the various parts including, but not limited to, the facepiece, head straps, valves, connecting tube, and cartridges, canisters or filters; and a check of elastomeric parts for pliability and signs of deterioration.

- Respirators that fail an inspection or are otherwise found to be defective are to be removed from service.
- At this time the only respirators at Caltech that might be used in emergency situations are Self-Contained Breathing Apparatus (SCBA), located in Unit 3, the Storage and Supply Facility. In addition to the procedures above, these SCBAs are inspected at least monthly.

Change Schedules

- For protection against gases and vapors, Caltech's EHS Office provides an atmosphere-supplying respirator, or an air-purifying respirator.
- The respirator is equipped with an end-of-service-life indicator (ESLI).
- If no ESLI is indicated, respirator cartridges shall be replaced as indicated below:

Hazard Assessment

Department	Contaminants	Exposure Level (8-hr TWA)	Change-out Schedule	Controls
Biology	Isoflurane / biohazard		Change every 3-4 months Disposable N95 for the biohazard	Ventilated rooms Procedures for the use of Isoflurane/ biohazard
Central Plant	Asbestos Chlorine		Change cartridges when first experience difficulty breathing (i.e., resistance) while wearing the masks	Training Outdoor activity
Chemical Engineering	HF			Chemical is used in a fume hood
Coat/Spray Booth in the Paint Shop	Paint			Spray booths have built in ventilation systems that provide fresh air in the booth while venting out hazardous substances
Engineering and Applied Sciences	Nanoparticles		Change cartridges when first experience difficulty breathing (i.e., resistance) while wearing the masks	Material is wet, in a fume hood, covered when transferred, procedures for the use of nanomaterial Training
Environment, Health, and Safety	Possible IDLH		SCBA	Training
Facilities Management	Asbestos		Change cartridges when first experience difficulty breathing (i.e., resistance) while wearing the masks	Training
Palomar Observatory	Acids		One time use Disposal after single use	Procedures for the use of acids Training

- For protection against particulates, Caltech's EH&S Office provides an atmosphere-supplying respirator, or an air-purifying respirator equipped with a filter as a high efficiency particulate air (HEPA) filter, or an air-purifying respirator equipped with a filter certified for particulates by NIOSH.
- Employees wearing APRs or PAPRs with P100 filters for protection against particulates need to change the cartridges on their respirators when they first begin to experience difficulty breathing (i.e., resistance) while wearing their masks.

PROGRAM EVALUATION

Caltech's EH&S Office will periodically evaluate the effectiveness of the program through workplace evaluations and consultation with respirator users.

RECORDKEEPING

Caltech's EHS Office maintains records of hazard assessments, training, and fit testing. The occupational physician maintains medical records.

APPENDIX A: HAZARD ASSESSMENT AND RESPIRATOR SELECTION

Assessment Performed By:	
Affected Employees:	
Task:	
Date:	
Location:	

I. Job Description:

Routine Emergency

Describe work performed and length of time involved:

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II. Contaminants

Contaminant	Concentration (Measured or Estimated)	Physical State	Exposure Limit	Hazard Ratio	LEL

Exposure Limit: Identify as PEL or TLV (Ceiling and IDLH as applicable)

Hazard Ratio: The quotient of the measured or estimated concentration divided by the appropriate occupational exposure limit. Respiratory protection is required if this value is greater than one and all feasible engineering and work practice controls have been implemented to reduce concentration to as low as possible.

III. Hazard Analysis

Protection Factor Needed:	
Skin Absorption/Irritation:	
Eye Irritation:	
Warning Properties	
Odor Threshold:	
Nose/Throat Irritation:	
Special Considerations:	

IV. Respirator Type Required

Minimum Acceptable:	
Alternative (optional):	

V. Specific Selections

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APPENDIX B: TYPES OF RESPIRATORS

Different types of respirators are designed to protect against specific respiratory hazards. The atmosphere and the air contaminant levels that workers encounter at work dictate the type of respirator that must be worn.

Respirators are available in many types, models and sizes from several manufacturers for a variety of applications. Described below are two major types of respirators: air-purifying respirators and atmosphere-supplying respirators.

