CHAPTER 15

RESPIRATORY PROTECTION PROGRAM

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15.0 INTRODUCTION

The California Occupational Safety and Health Administration (Cal-OSHA) regulations, (General Industry Safety Orders [GISO] 8CCR Section 5144, Respiratory Protection Equipment [RPE]) and good safety practice require employers who use respirators to follow a Respiratory Protection Program (RPP). The components of the program should ensure the health and safety of employees.

15.1 PURPOSE

The purpose for an RPP is to protect the employee's respiratory system (lungs) from inhaling harmful airborne materials found in the workplace. The respirator user shall understand the different types of airborne contaminants and their physical characteristics as well as the basic properties of atmospheric hazards. These items are required for consideration in choosing the appropriate respiratory protection.

15.2 ROLES AND RESPONSIBILITIES

The Headquarters Office of Health and Safety Services (H&S) administers the Caltrans' RPP and provides guidance on the selection of respiratory equipment, updates the statewide training program and evaluates the effectiveness of the program. H&S will also provide assistance to districts, divisions, and programs, and conduct periodic training-for-trainers classes.

Program Administrator for the RPP is the supervisor for a particular work group. His/her primary responsibility under the RPP is to manage and ensure compliance with the respiratory protection standard and the use and application of the respirators at the workplace. The program administrator shall maintain the Respirator Medical Certificate, exposure data records, training and fit-testing documents. The administrator may request assistance (e.g., consultation, instruction, training, fit-testing, etc.) from the other program's safety liaisons or district safety officers to ensure employee safety.

District Safety Officers (DSO) oversee the program in their respective districts and ensure that qualified trainers are available for district personnel.

Division Safety Liaison personnel oversee the program in their respective districts and ensure that qualified trainers are available in their areas.

Managers and supervisors ensure that employees are protected from exposure to harmful airborne materials in the workplace.

If respiratory protection is used, managers/supervisors are responsible to:

- Ensure that all employees who wear RPE are trained in accordance with the instructions contained in this chapter;
- Ensure that the correct RPE is available;
- Ensure that employees use the correct RPE as needed to perform their assigned duties; and
- Arrange for initial and annual fit tests and medical evaluations, and maintain the applicable training, fitting, medical, and exposure records.

Employees who use RPE are responsible to:

- Correctly use the RPE when needed (or directed to) and to ensure that it remains in good condition;
- Clean, inspect, maintain, and properly store their equipment; and
- Follow the facial hair policy.

15.3 REQUIREMENTS OF THE RESPRIATORY PROTECTION PROGRAM

State law requires that any Caltrans employee who performs pesticide spraying must receive respirator training as required in Title 3, the California Code of Regulations, Section 6739, Respiratory Protection.

These requirements apply to all Caltrans respirator users, whether voluntary or required except for voluntary use of dust masks. Employees who voluntarily wear nontoxic particle masks (dust masks/ filtering facepieces) as a "comfort measure" and not as a mandatory respirator are not required to have a medical evaluation or fit test. However, they must still comply with the Caltrans Dust Mask Guidelines (see the end of this chapter); be trained in the proper use and limitations of dust masks; comply with the facial hair policy; and use National Institute of Safety and Health (NIOSH)-approved RPE.

Prior to using a respirator, every Caltrans employee shall complete the following:

- Pass an appropriate medical evaluation by a physician or other licensed health care professional (PLHCP) upon initial assignment and annually thereafter;

- Receive training initially and at least annually thereafter in the proper use, selection, maintenance, sanitation, and storage of the used and/or assigned RPE. This includes review of the facial hair policy;

- Be properly fit-tested initially and at least annually thereafter in the assigned RPE. (NOTE: This applies only if tight-fitting respirators are being worn); and

- Use only NIOSH-approved RPE.

Respirator Facial Hair Policy

Prior to wearing any tight fitting respirator (e.g., cartridge respirators, dust masks, gas masks, other tight fitting masks), all Caltrans employees will be required to shave off any facial hair below the upper lip and any additional hair that interferes with the face-to-respirator seal.

Shaving is not required of employees wearing only loose fitting or Powered Air Purifying Respirators (PAPRs) (e.g., sand blasting helmets, PAPR welding helmets, Tyvek hoods, other loose fitting hoods); however, any hair or beard that interferes with wearing the respirator or extends past the neck area seal must be trimmed.

This policy applies to both required and voluntary respirator users, including dust masks.

Eyewear and Contact Lens Requirements

Eyewear worn with RPE must not interfere with the face-to-facepiece seal. If full-face respirators are worn, special eyeglass lens holders must be used. Contact lenses will not be worn when respirator use is required, unless the respirator design will prevent eye contact (i.e. full-face, hood, helmet, etc.).

Safety glasses must be worn if a respirator will be worn during grinding or welding operations. However, safety glasses are not necessary if the respirator is equipped with lenses or shields specifically designed and labeled as providing appropriate protection.

15.4 MEDICAL EVALUATION AND CLEARANCE

Employees are required to have a medical evaluation before respirator use. The evaluation shall be performed by a PLHCP and is paid for by the Department. DSOs/Safety Liaisons can assist in locating medical clinics and/or hospitals to provide respirator medical evaluation services.

Prior to the evaluation, employees are required to complete the Respirator Medical Questionnaire (described by the supervisor or PLHCP) and provide it to the doctor. This is a confidential document for the doctor's use only. The medical record and questionnaire shall be retained by the physician/clinic. A copy of the Respirator Medical Questionnaire is at the end of this chapter.

The evaluation is conducted to confirm that the employee is both physically and psychologically able to wear a respirator and perform his/her work. Employees will be permitted to be re-examined if they fail the initial test (see Section 15.7). The content and scope of the medical evaluation is determined by the PLHCP based upon his/her observations and an employee's Respirator Medical Questionnaire responses.

The medical evaluation typically includes the following:

Physical Examination:
- Height and weight
- Pulse
- Blood pressure
- Spirometry test results

Pulmonary Function Test - Spirometry:
- Forced Vital Capacity (FVC)
- Forced Expiratory Volume 1 (FEV-1)
- Forced Expiratory Flow (25-75%)

Respirator Medical Certificate

To document that an employee successfully passed the medical evaluation, the Department uses a *Respirator Medical Certificate* form. A copy of this certificate should be given to the employee to hand-carry to the PLHCP at the time of the medical evaluation. A sample of the certificate form is at the end of this chapter.

The *Respirator Medical Certificate* provides space for the PLHCP to verify that the employee has passed the medical evaluation and may use a respirator, or that the employee has not passed the medical evaluation and cannot use a respirator. The *Respirator Medical Certificate* form may be modified to fit specific needs.

The PLHCP must sign a *Respirator Medical Certificate* for the evaluated employee and return it to the supervisor and/or Safety Officer for appropriate action. The supervisor and/or Safety

Officer shall notify the employee of the medical evaluation results and provide them a copy of the certificate.

The supervisor also retains a copy of the certificate. The local Safety Office may maintain an additional copy.

Failing the Respirator Medical Evaluation

If an employee fails the medical evaluation, the supervisor will do the following:

- Temporarily assign the employee modified work that does not require the use of a respirator;
- Administer a second medical evaluation within two (2) months of the initial evaluation. If the employee fails the second evaluation, he/she will continue on a modified work assignment and will not be allowed to use a respirator;
- Administer a third medical evaluation within two (2) months of the second evaluation; and
    - If the employee fails the third evaluation, the supervisor will forward the results of the Pulmonary Function Test – Spirometry to H&S for review by the State Medical Officer. If the State Medical Officer agrees that the employee cannot use respiratory protection, he/she will be reassigned to a non-respirator job assignment. The employee will not be allowed to wear a respirator until he/she has passed a medical evaluation or been cleared by the State Medical Officer.

When the employee passes the medical evaluation, he/she will be allowed to resume duties that require a respirator and no further testing is needed.

15.5 APPROVED RESPIRATORY PROTECTION EQUIPMENT

Only NIOSH-approved RPE will be used by Caltrans employees. Do not use non-manufacturer supplied parts.

For approval, each respirator must pass specific tests based upon established NIOSH standards. NIOSH approval of RPE is based on testing of the entire unit; therefore, all parts, including filters, cartridges, valves, body, gaskets, and straps must be supplied by the original manufacturer. Filter cartridges are not interchangeable between brands. Airline supplied systems include~~s~~ the air supply hose and fittings from the wearer to the breathing air compressor or air supply filter box ("Breather Box"™ or equivalent).