AIR-PURIFYING RESPIRATORS

Air-purifying respirators work by removing gas, vapor, particulates, or combinations of gas, vapor, and/or particulates from the air through the use of filters, cartridges, or canisters. To help employees with identifying the specific chemicals that the cartridges are designed for, all filters, cartridges, and canisters must be labeled and color-coded with an approval label provided by the National Institute of Occupational Safety and Health (NIOSH).

Examples of air-purifying respirators include:

- *Filtering facepiece respirators*, which are often called dust masks.
- *Tight-fitting respirators*, which have either a half mask or a full facepiece.
- *Powered air-purifying respirators (PAPRs)* which have a hood, a helmet, a tight-fitting facepiece, or a loose-fitting facepiece. PAPRs have a battery powered blower to supply purified air.

Air-purifying respirators not designed for use in conditions that are immediately dangerous to life or health (IDLH) and must not be used when entering an area that is oxygen deficient ($O_2 < 19.5\%$ by volume). IDLH is a term that is used to describe an atmosphere that poses an immediate threat to life, which would cause irreversible adverse health effects or that would impair a person's ability to escape from a dangerous atmosphere.

ATMOSPHERE-SUPPLYING RESPIRATORS

Instead of filtering out contaminants, as air-purifying respirators do, atmosphere-supplying respirators work by providing clean breathing air from an uncontaminated source. These respirators consist of a hood, a helmet, a tight-fitting closed-circuit type facepiece, or a loose-fitting open-circuit type facepiece. The breathing air is supplied by a compressor or a pressurized cylinder.

Examples of atmosphere-supplying respirators include:

- *Supplied-air respirators (SARs)*, which provide breathing air through an airline from a source outside the contaminated work area.
- *Self-contained breathing apparatuses (SCBAs)*, which allow the user to carry a pressurized (compressed) breathing air cylinder.
- *Combination respirators*, which are SARs that have an auxiliary SCBA that is used to escape from a hazardous environment.
- *Escape-only respirators*, which are intended for use only during an emergency exit.
- Escape-only respirators cannot be used to enter an area that has a hazardous atmosphere.

Continuous flow and pressure demand respirators belong to different classes of atmosphere-supplying respirators. The continuous flow feature provides a continuous flow of breathing air to the respirator inlet covering. The pressure demand feature admits breathing air to the facepiece when the positive pressure inside the facepiece is reduced by inhalation.

Atmosphere-supplying respirators are mostly used in high hazard atmospheres. High-hazard atmospheres can be encountered during emergency situations, chemical spills, very high concentrations of air contaminants, or the use of materials that have poor warning properties.

Atmosphere-supplying respirators must also be used in the following situations:

- In atmospheres for which there are no approved cartridges (e.g., in an atmosphere where methylene chloride is present).
- During certain welding operations that involve toxic metals.
- During procedures that involve abrasive blasting.
- When escaping from a hazardous environment.
- In oxygen-deficient atmospheres.
- In conditions that are IDLH.

NEGATIVE- AND POSITIVE-PRESSURE RESPIRATORS

Both air-purifying respirators and atmosphere-supplying respirators may be further classified on the basis of their functioning as either negative-pressure respirators or as positive-pressure respirators.

Negative-pressure respirators are tight-fitting respirators that work by creating pressure differences between the volume of air inside and outside the respirator. As the wearer of a respirator breathes in, the pressure inside the facepiece is reduced, which forces air from outside the facepiece to be pulled through the inlet covering, to replace what was inhaled. Types of negative-pressure respirators include filter facepiece “dust masks”, half masks, and full-facepiece, air-purifying respirators.

Positive-pressure respirators are respirators that have a breathing air source that pushes air through the inlet covering of the respirator. The pressure inside the respirator exceeds the air pressure outside the respirator.

Supplied-air respirators provide breathing air independent of the environment. This type of respirator may be selected for conditions where:

- A contaminant does not have sufficient warning properties, or
- The concentration of a contaminant is beyond the design of an air-purifying respirator.