After passing NIOSH tests, a respirator is issued an identification number known as a Testing and Certification (TC) Number. The TC number will appear on the respirator box or in the written guidelines inside the package and on all replacement filters and cartridges that are supplied by the manufacturer. This includes disposable respirators and single-use nontoxic particle masks (dust masks/filtering facepieces).

15.6 TYPES OF RESPIRATORS

The following briefly describes the types of respirators used by Caltrans:

1. **Disposable dust masks**, commonly referred to as"filtering facepieces," are paper-type masks for protection against non-toxic nuisance dusts and mists. They are easy to wear and provide minimal protection. They must have NIOSH approval (TC Number.)

2. **Half-face cartridge respirators** are the most common respirators used by Caltrans employees and have rubber or silicone facepieces that hold the cartridges and fit over the nose and under the chin. They provide moderate protection and are adequate for most minimal exposure situations. But, they **do not** protect the eyes. Half-face respirators are available as reusable or disposable models with a variety of cartridges.

3. **Full-face cartridge respirators** cover from roughly the hairline to below the chin. The seal is more reliable and provides greater protection, including some eye protection. Full-face respirators are available with a variety of cartridges and filters.

4. **Powered air-purifying respirators (PAPRs)** have a battery-powered fan to draw air through a filter(s) and blow it into a hood, helmet, or facepiece. Hoods are generally soft, loose fitting types. However, helmet-type hard hoods are available. Full-face or half-face facepieces can also be used. PAPRs provide moderate protection and are comfortable to wear.

5. **Sandblasting hoods and helmets** generally enclose the person's head in a hard shell and have canvas or leather shrouds attached to cover the shoulders. They serve two functions: to provide fresh air to the wearer; and to protect the head and body from flying particles generated by blasting. They rely on an external compressor or air supply to provide clean air to the wearer through a hose. Most models have neck area seals (NIOSH Type CE) and provide very good protection. Loose fitting models (NIOSH Type C) without neck seals provide moderate protection. Both types are dependent on a continuous supply of the proper quantity of clean air (6+ CFM) to work effectively.

6. **Air-supplied respirators** use external air supplies (air compressor with hoses or carried air tanks) and have tight fitting full facepieces. These include self-contained breathing apparatus (SCBA) and airline respirators and each maintains a positive pressure inside the facepiece and provides the highest level of protection.

15.7 HOW RESPIRATORS WORK

A respirator will either purify the air or supply air for breathing.

Air-purifying -- A filtering system cleans the air being inhaled and removes the contaminants from the surrounding air. This system depends on the surrounding air for oxygen and filters contaminants from the employee's breathing air. It is the easiest to train on and use this type but it has limitations.

There are many types, styles, and shapes including half-face and full-face styles, quarter-masks, dust masks, gas masks, and powered air-purifying types with masks and hoods. They may be single or multiple cartridge/filter styles. This class of respirator includes all types that use filters, cartridges, canisters, or combinations of filters including powered models and dust masks. Before using an air-purifying respirator, the following conditions shall be assured:

- The atmosphere of the work area must contain at least 19.5 percent oxygen;
- An approximate concentration of contaminants must be known to ensure that the respirator's capabilities are not exceeded;
- The concentration of contaminants cannot exceed "Immediately Dangerous to Life and Health" (IDLH) levels (air purifying respirators cannot be used with IDLH materials unless the concentration of the contaminant is known);
- Contaminants must have good warning properties so filter "breakthrough" can be detected;
- Each employee must have been fit-tested to ensure a correct fit and must wear the respirator properly (*exceptions:* dust masks/filtering facepieces being worn voluntarily and respirators using loose-fitting hoods or helmets with neck area seals do not require fit-testing); and
- Each employee must be medically capable of wearing an air-purifying respirator.

Air-supplying -- This type of system supplies its own breathing air through a carried tank or airline independent of the surrounding air. It is used where there is insufficient oxygen in the air or where air-purifying types do not provide enough protection. These systems are used in environments where contaminants are unknown or have poor warning properties and/or where large concentrations of contaminants are expected. This type of system is often difficult to work with, requiring special support equipment and training. The weight and restrictiveness of this class of respirator requires that employees be both physically and psychologically capable to perform the work.

There are two (2) types of air-supplying respirators:

- Tank Supplied -- SCBA respiratory equipment requires the breathing air to be carried in a tank on the wearer's back. (Caltrans employees are no longer authorized to use SCBA respiratory equipment except during Hazardous Materials (Hazmat) Specialist/Technician training and refresher classes provided by the California Specialized Training Institute.)

- Airline Supplied -- An Airline Supplied Respirator respirator has air supplied from an external source such as a hose. The characteristics and restrictions of an airline respirator are described as follows:

Characteristics

- Breathing air is supplied through a hose to the facepiece or hood;
- Positive pressure is maintained inside a mask or hood;
- The device is connected to remote air supplying equipment through an air hose;
- The device does not depend on the same air the employee is working in, so it can be used where air-purifying respirators are not acceptable;
- An unlimited (usually) supply of air is available, so extended-duration work is possible;
- Tight fitting full facepiece types provide maximum protection; loose fitting hoods with neck seals provide good protection; loose fitting hoods without neck seals provide moderate protection; and
- The hood can also provide physical protection from particles; e.g., sandblasting.

Restrictions

- Mobility is limited due to the air hose;
- Vision is restricted (helmet/hoods);
- Specialized training is required;
- Fit tests of tight fitting facemasks are required (*exception:* helmets/hoods);
- Annual medical evaluations are required before use;
- Loose hoods provide lower protection factors and may not be suitable for high concentrations of contaminants;
- Tight fitting facepieces or neck seal helmets/hoods require auxiliary air bottles if used in dangerous/IDLH atmospheres; and
- Special "breathing air" supplying equipment that meets the following requirements is necessary:
  - "Breathing air only" air compressor; or
  - Use of a "Breather Box™" (or equivalent) equipped with inline filters and a carbon monoxide alarm, plus an appropriate inline water/oil pre-filter in accordance with the Airline Supplied Respirator Code of Safe Practices found at the end of this chapter.

Special Note: Although tight fitting **airline supplied respirators** can provide protection from high concentrations of contaminants and dangerous/IDLH atmospheres, it is Caltrans policy that employees **will not enter** into IDLH, explosive, flammable and/or oxygen deficient atmospheres. If there are any questions contact the Division of Human Resources, Office of Health and Safety Services at (916) 227-2640.

15.8 RESPIRATOR AND CARTRIDGE SELECTION

The following factors should be considered when selecting the correct respirator for a particular job:

- Type of air contaminants present (e.g., particles, vapors, gases);
- Hazards of exposure (e.g., IDLH, eye irritant, toxicity, flying particles);
- Warning properties of contaminants;
- Level of exposure during work;
- Exposure time;
- Type of work activity;
- Characteristics and limitations of the respirator equipment; and
- Level of protection needed.

A critical step in determining which respirator to select is identifying the airborne contaminants, which include:

- Gases;
- Vapors (gaseous state of a liquid);
- Particulates;
- Mist (vapor droplets - 40-500 microns);
- Fumes (finely divided particulate from hot processes - .1-1.0 microns);
- Dust (large particulate from solid material .1-25 microns); and
- Combination(s) of gas, vapor, and particulate contaminants.

Note: For comparison purposes, human hair is 18-180 microns, average 80 microns.

Warning Properties – Some airborne contaminants have noticeable odors or tastes, even at very low levels; other materials have no odor or taste at any level.

Olfactory Fatigue – Some materials that are measured at very low levels quickly overwhelm the nose's ability to detect them. This creates a false impression that exposure has ended, when in fact it may be the same or much higher.

Dangerous Atmospheres – Some atmospheres pose serious physical or health hazards beyond toxic effects. These include:

- Flammable Atmosphere – by definition >10 percent of Lower Explosive Limit
- Oxygen Deficient – by definition <19.5 percent oxygen
- Oxygen Enriched – by definition >23.5 percent oxygen
- Immediately Hazardous to Life or Health (IDLH) > IDHL level of contaminant – by definition at this level permanent damage will occur
- Unknown Atmosphere – when contaminants and/or levels of contaminants are unknown

See: NIOSH RESPIRATOR SELECTION DECISION TREE at the end of this chapter.

15.09 RESPIRATOR FIT-TESTING

The fit-test ensures the respirator properly fits the user's face. Face size, gender, and bone structure all affect the face seal and fit. Tight-fitting respirators depend on the face-to-facepiece seal working properly.

Tight fitting cartridge respirators come in three sizes: small, medium, and large. Most people can obtain a good fit with the medium size, but other sizes may be required.

Generally, a full facepiece will fit better than a half-face mask; but for most Caltrans work applications, a half-face mask is acceptable. Dust masks are generally available in only one size.

Before starting the fit-test process, the following conditions must be evaluated:

Facial hair – Respirator users must comply with the facial hair policy (See 15.3). Trimmed moustaches above the upper lip are acceptable if they don't interfere with the valves or extend into the respirator seal area. For loose fitting or neck-seal respirators, hair that interferes with respirator wear or extends past the neck seal must be trimmed;

Eye glasses -- If a respirator user wears glasses, ensure that eyeglasses do not interfere with the facepiece fit or straps. For full-face respirators, a manufacturer's spectacles kit to hold special eyeglass frames in the face-piece is required (Caltrans will provide this equipment if necessary);

Facial irregularities -- Respirator users with facial scars, deep skin creases, prominent cheekbones, or other conditions may have difficulty achieving a proper face-to-facepiece seal. It may be necessary to use a full-face respirator to achieve an acceptable fit;

Communications – Talking while wearing a facepiece may cause a break in the face-to-facepiece seal, so it is important that the user talk during fit-testing; and

P**hysiological response --** Be aware that respirators impose physiological stress. They are confining and may be claustrophobic, as well as increase breathing resistance and work effort. Some individuals may not be able to wear a respirator, particularly the tight fitting types. Be sure all users wear a respirator for an adequate period of time before and during the fit-testing. This is not required for voluntary use, but must be done with irritant smoke or saccharin if use is mandatory. (***Note:*** The saccharin test is done similarly to the Bitrex test.)

During fit testing, the critical fit area is typically around the bridge of the nose. During the positive/negative fit check; listen for air escaping in this area. If leaking occurs, repositioning the mask and tightening the headstraps will usually help. If this is not sufficient, consider using a larger respirator or changing to a different style (i.e., full-face).

15.10 EXPOSURE RECORDS FOR HAZARDOUS MATERIALS

There are two (2) methods to record employee exposure to hazardous materials:

- **All Programs (**Includes Maintenance, Construction, Structures and others) -- Supervisors will establish a *Respirator Information Data Card* (PM-S-009) or a similar exposure record for each employee required to wear a respirator. The card will be kept with the employee's medical information and transferred with the employee as he/she changes positions.

- **Maintenance Program --** Maintenance supervisors with pesticide applicators will use the pesticide application forms in the computerized time system to record respirator usage.

A sample of the *Respirator Information Data Card* showing an employee's name, respirator type, and medical exam and fit-test is included at the end of this section.

15.11 APPROVED RESPIRATORS AND PARTS

To standardize usage and ensure interchangeable parts of respiratory protection equipment within the Department, the following brands and models are recommended:

- Half-face respirator, use MSA Comfo II "Comfo Classic";
- Full-face respirator, use MSA Comfo II "Comfo Classic";
- Dust masks/filtering facepieces, use various brands;
- Airline supplied helmet (sand blasting, NIOSH Type CE), use various brands;
- Airline supplied full-face, use various brands; and
- Powered Air-Purifying Respirator (PAPR), various brands.

If the above recommendations do not meet your needs, contact H&S at (916) 227-2640 for assistance.

MATERIALS LIST

Some materials have poor or no warning properties, cause olfactory fatigue, or are just too toxic to use with air purifying respirators. Never use air-purifying respirators for protection from the following materials:

Acrolein
Aniline
Arsine
Carbon Monoxide
Dimethylaniline
Dimethyl Sulfate
Diisocyanates
Hydrogen Cyanide
Hydrogen Fluoride
Hydrogen Selenide
Hydrogen Sulfide
Methanol
Methanol Bromide
Methyl Chlorine
Methylene Bisphenyl Isocyanate
Nickel Carbonyl
Nitric Acid
Nitro compounds: Nitrobenzene, Nitrogenoxides, Nitroglycerin, Nitromethane
Ozone
Phosgene
Phosphine
Phosphorus Trichloride
Stibline
Sulfur Chloride
Urethane or other Diisocyanate containing paints
Vinyl Chloride

This list is not all-inclusive. Contact H&S at (916) 227-2640 for information and assistance.

15.12 RECCOMENDED RESPIRATORS

Certain types of respirators are not acceptable for some operations. Note the recommended respirators used for the following operations:

Pesticides – Cartridge respirator with P100/organic vapor cartridges. Dust masks cannot be used for pesticides. Follow your pest control advisor's use recommendations – a respirator is required for mixing/loading loose (not packaged) powders.

Spray painting – Respirator use is required for solvent-based paints but not for latex based. Use a cartridge respirator with P100/organic vapor cartridges. Dust masks are not appropriate for spray painting. See the bottom of the next page regarding isocyanate containing paints.

Sandblasting – A cartridge respirator with N or P100 filters must be used for limited sandblasting (less than one hour per shift) if proper protective equipment to protect the face, head, and eyes is also worn. For work over one hour, a supplied air-sandblasting hood (NIOSH type CE) must be used (air supply system must comply with the Airline Supplied Code of Safe Operating Practices CSOP at the end of this chapter). PAPR helmets or hoods are no longer NIOSH-approved for sandblasting and may not be used. No dust masks are allowed.

Lead – Respirator selection for operations that disturb lead–containing paints or materials will follow the Lead Compliance Plan for that particular operation. Any operation that disturbs lead-containing materials requires special lead training and protective equipment. Dust masks may not be used for protection from lead.

Asbestos – Asbestos removal or disturbance requires special training and equipment. A specific work plan or CSOP is required, and the plan will indicate what type of respirator is required. Dust masks may not be used for asbestos protection.

Galvanized Metals – Welding or cutting on galvanized metals can release toxic fumes. Follow the appropriate CSOP. Use a cartridge respirator with N or P100 filters if welding or cutting for more than 30 minutes continuously. For less than 30 minutes, no respirator is required, but an N-95 dust mask may be used.

Methacrylate road/bridge sealers – Respirator use is not required, but a cartridge respirator with organic vapor (black) or organic vapor/P100 combination cartridges may be used. These materials sometimes have an offensive odor. Dust masks may not be used.

Polyester Concrete – Employees working with or around (within 50 feet) of polyester concrete construction projects need to wear cartridge respirators with organic vapor (black) or organic vapor/P100 combination cartridges. Dust masks may not be used.

Asphalt Paving – Respirator use is not required, but a cartridge respirator with organic vapor (black) or organic vapor/P100 combination cartridges will provide adequate protection from the offensive odors and fumes. Dust masks may not be used.

Treated Wood – Respirator use is not required during sawing and drilling on treated wood, but a cartridge respirator with N or P100 cartridges may be worn. An N95 dust mask may also be worn.

Isocyanates – Because of low volatility, a respirator is not required during hand mixing and application of isocyanate-containing road repair products. If isocyanate paints are being spray applied, an air-supplied full-face respirator or hood is required. For brush and roller painting, a respirator is not required for isocyanates, but a cartridge respirator with P100/organic vapor combination cartridges can be worn for solvent protection. Dust masks may not be used.

IDLH, Explosive, Flammable, and/or Oxygen Deficient Atmospheres – By policy, Caltrans employees do not enter these locations. A supplied-air full-face positive pressure respirator (SCBA or airline with escape bottle) would be required.

15.13 RESPIRATOR CARTRIDGE SELECTION GUIDE

There are several different types of cartridges that may be used with respirators. These types are described as follows:

Filter Cartridge – Contains filtering medium, typically paper, which catches and stops particulate material from entering. NIOSH has three levels of purifying efficiency: 95 percent, 99 percent, and 99.97 percent of particles down to .3 microns, labeled **95**, **99**, and **100** respectively - and three categories of filter oil hazard resistance: "N" for **N**ot resistant to oil, "R" for **R**esistant to Oil, and "P" for oil-**P**roof. (The former "High Efficiency Particulate Air filter" (HEPA) rating is now N100 or P100.) Filter cartridges protect against particulates only and are not effective against vapors or gasses. An N95 filter is equivalent to the "dust, fume, mist" filter used in the past. Filter cartridges are available as N100 or P100; dust masks/filtering facepieces are available in N95 and N100 or P100. Filter cartridges can be used alone for particulate-only protection, or in a combination configuration with a chemical cartridge. N or P100 filter cartridges have a red, pink, or magenta color code band.