This type of respirator is acceptable for oxygen deficient atmospheres. Classifications of supplied-air respirators are:

- **Demand:** Air is supplied to the user during inhalation (demand) which creates negative pressure in the facepiece. Leakage into the facepiece is possible if there is a poor respirator-to-face seal.
- **Pressure-Demand:** A continuous positive pressure is maintained within the facepiece. This positive pressure prevents any leakage into the facepiece.
- **Continuous Flow:** A continuous flow of air is maintained through the facepiece. This continuous flow prevents any leakage into the facepiece.

SELF-CONTAINED BREATHING APPARATUS (SCBA)

This type of respirator provides independence from a fixed source of air. The classifications for SCBA are the same as supplied-air respirators.

ASSIGNED PROTECTION FACTORS

Different types of respirators have different limits on how effective they are in protecting against air contaminants. The assigned protection factor (APF) of a respirator reflects the level of protection that a properly maintained and functioning respirator can be expected to provide

to a population of properly fitted and trained users.

Different types of respirators have different APFs. Tight-fitting, half-mask, air-purifying respirators have the lowest APF, and SCBAs have the highest protection factor. An APF of 10 means that the concentration of air contaminants inside the respirator facepiece is reduced by a factor of 10.

The Institute relies on APFs published by NIOSH and the American National Standards Institute (ANSI). Cal/OSHA has enforceable APFs that are contained in substance-specific health standards.

APFs for Respiratory Types

Respirator Class and Type	OSHA Cadmium Std.	NIOSH
Air Purifying		
Filtering Facepiece	10	10
Half-Mask	10	10
Full-Facepiece	50	50
Powered Air Purifying		
Half-Mask	50	50
Full-Facepiece	250	50
Loose Fitting Facepiece	25	25
Hood or Helmet	25	25
Supplied Air		
Half-Mask-Demand	10	10
Half-Mask-Continuous	50	50
Half-Mask-Pressure Demand	1000	1000
Full-Facepiece Demand	50	50
Full-Facepiece Continuous Flow	250	50
Full-Facepiece Pressure Demand	1000	2000
Loose Fitting Facepiece	25	25
Hood or Helmet	25	25
Self-Contained Breathing Apparatus (SCBA)		
Demand	50	50
Pressure Demand	> 1000	10,000

Cartridge and Canister Warning Systems

The useful service life of a cartridge or canister is defined by how long it provides employees with adequate protection from harmful chemicals in the air. The service life of a cartridge depends on many factors, including environmental conditions (e.g., high humidity), breathing rate, cartridge capacity, the amount of contaminant in the air, and how many hours the cartridge is used.

For air-purifying respirators that protect against gases and vapors, a system must be in

effect that will reliably warn respirator wearers of contaminant breakthrough. These systems include an end-of-service-life indicator (ESLI) or an established and enforced cartridge or canister change schedule. Some cartridges and canisters are equipped with an ESLI system that warns the user of the end of adequate respiratory protection. The indicator is usually a sorbent material that changes color when the cartridge approaches saturation or is no longer effective. However, few cartridges are currently equipped with an ESLI. In this situation, a cartridge or canister change schedule will be developed and provided to the respirator user.

- **ALWAYS FOLLOW THE MANUFACTURER'S INSTRUCTIONS WHEN DETERMINING PROTECTION FACTORS.**
- **NO RESPIRATORS ARE APPROVED FOR ATMOSPHERES WHERE AIRBORNE CONCENTRATIONS MAY EXCEED 25% OF THE LOWER EXPLOSIVE LIMITS.**

APPENDIX C: PHYSICAL STATUS QUESTIONNAIRE

CALIFORNIA INSTITUTE OF TECHNOLOGY

ENVIRONMENT, HEALTH, AND SAFETY SERVICES

– Respirator Medical Evaluation Questionnaire –

Once you have completed all applicable sections of this questionnaire, please FAX it to:
Pasadena Community Urgent Care
Fax: 626.270.2496
Attn: Occupational Health / Dr. Manoogian