Pre-Filters – These are a fiber or paper medium typically used with a chemical cartridge to stop mists and liquids from entering the cartridge. They are never used alone because they are ineffective against particulates, vapors, or gasses. They are used with organic vapor chemical cartridges for painting and pesticides, but are now replaced by P100/organic vapor combination cartridges.

Chemical cartridge – This contains a capture medium, typically charcoal or carbon, which capture vapors or gasses. Cartridges are available for different materials, the most common being the organic vapor cartridge. It is most often used with a P100 particulate filter in a combination cartridge. Organic vapor cartridges have a black color code band.

Combination cartridge – This contains both a filtering cartridge and a chemical cartridge in the same case. The most common combination is a P100/organic vapor cartridge.

Color Code Band – Cartridges are color-coded. Combination cartridges have two bands.

N100, P100 (particulate)	magenta, pink, red
Organic Vapor	black
Organic Vapor/Acid Gas	yellow
Acid Gas	white
Ammonia	green

Respirator cartridges are selected based on the user's exposure. Use the chart below for typical respirator uses. Contact your local DSO or H&S at (916) 227-2640 for assistance in selecting the proper cartridge.

***Note*:** The Mine Safety Appliances (MSA) pesticide cartridge GMP is no longer made. It has been replaced by the MSA GMA-P100 (P100/Organic Vapor) combination cartridge. This cartridge is stocked in the Caltrans warehouse. Other cartridges must be purchased directly. Contact MSA at 1-800-MSA-2222 for the nearest dealer.

COLOR	MSA #TYPE		CONTAMINANT - JOB TYPE
BLACK	GMA 464031		Organic vapor solvents, paints, organic vapors, paint strippers and removers
MAGENTA	P100 815175	P100 (HEPA-High Efficiency Particulate)	Asbestos, lead, dust, metal fumes, regular asphalt paving, fit testing
MAGENTA and BLACK	GMA-P100 815178	Combination - P100 & Organic Vapor	PBA and rubber-modified asphalt paving, methacrylate, polyester concrete, pesticides, fit testing, and all particulates
MAGENTA and YELLOW	GMC-P100 815180	Combination - P100 & Acid Gas/OV	Rubber-modified asphalt paving, fit testing

15.14 CARTRIDGE CHANGE INTERVALS

Respirator cartridges and dust masks/filtering facepieces are filters with a limited service life. If a cartridge is beyond the printed end-of-service date, it shall not be used. Store used cartridges separately from the respirator body. Place them in a separate plastic bag to prevent cross contamination.

Filters must be changed immediately whenever odor, smell or taste is detected inside the respirator (this is called "breakthrough" and means that the filter is no longer effective). If the wearer detects an odor, taste or irritation, he/she shall leave the work area immediately and go to a safe area away from the hazard.

Respirator cartridges shall be replaced and the positive/negative fit check done. If the fit is satisfactory, work may continue; otherwise, work will not resume until the problem has been corrected. The cartridges must be changed immediately if increased breathing resistance is felt or if the filter is plugged. If filters and masks do not "breakthrough" or - become plugged, the following change interval schedule will apply:

1.) Paper dust masks/filtering facepieces will be changed daily or more often as needed to remain effective.
2.) Cartridges used for protection from pesticides will be changed at the end of each shift during which they were used (see Special Note below).
3.) Particulate filters (P100, N100, HEPA, etc.) will be changed after eight (8) hours of use. The supervisor may extend the change interval if actual airborne exposure is minimal or if the flow rate is measured before each use (i.e.: PAPRs).
4.) Organic vapor, acid gas, chlorine, ammonia, and other chemical cartridges (carbon filled cartridges) will be changed after eight (8) hours of use. This may be extended by the supervisor if actual airborne exposure is minimal, but will not exceed weekly, unless the cartridge has an "end-of-service life" indicator.
5.) If a filter is a combination particulate and chemical cartridge, the change interval most protective of employee safety will be used.
6.) If a filter is damaged, punctured, modified, contaminated, or otherwise rendered unusable, it will be changed immediately.
7.) "Disposable" and "one-time-use" respirators shall be discarded after use or at the end of the shift.

Special Note:

Title 3 of the Department of Pesticide Regulation standards requires that when air-purifying type respirators are used for protection against pesticides, the air purifying cartridges shall be replaced according to:

- Pesticide product labeling directions;
- Respiratory equipment manufacturer recommendations;
- First indication of odor, taste, or irritation; and
- At the end of each day's work period.

Contact your local DSO or H&S for respirator selection assistance and guidance if your operation is not listed.

15.15 RESPIRATOR ASSIGNED PROTECTION FACTORS

Respirators have different effectiveness ratings based on fit, type of seal, and physical characteristics of the equipment. These ratings are called **Assigned Protection Factors** (APFs), and are NIOSH-established for each type of respirator. The following are protection factors for different types of respirators:

TYPE OF RESPIRATOR	**PROTECTION FACTOR ***
DUST MASK (Filtering Facepiece).....	10
HALF-FACE CARTRIDGE RESPIRATOR	10
FULL-FACE CARTRIDGE RESPIRATOR	50
LOOSE-FITTING BLAST HELMET/HOOD (NIOSH Type C) WITH SUPPLIED AIR IN CONTINUOUS FLOW	25**
HELMET/ HOOD POWERED AIR PURIFYING RESPIRATOR (PAPR) WITH P100 FILTERS.....	25/1,000***
TIGHT-FITTING FULL FACEPIECE PAPR WITH P100 FILT.....	1,000
BLAST HELMET/HOOD WITH TIGHT NECK SEAL (NIOSH TYPE CE) AND SUPPLIED AIR IN CONTINOUS FLOW.....	1,000**
HALF-FACE AIRLINE SUPPLIED RESPIRATOR IN POSITIVE PRESSURE MODE	50
TIGHT-FITTING, FULL FACEPIECE, AIRLINE SUPPLIED RESPIRATOR IN POSITIVE PRESSURE MODE	1,000
TIGHT-FITTING, FULL FACEPIECE, SELF-CONTAINED BREATHING APPARATUS (SCBA) IN POSITIVE PRESSURE MODE	10,000

* Given APFs based on 2007 California Occupational Safety & Health Administration (Cal-OSHA) proposed values.
** NIOSH Type CE Sandblasting helmets (i.e. Bullard Model 77 and 88) and similar types with tight-fitting collars have an APF of 1,000 when operated in accordance with manufacturer's airflow requirements (6+ CFM).
*** Use of 1,000 APF requires proof of testing from respirator manufacturer, otherwise an APF of 25 applies.

APFs are used to determine if a selected respirator will provide adequate protection at a given level of contamination by applying the following formula:

$$\frac{\textit{Concentration in Air}}{\textit{APF}} = \textit{Respirator Wearer's or User's Exposure.}$$

The user's exposure is then compared to the Permissible Exposure Level (PEL) or other allowable airborne level to determine if the respirator is adequate.

EXAMPLE:

- A work operation involves exposure to lead dust at a concentration of 1,000 ug/m3 in the air (micrograms of lead per cubic meter of air).

- The employee has a half-face cartridge respirator with P100 cartridges. (APF = 10)

- The Cal-OSHA PEL for lead is 50 ug/m3.

Will the selected respirator provide adequate protection for the employee?

$$\frac{\textit{1,000 ug/m3}}{\textit{10}} = \textit{100 ug/m3} = \textit{Respirator Wearer's or User's Exposure}$$

100 ug/m3 is more than PEL (50ug/m3) – respirator is inadequate

- Because the respirator user's exposure would be more than the PEL, a half-face respirator is NOT adequate to protect the employee.

- A full-face cartridge respirator with an APF of 50 or a sandblast helmet with an APF of 25 or 1000 would be adequate to protect the employee.