Date (MM/DD/YYYY)	Name (Last, First)	Caltech UID No.	
Address	City, State	Zip Code	
Telephone () -	Job Title	Sex Male <input type="checkbox"/> Female <input type="checkbox"/>	Age
Height Ft. in.	Weight Lbs.	Best time to reach you _____	
Type of Respirator to be Worn (you can check more than one category): <input type="checkbox"/> N, R, or P Disposable Respirator (filter-mask, non-cartridge type only) _____ <input type="checkbox"/> Other Type (for example, half- or full-facepiece type, powered-air purifying, supplied-air) _____			
Have you ever worn a respirator before? <input type="checkbox"/> Yes <input type="checkbox"/> No If you have worn a respirator before, what type? _____			
Do you currently smoke tobacco or have you smoked tobacco in the last month? <input type="checkbox"/> Yes <input type="checkbox"/> No			

1. Have you ever had any of the following conditions?			
Seizures (fits) <input type="checkbox"/> Yes <input type="checkbox"/> No	Diabetes (sugar disease) <input type="checkbox"/> Yes <input type="checkbox"/> No		
Allergic reactions that interfere with breathing <input type="checkbox"/> Yes <input type="checkbox"/> No	Claustrophobia (fear of closed in spaces) <input type="checkbox"/> Yes <input type="checkbox"/> No		
Trouble smelling odors <input type="checkbox"/> Yes <input type="checkbox"/> No	Asbestosis <input type="checkbox"/> Yes <input type="checkbox"/> No		
Asthma <input type="checkbox"/> Yes <input type="checkbox"/> No	Chronic Bronchitis <input type="checkbox"/> Yes <input type="checkbox"/> No		
Emphysema <input type="checkbox"/> Yes <input type="checkbox"/> No	Pneumonia <input type="checkbox"/> Yes <input type="checkbox"/> No		
Tuberculosis <input type="checkbox"/> Yes <input type="checkbox"/> No	Silicosis <input type="checkbox"/> Yes <input type="checkbox"/> No		
Pneumothorax (collapsed lung) <input type="checkbox"/> Yes <input type="checkbox"/> No	Lung cancer <input type="checkbox"/> Yes <input type="checkbox"/> No		
Broken ribs <input type="checkbox"/> Yes <input type="checkbox"/> No	Any chest injuries or surgeries <input type="checkbox"/> Yes <input type="checkbox"/> No		
Any other lung problems <input type="checkbox"/> Yes <input type="checkbox"/> No	Heart Disease <input type="checkbox"/> Yes <input type="checkbox"/> No		
Stroke <input type="checkbox"/> Yes <input type="checkbox"/> No	Angina <input type="checkbox"/> Yes <input type="checkbox"/> No		
Heart Failure <input type="checkbox"/> Yes <input type="checkbox"/> No	Swelling in the legs or feet (not caused by walking) <input type="checkbox"/> Yes <input type="checkbox"/> No		
Heart arrhythmia (irregular heart beat) <input type="checkbox"/> Yes <input type="checkbox"/> No	High Blood Pressure <input type="checkbox"/> Yes <input type="checkbox"/> No		
Any other heart problems <input type="checkbox"/> Yes <input type="checkbox"/> No If YES, please describe:			

2. Are you currently experiencing any of the following symptoms?			
Shortness of breath <input type="checkbox"/> Yes <input type="checkbox"/> No	Shortness of breath when walking fast on level ground or on a slight incline <input type="checkbox"/> Yes <input type="checkbox"/> No		
Shortness of breath when walking with others at an ordinary pace <input type="checkbox"/> Yes <input type="checkbox"/> No	Have to stop for breath when walking at your own pace on level ground <input type="checkbox"/> Yes <input type="checkbox"/> No		
Shortness of breath when washing or dressing yourself <input type="checkbox"/> <input type="checkbox"/>	Shortness of breath that interferes with your job <input type="checkbox"/> Yes <input type="checkbox"/> No		
Coughing that produces phlegm <input type="checkbox"/> Yes <input type="checkbox"/> No	Coughing that wakes you early in the morning <input type="checkbox"/> Yes <input type="checkbox"/> No		
Coughing that occurs mostly when laying down <input type="checkbox"/> Yes <input type="checkbox"/> No	Coughing up blood in the past month <input type="checkbox"/> Yes <input type="checkbox"/> No		
Wheezing <input type="checkbox"/> Yes <input type="checkbox"/> No	Wheezing that interferes with your job <input type="checkbox"/> Yes <input type="checkbox"/> No		
Chest pain when you breathe deeply <input type="checkbox"/> Yes <input type="checkbox"/> No	Any other lung problems <input type="checkbox"/> Yes <input type="checkbox"/> No If YES, please describe:		

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ENVIRONMENT, HEALTH, AND SAFETY SERVICES

3. Are you currently experiencing any of the following symptoms?			
Frequent pain or tightness in your chest <input type="checkbox"/> Yes <input type="checkbox"/> No	Pain/tightness in your chest during physical activity <input type="checkbox"/> Yes <input type="checkbox"/> No		
Pain or tightness in your chest that interferes with your job <input type="checkbox"/> Yes <input type="checkbox"/> No	In the past two years have you noticed your heart skipping or missing a beat <input type="checkbox"/> Yes <input type="checkbox"/> No		
Heartburn or indigestion that is not related to eating <input type="checkbox"/> Yes <input type="checkbox"/> No	Any other symptoms related to the heart or circulation? <input type="checkbox"/> Yes <input type="checkbox"/> No If YES, please describe:		
4. Do you currently take medication for any of the following problems?			
Breathing or lung problems <input type="checkbox"/> Yes <input type="checkbox"/> No	Heart trouble <input type="checkbox"/> Yes <input type="checkbox"/> No		
Blood Pressure <input type="checkbox"/> Yes <input type="checkbox"/> No	Seizures <input type="checkbox"/> Yes <input type="checkbox"/> No		
Are you taking any other medications for any other reason? <input type="checkbox"/> Yes <input type="checkbox"/> No			
5. Have you ever had any of the following problems while using a respirator?			
I have never used a respirator <input type="checkbox"/> (Skip to the next section)		Eye irritation <input type="checkbox"/> Yes <input type="checkbox"/> No	
Anxiety <input type="checkbox"/> Yes <input type="checkbox"/> No		Skin allergies or rashes <input type="checkbox"/> Yes <input type="checkbox"/> No	
General weakness or fatigue <input type="checkbox"/> Yes <input type="checkbox"/> No		Any other problem that may interfere with your use of a respirator <input type="checkbox"/> Yes <input type="checkbox"/> No If YES, please describe:	
6. Have you ever worked with any of the materials or under any of the conditions listed below? If yes, describe exposure.			
Hazardous Solvents <input type="checkbox"/> Yes <input type="checkbox"/> No	Hazardous airborne chemicals (Gasses, Fumes, Dust) <input type="checkbox"/> Yes <input type="checkbox"/> No		
Asbestos <input type="checkbox"/> Yes <input type="checkbox"/> No	Silica <input type="checkbox"/> Yes <input type="checkbox"/> No		
Tungsten / Cobalt <input type="checkbox"/> Yes <input type="checkbox"/> No	Beryllium <input type="checkbox"/> Yes <input type="checkbox"/> No		
Aluminum <input type="checkbox"/> Yes <input type="checkbox"/> No	Coal <input type="checkbox"/> Yes <input type="checkbox"/> No		
Iron <input type="checkbox"/> Yes <input type="checkbox"/> No	Tin <input type="checkbox"/> Yes <input type="checkbox"/> No		
Dusty Environments <input type="checkbox"/> Yes <input type="checkbox"/> No	Any other hazardous exposures <input type="checkbox"/> Yes <input type="checkbox"/> No		
7. Work Experience			
List any second jobs or side businesses:		List your previous occupations:	
List your hobbies:		Have you ever been in the military service? If YES, were you exposed to biological or chemical agents? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Have you ever worked on a HAZMAT team? <input type="checkbox"/> Yes <input type="checkbox"/> No			
8. Respirator Information			
How often will you use the respirator?		What length of time will you use your respirator?	
What type of work will you be performing while wearing the respirator?		Will the respirator be used in extreme temperatures and / or humidity? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (For example, confined spaces):			
<i>Note: Weight of respirator to be used is 0.5 – 2 lbs.</i>			
9. Will you be using any of the following with your respirator?			
HEPA Filters <input type="checkbox"/> Yes <input type="checkbox"/> No	Canisters <input type="checkbox"/> Yes <input type="checkbox"/> No		
Cartridges <input type="checkbox"/> Yes <input type="checkbox"/> No	Protective clothing or equipment <input type="checkbox"/> Yes <input type="checkbox"/> No		
If YES, please list _____			
10. How are you expected to use your respirator? (Check all that apply)			
<input type="checkbox"/> Escape only (No Rescue)	<input type="checkbox"/> Emergency rescue only	<input type="checkbox"/> Less than 5 hours per week	<input type="checkbox"/> Less than 2 hours per day
<input type="checkbox"/> 2 to 4 hours per day	<input type="checkbox"/> Over 4 hours per day	<input type="checkbox"/> Under hot conditions	<input type="checkbox"/> Under humid conditions
<input type="checkbox"/> Doing light work (e.g. sitting,	<input type="checkbox"/> Doing moderate work (e.g. sitting while	<input type="checkbox"/> Doing heavy work (e.g. heavy lifting,	