15.16 INSPECTION, MAINTENANCE, REPAIR, AND STORAGE

Respiratory protection equipment (RPE) shall be inspected before and after each use. The examination shall include the:

- Facepiece;
- Head straps or head harness;
- Exhalation and inhalation valves;
- Air-purifying cartridges (if applicable);
- Corrugated breathing tube, the tube ends, connectors, and clamps (if applicable);
- Air supplying hoses, regulator (if applicable) and filters, etc;
- Tanks and harness (if applicable) for cuts, cracks, and defects; and
- Hood or helmet, including face-shield, suspension, neck cuff, shroud, and other parts (if applicable)

- **Inspection** -- Inspect rubber and elastic parts for pliability and signs of deterioration. Check for cracks, cuts, modifications, stretching, hardening, distortion, or other damage. Inhalation and exhalation valves must be flexible and return to a flat shape after rolling between thumb and finger. If any part of a respirator is broken, damaged, or missing, take it out of service until properly repaired.

  - Respirators that are not routinely used but are kept for emergency use shall be inspected after each use and at least monthly to ensure the equipment is in satisfactory working condition. Inspections shall be documented and maintained by the supervisor and kept with the individual respirator.

- **Repair** -- Experienced personnel will do parts replacement and repair of respirators. Replacement parts must be designed for each specific respirator. All repair work will be in full compliance with manufacturer's instructions.

- **New equipment** -- New equipment shall be issued to replace worn or damaged RPE. Any respirator with suspected damaged shall be inspected and repaired or removed from service, if necessary.

- **Storage** -- Always store the respirator, filters, cartridges, and other parts in a clean dry place, preferably in a tightly closed paper or plastic container. Protect respirators from dust, dirt, sunlight, heat, extreme cold, excessive moisture, and chemicals.

  - Store respirators in a single layer with the facepiece and exhalation valve in a normal rest position. This helps prevent facepiece distortion.

  - Do not store respirators in personal lockers or toolboxes unless they are in a separate respirator container. A rectangular plastic container with a lid size of at least 11 inches, by 7 & 3/8 inches, by 4 & 5/8 inches deep is recommended for storing the half-mask respirator.

- **Cleaning** -- Respirators shall be cleaned as necessary during use and afterwards. At a minimum, they should be wiped off after every use and inspected. Respirators used routinely will be washed weekly. Respirators can be cleaned by washing with mild soap and water or by using specially designed equipment wipes. Never use solvents, first aid wipes or strong cleansers to wash a respirator as they will damage the face-piece and could cause skin irritation. After washing, thoroughly rinse in clear water to remove all soap residue~~s~~ and allow to air dry.

The following are useful hints when cleaning respirators:

- Use a soft brush to facilitate cleaning;
- Remove filters, cartridges or canisters, and dispose of as necessary. Remove head straps and harnesses;
- Wash facepiece and breathing tube in mild soap and rinse thoroughly to remove all residue;
- Air-dry in a clean area (never apply heat to respirators);
- Clean all parts as recommended by the manufacturer;
- Inspect valves, head straps, and other parts and replace as necessary;
- Insert new filters, cartridges, or canisters;
- Ensure all seals are tight with cartridge gaskets in place; and
- Place in sealable plastic bag or container for storage.

Respirators worn by multiple users must be cleaned and disinfected between users.

APPENDIX-A

The Fit-Testing Process

The fitting of a respirator consists of the following steps:

1. Face Fitting

Select a respirator that closely matches the size of the individual's face. Proper sizing and fit is critical. Most employees can use a medium mask. If a mask does not seal properly, usually a larger mask will fit better. Pay particular attention to the bridge of the nose as this is where most leaks occur there. Some individuals cannot be fitted with a half-face mask and may require a full-face mask or a hood. Never allow an employee to wear a respirator that does not fit properly.

Secure the respirator facepiece by adjusting the head straps. The respirator should fit comfortably against the face, not too tightly, but tight enough to form a good seal. It should not distort facial features or deform the facepiece of the respirator. Be sure the straps are properly positioned -- upper straps on the crown of the head, lower strap around the back of neck. The chin must be securely placed in the cup at the bottom of the facepiece.

2. Negative Pressure Fit Check

The negative pressure fit check consists of: closing off the inlet of the canister, cartridge(s), or filters(s) by covering with the palm(s) of the hand or using rubber seals, or by squeezing the breathing tube so that it does not pass air; inhaling gently so that the facepiece collapses slightly; and holding the breath for 10 seconds. If the facepiece remains slightly collapsed and no inward leakage is detected, the respirator fit is acceptable. If not, try tightening the straps and testing again. This fit check will be done every time a tight fitting respirator is put on.

3. Positive Pressure Fit Check

The positive pressure fit check is done by covering the exhalation valve and exhaling gently into the facepiece. If the seal is acceptable. a slight positive pressure will build up inside the facepiece without any evidence of outward leakage. This fit check will also be done every time a tight fitting respirator is put on.

APPENDIX-A

4. Irritant Smoke Test

The irritant smoke test uses stannic chloride-impregnated pumice. This is the preferred method for fit testing (In the rare case where the test subject has no reaction to smelling a weak concentration of stannic chloride, the Bitrex test can be used). Smoke is created by the reaction of water vapor with the stannic chloride. A squeeze bulb is attached to the tube to force air in and smoke out. Before starting, the tips of the glass tube must be broken off – do this over a trashcan to catch the glass pieces and wear eye protection. Put a piece of rubber hose over the sharp glass ends of the tube during testing. This test should be administered outside -- do not use a test enclosure, chamber, or hood. Keep the smoke away from building ventilation air intakes.

The employee shall wear a respirator that has been selected as described above, equipped with N or P100 cartridges (any cartridge with a magenta color band).

The respirator wearer will do the positive and negative fit checks as described above, and wear the respirator for at least fifteen (15) minutes in clean air before starting the test.

Advise the wearer that the irritant smoke can bother the eyes and instruct them to keep their eyes closed while the test is being performed.

Direct a stream of irritant smoke from the tube towards the respirator facepiece. Begin at least 12 inches from the facepiece and gradually move to within 3 or 4 inches, moving around the whole perimeter of the facepiece seal. Talk with the wearer continuously - caution him/her about sudden movements to prevent the possibility of smoke tube punctures.

The wearer should do the following while the respirator seal is being challenged with smoke:

- Breathe normally;
- Breathe deeply (breaths are deep and regular);
- Turn head side to side;
- Nod head up and down; and
- Speak slowly and distinctly – recite the alphabet.

If the irritant smoke produces an involuntary reaction (cough) by the wearer, the test shall stop. Have the wearer readjust and retry the respirator. The positive/negative fit check may help to locate the leak points. If numerous attempts remain unsuccessful, a different size facepiece should be tried. A larger mask may fit better. Continue the test until the fit tester is assured the respirator is fitting properly.

The wearer shall smell a weak concentration of the irritant smoke after the fit test to check for a reaction. If no reaction is noted, a Bitrex test is required.

The smoke is corrosive and could cause irritation. The wearer and fit tester need to wash their hands and face after the fit testing to remove any irritant smoke from their skin.

APPENDIX-A

5. Bitrex Test

Use this method only for respirator wearers who have no reaction to irritant smoke.

A.) Taste Threshold Screening (for Bitrex Test Only)

This screening is done without the use of a respirator to determine if the employee can detect the taste of Bitrex. Prior to the screening test, the entire screening and testing procedure will be explained to the employee.

While inside an enclosure, the employee shall breathe through his/her slightly open mouth with tongue extended and report when a bitter taste is detected. The solution is introduced into the enclosure in 10 squeeze increments using a DeVilbiss Model 40 Inhalation Medication Nebulizer or its equivalent. If the employee does not detect the bitter taste within three 10 squeeze attempts (30 total), they cannot be fit-tested using Bitrex.

B.) Bitrex Fit Test

The employee to be tested may not eat, drink (except water), smoke, chew gum, or use smokeless tobacco for 15 minutes before the test.

The respirator shall be equipped with N or P100 cartridges (any cartridge with magenta color band).

The respirator wearer will perform the positive and negative fit-checks and wear the respirator outside the enclosure for 15 minutes before the test.

A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer used earlier.

The employee shall enter the enclosure and breathe through his/her slightly open mouth with tongue extended inside the facepiece and be instructed to report when a bitter taste is detected.

An initial concentration of the fit test solution is sprayed into the enclosure using the same number of squeezes (10) as required for a response in the screening test.

After the aerosol is generated inside the enclosure, the employee will do the following exercises:

- Breathe normally;
- Breathe deeply deep breathing;
- Turn head from side to side;
- Nod head up and down; and
- Speak slowly and distinctly – recite the alphabet.