writing, typing) if Yes, for how long during the shift?	nailing, assembly work, walking) if Yes, for how long during the shift?	shoveling, walking up an incline) if Yes, for how long during the shift?
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CALIFORNIA INSTITUTE OF TECHNOLOGY
ENVIRONMENT, HEALTH, AND SAFETY SERVICES

The following questions must be answered by every employee who has been selected to use either a **full-face piece respirator** or a **self-contained breathing apparatus (SCBA)**.

I will not be wearing a full-face respirator or a self-contained breathing apparatus (SCBA) (If checked, skip this section)

11. Do you currently have any of the following vision problems?			
Loss of vision in either eye	<input type="checkbox"/> Yes <input type="checkbox"/> No	Wear contact lenses	<input type="checkbox"/> Yes <input type="checkbox"/> No
Wear glasses	<input type="checkbox"/> Yes <input type="checkbox"/> No	Color blind	<input type="checkbox"/> Yes <input type="checkbox"/> No

12. Are you currently experiencing any of the following hearing problems?			
Ear injury including broken ear drum	<input type="checkbox"/> Yes <input type="checkbox"/> No	Wear a hearing aid	<input type="checkbox"/> Yes <input type="checkbox"/> No
Difficulty hearing	<input type="checkbox"/> Yes <input type="checkbox"/> No	Any other hearing problems	<input type="checkbox"/> Yes <input type="checkbox"/> No

13. Are you currently experiencing any of the following musculoskeletal problems?			
Back injury	<input type="checkbox"/> Yes <input type="checkbox"/> No	Back pain	<input type="checkbox"/> Yes <input type="checkbox"/> No
Weakness in any of your arms, hands, legs, or feet	<input type="checkbox"/> Yes <input type="checkbox"/> No	Difficulty fully moving your arms or legs	<input type="checkbox"/> Yes <input type="checkbox"/> No
Pain or stiffness when you lean forward or backward at the waist	<input type="checkbox"/> Yes <input type="checkbox"/> No	Difficulty fully moving your head up or down	<input type="checkbox"/> Yes <input type="checkbox"/> No
Difficulty fully moving your head side to side	<input type="checkbox"/> Yes <input type="checkbox"/> No	Difficulty bending at your knees	<input type="checkbox"/> Yes <input type="checkbox"/> No
Difficulty squatting to the ground	<input type="checkbox"/> Yes <input type="checkbox"/> No	Difficulty climbing a flight of stairs or a ladder carrying more than 25 lbs.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Any other muscle or skeletal problem that interferes with using a respirator		<input type="checkbox"/> Yes <input type="checkbox"/> No	

14. Would you like to talk with the health care professional who will review this questionnaire about your answers to this questionnaire?	<input type="checkbox"/> Yes <input type="checkbox"/> No
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Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

If you have any questions about any portion of this questionnaire please contact the Environment, Health, and Safety Office at extension 6727. This questionnaire will be reviewed by an Occupational Health Physician and the Environment, Health, and Safety Office will be contacted regarding your medical clearance to wear a respirator. You will be contacted by the Physician directly if s/he has any questions or if further medical evaluation is deemed necessary.



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TO THE CALTECH COMMUNITY SINCE 1947*

APPENDIX D: TRAINING & FIT TESTING RECORD

Name _____ Date _____

Department _____

Respiratory Hazards _____

I. Respirator Type

- | | | |
|--|--|--------------------------------|
| <input type="checkbox"/> ½ Face Air Purifying | <input type="checkbox"/> Filtering Facepiece | |
| <input type="checkbox"/> Full Face Air Purifying | <input type="checkbox"/> Full Face PAPR | |
| <input type="checkbox"/> Full Face Supplied Air | <input type="checkbox"/> Full Face SCBA | |
| <input type="checkbox"/> Other _____ | | |
| <input type="checkbox"/> 3M | <input type="checkbox"/> Moldex | |
| <input type="checkbox"/> North | <input type="checkbox"/> Wilson | |
| <input type="checkbox"/> Other _____ | | |
| <input type="checkbox"/> Small | <input type="checkbox"/> Medium | <input type="checkbox"/> Large |

II. Training

- Video Previewed

III. Qualitative Fit Test

TEST:

Negative Fit Test

Positive Fit Test

Sensitivity Test:

Isoamyl Acetate

Saccharin #Squeezes: 10 20 30

Fit Test:

Isoamyl Acetate (Organic Vapor Filter)

Saccharin (Particulate Filter)

RESULTS:

Pass Fail N/A

Comments:

Repeat Fit Test Before: _____

Test Conductor: _____ Employee Signature: _____

PTA Account: _____

Date Billed _____ Amount: _____

Entered into database _____

APPENDIX E: RESPIRATOR FIT CHECKS

Each time a respirator is donned, the user performs positive and negative fit checks. Fit checks are not a substitute for fit testing performed by Caltech's EH&S Office.

NEGATIVE PRESSURE CHECK

This test cannot be performed on all respirators. It can be performed on the facepieces of air-purifying respirators with tight-fitting inlet covers. It can also be performed on SCBA respirators equipped with breathing tubes that can be squeezed at the inlet to prevent passage of air.

To perform the negative pressure check:

- 1 Close the inlet opening. This is addressed by covering the canister, cartridge, or filter with the palm of the hand or squeezing the inlet tube.
- 2 Inhale gently and hold for at least 10 seconds.

The facepiece should collapse slightly with no detectable inward leakage of air into the facepiece. It can be reasonably assumed that the respirator is properly positioned and the exhalation valve and facepiece are not leaking.

POSITIVE PRESSURE CHECK

This test cannot be performed on all respirators. Respirators with exhalation valves can be tested. To perform the positive pressure check:

- 1 Close the exhalation valve or breathing tube with the palm of the hand.
- 2 Exhale gently.

A properly positioned facepiece will build up a slight positive pressure. There should be no detection of outward leakage between the sealing surface of the facepiece and the face.

APPENDIX F: 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. 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 respirators are for voluntary use, or if employee provides his/her own respirator, he/she needs to take certain precautions to be sure that the respirator itself does not present a hazard.

Respirator wearer should:

- 1 Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators' limitations.
- 2 Choose respirators certified for use to protect against the contaminant of concern.
- 3 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 wearer what the respirator is designed for and how much it will protect him/her.
- 4 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.
- 5 Keep track of your respirator so that you do not mistakenly use someone else's respirator.

APPENDIX G: RESPIRATOR FIT TESTING GUIDELINES

A “fit test” tests the seal between the respirator’s facepiece and your face. It takes about fifteen to twenty minutes to complete and is performed at least annually. After passing a fit test with a respirator, you must use the exact same make, model, style, and size respirator on the job.

- 1 Respirator wearers with facial hair will need to remain clean shaven (in facial seal areas) so that a respirator can be worn. See below.
- 2 Employees need to bring any type of PPE usually worn when performing the job involving respirators. e.g. Safety glasses.
- 3 Respirator wearer may not eat, drink (except for plain water), smoke, or chew gum for 15 minutes before the test.