APPENDIX-A

The aerosol concentration shall be replenished every 30 seconds using half (5) the number of squeezes used initially.

The employee shall indicate to the tester if at any time during the fit test the taste of Bitrex is detected. The test is passed if the employee does not report tasting the Bitrex.

If the taste of Bitrex is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

6. Fit-Test Record

After the respirator fit-test has been completed, the respirator trainer/fit tester shall document that the employee has successfully completed the fit-testing and is qualified to wear a respirator. Record the information on the *Respiratory Equipment Fitting and Testing Record* form (PM-S-008).

The fit-test record form provides for the name of the employee, date of the test, and type of respirator used. The employee shall sign the form to verify that he/she has been fit-tested. The supervisor and the fit tester shall maintain copies of the fit-test record.

A sample of the *Respiratory Equipment Fitting and Testing Record* form is shown at the end of this section.

APPENDIX-B

Caltrans Guidelines for Dust Masks

1) Dust Masks are respirators (correct term: “filtering facepiece respirator”).
2) If an employees wishes to wear dust masks (voluntary use), he/she must:
   A) Be trained in their proper use, fit, limitations, storage and disposal (see below).
   B) Comply with the Caltrans Facial Hair Policy (no facial hair below the upper lip and removal of other hair that interferes with the face-to-facepiece seal).
   C) Use only NIOSH approved dust masks.
3) If an employee is required to wear a dust mask (mandatory use), he/she must also:
   A) Have a respirator medical evaluation.
   B) Have a respirator fit test with the dust mask he/she will wear.
4) Dust Mask Training:
   A) Dust masks are respirators guidelines must be followed during their use.
   B) Dust masks only filter air, they do not provide oxygen. They work only for particulates (dust particles) and will not filter out solvents, vapors, gasses or liquids.
   C) Dust masks are only good for non-toxic dusts and particulates; they do not provide adequate protection for lead, asbestos, or pesticides.
   D) Use only NIOSH-approved dust masks. They will have a “TC” number or “N-__” on the facepiece or straps (these always have two straps. Do not use non-approved dust masks with only one strap).
   E) Never modify a dust mask by cutting straps, poking holes, etc. Any modification voids the approval.
   F) An N95 dust mask will filter out 95 percent of particulate down to .3 microns -- this is adequate for non-toxic dusts and smoke.
   G) Wear the mask correctly. Before donning, bend the nose strip over a finger – this causes a better fit around the bridge of the nose – put the upper strap over the crown of the head and the lower strap on the neck. Check fit and re-position if necessary.
   H) If breathing problems or exposure symptoms occur while wearing a dust mask, leave the area immediately. Replace the dust mask before re-entry. If the problem continues, contact your supervisor as additional protection may be necessary.
   I) Discard the dust mask in a trash receptacle following use. Do not fold it for later use. Unused masks should be stored in a clean location with ample space so they are not crushed or deformed.
   J) Training, medical evaluations, and fit testing – if required – must be renewed annually.
5) Document Dust Mask training and review of these guidelines. A tailgate meeting form or other documentation may be used.
6) If there are questions about appropriate dust mask use, contact your local DSO or H&S at (916) 227-2640.

APPENDIX-C

Code of Safe Operating Practices (CSOP)

SAFE PRACTICE RULES

Airline Supplied Respiratory Protection Equipment (Sandblast Helmets, Loose Fitting Hoods, Tight Fitting Facepieces)

NOTE: Does not apply to Powered Air Purifying Respirator (PAPR) or Self-Contained Breathing Apparatus (SCBA) use.

Hazards Review

Inhalation of harmful dust, fumes, mists, vapors, and gases.
(i.e., lead, silica, solvents, paint, isocyanates, carbon monoxide.)
Limited vision and mobility.
Possible carbon monoxide contamination from air compressors.

Caltrans issued respirators covered by this CSOP:
Bullard 77/88 abrasive blast helmets

- MSA Ultra Twin full-face respirators with air supply fittings
- MSA Constant Flow Respirators
- Loose fitting airline supplied hoods
- Bullard 999 airline supplied hoods
- Other airline supplied respirators

This CSOP is for the specific hazards of airline supplied respirator use and is in addition to the job-specific and equipment-specific CSOPs and Lead Compliance Plans. The following are required for respirator use:

1) All employees using airline supplied respirators must comply with the Caltrans Respiratory Protection Program (RPP) (Chapter 15 of Safety Manual) that requires the following <u>before</u> respirator use:
   - Medical evaluation and clearance by a physician;
   - Training in the Caltrans RPP and the proper use, limitations, inspection, cleaning, and storage of the respirator to be used;
   - Compliance with the facial hair policy;
   - Fit testing of tight fitting respirators; and
   - Use of only NIOSH-approved respiratory protection equipment (RPE).

These requirements will be renewed annually as long as the employee is using or may be required to use airline supplied RPE;

APPENDIX-C (Cont.)

2) Training in the proper use, limitations, maintenance, inspection, and operation of the air supplying system being used, including the applicable filtering, monitoring, alarm, and notification systems.
3) If there is a conflict, the measures most protective for employees will be followed;
4) Pre-op and post-op air compressors, including rental equipment;
5) Familiarity with the operator's manual for the equipment in use is required;
6) A compressor will be located to prevent the entry of contaminated air into the air-supply;
7) If a compressor is disconnected from a truck, wheels are to be chocked and the brake set;
8) A compressor is to be equipped with a water trap or filter to limit air moisture content. The water trap will be drained daily or as needed;
9) Breathing air at the work location will pass through an in-line filter (Bullard 41P or equivalent) to remove oil contamination, and then a final filter and carbon monoxide monitor (Air Systems/Bullard "Breather Box ™" or equivalent) before going to the respirator(s);
10) The air supply couplings on the "Breather Box ™" outlet side and the respirator air supply hoses shall be incompatible with those used for power tools and other equipment. ***Note:*** If Foster fittings are used, they are incompatible with the Hansen fittings used on tools;
12) The air supply hoses from the "Breather Box ™" to the respirator must be NIOSH-approved and of the same brand as the respirator. This does not apply to hoses from the compressor to the in-line filter and "Breather Box ™";
13) Filters will be maintained, replaced, or refurbished according to manufacturer's recommendations (Every six months, or immediately if respirator wearer feels, smells or tastes contaminants inside the respirator);
14) Filters are to have a tag containing the most recent change date and the signature of the person authorized to perform the change. A tag will be kept with both the filter and the compressor;
15) The "Breather Box ™" will always be operated in the upright position to allow filters to drain;
16) The "Breather Box ™" will be maintained according to manufacturer's recommendations and maintenance and filter changes will be documented;
17) A carbon monoxide monitor will be calibrated at least monthly or before each use by a trained technician. The calibration log (or a copy) will be available with the "Breather Box ™". ***Note:*** The carbon monoxide monitor will be set to alarm at 10 parts per million (ppm);
18) The carbon monoxide monitor and alarm function will be checked according to the manufacturers operational checklist before each use and documented;
19) The carbon monoxide alarm and/or signal light will be positioned so that it is visible to the respirator wearer(s) or nearby crew members who will immediately notify the wearer(s) if an alarm occurs;
20) If an alarm occurs, the respirator wearer(s) will stop work and leave the work area immediately. Respirator(s) will be removed when it is safe to do so;
21) Before resuming work, the cause for the alarm will be determined. If a faulty monitor is suspected, the monitor is to be checked and re-calibrated before being placed back in service;
22) The respirator(s), supply line(s), filter and "Breather Box ™" are to be inspected prior to starting work;

APPENDIX-C (Cont.)

23) The work area is to be evaluated before placing equipment. Hoses, filter, and the "Breather Box ™" are to be positioned so that they will not block walkways or be struck by workers or equipment. Secure the air supply hoses from the compressor so they don't pull on the filter or the "Breather Box ™";
24) Work should be planned so that respirator wearer(s) will not tangle hoses or get stuck on obstacles. Plan to return by the same route as used in heading for the work area.
25) Be aware that using an airline respirator will take extra effort and may increase fatigue and heat stress. Plan for additional breaks and drink extra water;
26) Wipe off hoses, filter, and the "Breather Box ™" at the end of the day to minimize the spread of contamination;
27) If respirator wearer(s) experience smells or tastes in the mask, the work area should be vacated immediately and respirator(s) removed when possible. Use of respirator(s) should not be resumed until the cause of contamination has been determined;
28) If any unusual problems or alarms occur, the supervisor should be notified immediately;
29) Airline supplied respirators should not be worn into confined spaces or other locations where dangerous air contamination (oxygen deficiency or enrichment, flammable atmospheres, Immediately Dangerous to Life and Health [IDLH] toxic atmospheres, etc.) is known or expected to exist; and
30) All entry into confined spaces will comply with the Caltrans Confined Spaces Program (Chapter 14 in the Caltrans Safety Manual).

APPENDIX D

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

RESPIRATOR MEDICAL QUESTIONNAIRE

PM-S-0010 (New 10/98)

EMPLOYEE NAME *(Please Print)*	COST CENTER
EXAMINING DOCTOR *(Please Print)*	DATE

Please complete the following information about yourself *(answer all questions)*:

1. AGE *(to nearest year)*	2. ☐ Male ☐ Female	3. HEIGHT ft. in.	4. WEIGHT lbs.	5. JOB TITLE

6. A phone number where you can be reached: ( )

7. The best time to phone: am pm

8. Check the type of respirator you will use *(you can check more than one category)*:

☐ N, R, or P disposable respirator *(filter-mask, no-cartridge type only)*

☐ Other type (*for example, half- or full-facepiece type, powered-air purifying supplied-air, self-contained breathing apparatus).*

9. Have you worn a respirator: ☐ YES ☐ NO

10. IF "YES", WHAT TYPE(S)

1. Do you currently smoke tobacco, or have you smoked in the last month? ☐ YES ☐ NO

2. Have you ever had any of the following conditions? ☐ YES ☐ NO

a. Seizures: ☐ YES ☐ NO

b. Diabetes *(sugar disease)*: ☐ YES ☐ NO

c. Allergic reactions that interfere with your breathing: ☐ YES ☐ NO

d. Claustrophobia *(fear of closed-in places)*: ☐ YES ☐ NO

e. Trouble smelling odors: ☐ YES ☐ NO

3. Have you ever had any of the following pulmonary or lung problems? ☐ YES ☐ NO

a. Asbestos: ☐ YES ☐ NO

b. Asthma: ☐ YES ☐ NO

c. Chronic bronchitis: ☐ YES ☐ NO

d. Emphysema ☐ YES ☐ NO

e. Pneumonia ☐ YES ☐ NO

f. Tuberculosis: ☐ YES ☐ NO

g. Silicosis ☐ YES ☐ NO

h. Pneumothorax *(collapsed lung)*: ☐ YES ☐ NO

i. Lung cancer: ☐ YES ☐ NO

j. Broken ribs: ☐ YES ☐ NO

k. Any chest injuries or surgeries: ☐ YES ☐ NO

l. Any other lung problem that you've been told about? ☐ YES ☐ NO

4. Do you currently have any of the following symptoms of pulmonary or lung illness? ☐ YES ☐ NO

a. Shortness of breath: ☐ YES ☐ NO

b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: ☐ YES ☐ NO

c. Shortness of breath when walking with other people at an ordinary pace on level ground: ☐ YES ☐ NO

d. Have to stop for breath when walking at your own pace on level ground: ☐ YES ☐ NO

e. Shortness of breath when washing or dressing yourself: ☐ YES ☐ NO

f. Shortness of breath that interferes with your job: ☐ YES ☐ NO

g. Coughing that produces phlegm *(thick sputum)*: ☐ YES ☐ NO

h. Coughing that wakes you early in the morning: ☐ YES ☐ NO

i. Coughing that occurs mostly when you are lying down: ☐ YES ☐ NO

j. Coughing up blood in the last month: ☐ YES ☐ NO

k. Wheezing: ☐ YES ☐ NO

APPENDIX D (cont.)

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION
RESPIRATOR MEDICAL QUESTIONNAIRE
PM-S-010 (New 10/98)

4. Continued

l.	Wheezing that interferes with your job:	☐ YES	☐ NO	
m.	Chest pain when you breathe deeply:	☐ YES	☐ NO	
n.	Any other symptoms that you think may be related to lung problems:	☐ YES	☐ NO	
5.	**Have you ever had any of the following cardiovascular or heart problems?**		☐ YES	☐ NO
a.	Heart attack:	☐ YES	☐ NO	
b.	Stroke:	☐ YES	☐ NO	
c.	Angina:	☐ YES	☐ NO	
d.	Heart failure:	☐ YES	☐ NO	
e.	Swelling in your legs or feet *(not caused by walking)*:	☐ YES	☐ NO	
f.	Heart arrhythmia *(heart beating irregularly)*:	☐ YES	☐ NO	
g.	High blood pressure:	☐ YES	☐ NO	
h.	Any other heart problem that you've been told about:	☐ YES	☐ NO	
6.	**Have you ever had any of the following cardiovascular or heart symptoms?**		☐ YES	☐ NO
a.	Frequent pain or tightness in your chest:	☐ YES	☐ NO	
b.	Pain or tightness in your chest during physical activity:	☐ YES	☐ NO	
c.	Pain or tightness in your chest that interferes with your job:	☐ YES	☐ NO	
d.	In the past two years, have you noticed your heart skipping or missing a beat:	☐ YES	☐ NO	
e.	Heartburn or indigestion that is not related to eating:	☐ YES	☐ NO	
f.	Any other symptoms that you think may be related to heart or circulation problems:	☐ YES	☐ NO	
7.	**Do you currently take medication for any of the following problems:**		☐ YES	☐ NO
a.	Breathing or lung problems:	☐ YES	☐ NO	
b.	Heart trouble:	☐ YES	☐ NO	
c.	Blood pressure:	☐ YES	☐ NO	
d.	Seizures:	☐ YES	☐ NO	
8.	**If you've used a respirator, have you ever had any of the following problems:**		☐ YES	☐ NO If no, go to question 9.
a.	Eye irritation:	☐ YES	☐ NO	
b.	Skin allergies or rashes:	☐ YES	☐ NO	
c.	Anxiety:	☐ YES	☐ NO	
d.	General weakness or fatigue:	☐ YES	☐ NO	
e.	Any other problem that interferes with your use of a respirator:	☐ YES	☐ NO	
9.	**Would you like to talk to the doctor, who will review this questionnaire about your answers to this questionnaire:**		☐ YES	☐ NO
10.	**Have you ever lost vision in either eye** *(temporarily or permanently)*:		☐ YES	☐ NO
11.	**Do you currently have any of the following vision problems:**		☐ YES	☐ NO
a.	Wear contact lenses:	☐ YES	☐ NO	
b.	Wear glasses:	☐ YES	☐ NO	
c.	Color blind:	☐ YES	☐ NO	
d.	Any other eye or vision problem:	☐ YES	☐ NO	
12.	**Have you ever had an injury to your ears, including a broken ear drum:**		☐ YES	☐ NO
13.	**Do you currently have any of the following hearing problems:**		☐ YES	☐ NO
a.	Difficulty hearing:	☐ YES	☐ NO	
b.	Wear a hearing aid:	☐ YES	☐ NO	
c.	Any other hearing or ear problem:	☐ YES	☐ NO	
14.	**Have you ever had a back injury:**		☐ YES	☐ NO

APPENDIX D (Cont.)

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RESPIRATOR MEDICAL QUESTIONNAIRE
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15. Do you currently have any of the following musculoskeletal problems: ☐ YES ☐ NO

a. Weakness in any of your arms, hands, legs, or feet: ☐ YES ☐ NO
b. Back pain: ☐ YES ☐ NO
c. Difficulty fully moving your arms and legs: ☐ YES ☐ NO
d. Pain or stiffness when you lean forward or backward at the waist: ☐ YES ☐ NO
e. Difficulty fully moving your head up or down: ☐ YES ☐ NO
f. Difficulty bending at your knees: ☐ YES ☐ NO
g. Difficulty fully moving your head side to side: ☐ YES ☐ NO
h. Difficulty squatting to the ground: ☐ YES ☐ NO
i. Climbing a flight of stairs or a ladder carrying more than 25 lbs: ☐ YES ☐ NO
j. Any other muscle or skeletal problem that interferes with using a respirator: ☐ YES ☐ NO

Please answer the following questions:

1. In your present job, are your working at high altitudes *(over 5,000 feet)* or in a place that has lower than normal amounts of ☐ YES ☐ NO

   If yes, do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: ☐ YES ☐ NO

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals *(e.g. gases, fumes, or dust)*, or have you come into skin contact with hazardous chemicals: ☐ YES ☐ NO

   If yes, name the chemical*(s)* if you know them: _____

3. Have you ever worked with any of the materials, or under any of the conditions listed below:

a. Asbestos: ☐ YES ☐ NO
b. Silica *(e.g. in sandblasting)*: ☐ YES ☐ NO
c. Tungsten/colbalt *(e.g. grinding or welding this material)*: ☐ YES ☐ NO
d. Beryllium: ☐ YES ☐ NO
e. Aluminum: ☐ YES ☐ NO
f. Coal *(for example, mining)*: ☐ YES ☐ NO
g. Iron: ☐ YES ☐ NO
h. Tin: ☐ YES ☐ NO
i. Dusty environments: ☐ YES ☐ NO
j. Any other hazardous exposures: ☐ YES ☐ NO

   If yes, describe exposure*(s)*: _____

4. List any second jobs or side businesses you have: _____

5. List your previous occupations: _____

6. List your current and previous hobbies: _____

7. Have you been in the military services? ☐ YES ☐ NO

   If yes, were you exposed to biological or chemical agents *(either in training or combat)*: ☐ YES ☐ NO

8. Have you ever worked on a HAZMAT team? ☐ YES ☐ NO

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason *(including over-the-counter medications)*: ☐ YES ☐ NO

   If yes, name the medications, if you know them: _____

10. Will you be using any of the following items with your respirator*(s)*?

a. HEPA Filters: ☐ YES ☐ NO
b. Canisters *(for example, gas masks)*: ☐ YES ☐ NO
c. Cartridges: ☐ YES ☐ NO

APPENDIX D (Cont.)

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION
RESPIRATOR MEDICAL QUESTIONNAIRE
PM-S-010 (New 10/98)

11. During the period you are using the respirator(s), is your work effort:

a. Light *(less than 200 kcal per hour)*: ☐ YES ☐ NO

If yes, how long does this period last during the average shift: ____ hrs. ____ mins.
Examples of a light work effort are sitting while writing, typing, drafting or performing light assembly work, or standing while operating a drill press *(1-3 lbs.)* or controlling machines.

b. Moderate *(200 to 350 kcal per hour)*: ☐ YES ☐ NO

If yes, how long does this period last during the average shift: ____ hrs. ____ mins.
Examples of a moderate work effort are sitting while nailing or filing, driving a truck or bus in urban traffic, standing while drilling, nailing, performing assembly work, or transferring a moderate load *(about 35 lbs.)* at trunk level: walking on a level surface about 2 mph or down a 5-degree grade about 3 mph or pushing a wheelbarrow with a heavy load *(about 100 obs.)* on a level surface.

c. Heavy *(above 350 kcal per hour)*: ☐ YES ☐ NO

If yes, how long does this period last during the average shift: ____ hrs. ____ mins.
Examples of heavy work are lifting a heavy load *(about 50 lbs.)* from the floor to your waist or shoulder; working on a loading dock; shoveling, standing while bricklaying or chipping castings, walking up an 8-degree grade about 2 mph, climbing stairs with a heavy load *(about 50 lbs.)*.

12. Will you be wearing protective clothing and/or equipment *(other than the respirator)* when you're using your respirator: ☐ YES ☐ NO

If yes, describe this protective clothing and/or equipment: _____

13. Will you be working under hot conditions (temperature exceeding 77 degrees F): ☐ YES ☐ NO

14. Will you be working under humid conditions: ☐ YES ☐ NO

15. Describe the work you'll be doing while you're using your respirator: _____

16. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threating gases): _____

17. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):

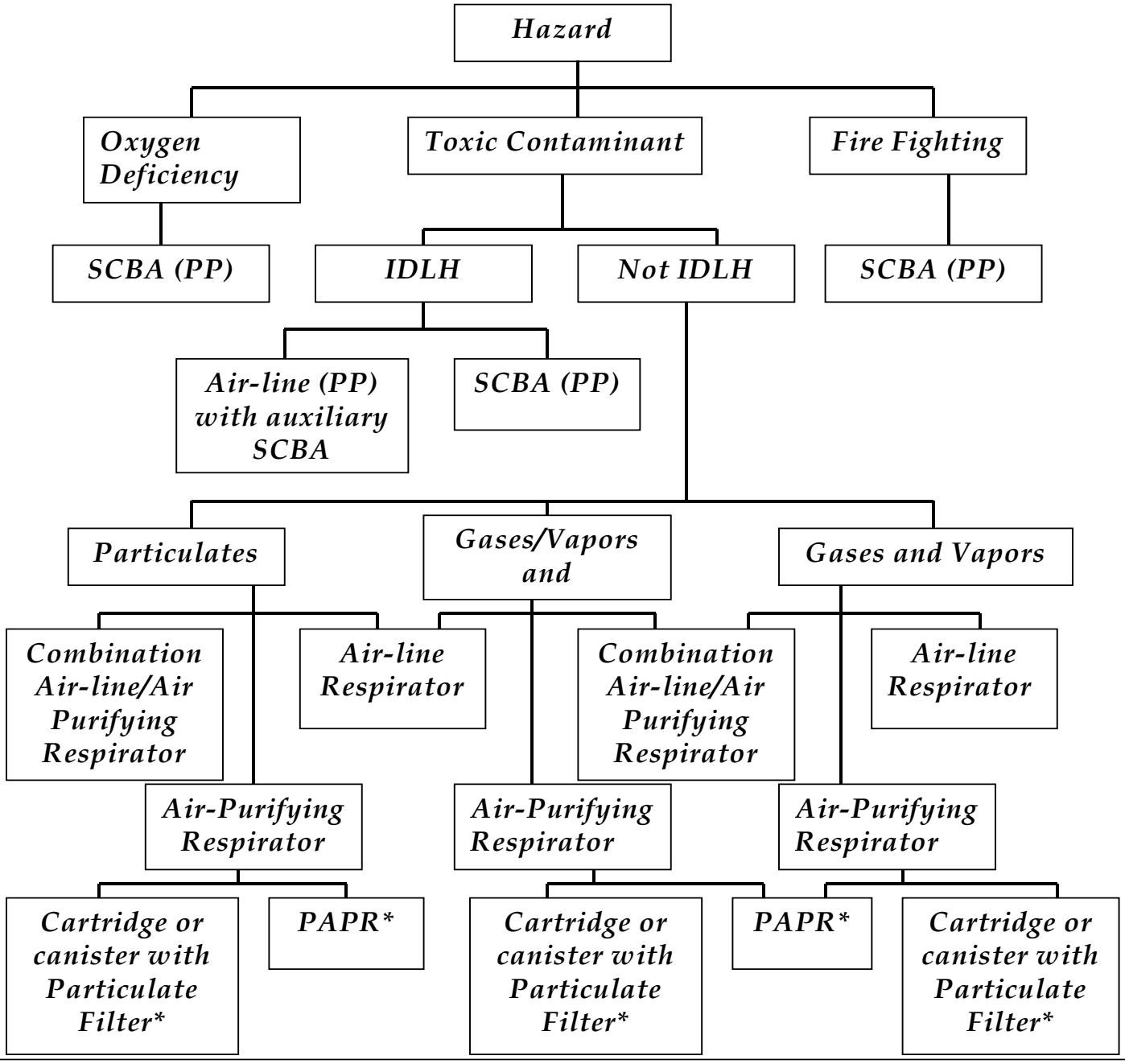
a. Name of the first toxic substance: _____
b. Estimated maximum exposure level per shift: _____
c. Duration of exposure per shift: _____
d. Name of the second toxic substance: _____
e. Duration of exposure per shift: _____
f. Estimated maximum exposure level per shift: _____
g. Name of the third toxic substance: _____
h. Estimated maximum exposure level per shift: _____
i. Duration of exposure per shift: _____
j. Name of any other toxic substances that you'll be exposed to while using your respirator: _____

18. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (e.g. rescue, security): _____

ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

Appendix E

NIOSH GUIDE TO RESPIRATOR SELECTION
DECISION TREE



*See Section 8 – RESPIRATOR AND CARTRIDGE SELECTION on page 15-28 for cartridge selection guidance.
SCBA – Self-Contained Breathing Apparatus. IDLH – Immediately Dangerous to Life and Health.
PP – Positive Pressure. Includes pressure demand units, does not include demand units.
PAPR – Powered Air-Purifying Respirator.