

WORKER

Construction
Safety & Injury Prevention
Program

WORKBOOK

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INTRODUCTION

Construction Safety & Injury Prevention Program

The Construction Safety & Injury Prevention Program (CSIP) has been made possible by the Susan Harwood Training Grant Program, which supports training and education programs for workers and employers on the recognition, avoidance, abatement, and prevention of safety and health hazards in their workplaces.

The goal of CSIP is to address prevention and identification of construction safety and health hazards to “secure safe and healthy workplaces, particularly in high-risk industries” (DOL’s Strategic Objective, Performance Goal OSHA 2.1). The Building Industry Association of Hawaii, along with contributions from local organizations, businesses, and individuals, such as the Hawaii Safety Alliance and the Hawaii Chapter Veterans of Safety, has developed CSIP specifically for the Hawaii market.

OSHA Statistics:

Source: <https://www.osha.gov/oshstats/commonstats.html>

In 2016, OSHA performed 31,948 federal inspections and 43,105 State Plan inspections. In 2015, 4,836 workers were killed on the job, which averages out to more than 93 deaths a week or more than 13 deaths every day. 937 of these workers were in the construction industry. The leading causes of these deaths (excluding highway collisions) were results of the **Fatal Four**: falls, followed by struck by object, electrocution, and caught-in/between. The Fatal Four caused 64.2% of the construction worker deaths in 2015. Eliminating the Fatal Four would save 602 workers' lives in America every year.

2015 Fatal Four Statistics	2016 Top 10 most frequently cited OSHA standards violated
<p>I. Falls — 364 (38.8%)</p> <p>II. Struck by Object - 90 (9.6%)</p> <p>III. Electrocutions - 81 (8.6%)</p> <p>IV. Caught-in/between - 67 (7.2%) (This category includes construction workers killed when caught-in or compressed by equipment or objects, and struck, caught, or crushed in collapsing structure, equipment, or material)</p> <p>(2015)</p>	<p>I. Fall protection, construction communication standard, general industry</p> <p>II. Hazard communication standard, general industry</p> <p>III. Scaffolding, general requirements, construction</p> <p>IV. Respiratory protection, general industry</p> <p>V. Control of hazardous energy (lockout/ tagout), general industry</p> <p>VI. Powered industrial trucks, general industry</p> <p>VII. Ladders, construction</p> <p>VIII. Machinery and Machine Guarding, general requirements</p> <p>IX. Electrical, wiring methods, components and equipment, general industry</p> <p>X. Electrical systems design, general requirements, general industry</p> <p>(2016)</p>

INTRODUCTION

Evaluations

As this program has been funded through a grant, continued support for these types of programs necessitates lively engagement. Your attendance already is a critical component of the continuation of these types of programs. We are required to provide the Funder information so that they can evaluate the success of this program. The Funder wants your perception of the importance and effectiveness of this program. Immediately following the training session, you will be asked to fill out two evaluations. You will be asked to fulfill the third evaluation a few months after the end of the program. Each evaluation assesses a different aspect of the training and each are equally important. These evaluations measure your perception of the effectiveness and efficiency of the program. It is appreciated that you answer all questions honestly and to the best of your ability. Please provide detailed feedback so we may improve this program in the future.

The types of evaluations are described below:

Level 1- Training Session Reaction: Level 1 evaluations focus on your perceptions of the training program and the trainer(s). More specifically, these questions are designed to evaluate if the training was useful and relevant. The results of this evaluation will be used to improve future training programs.

Level 2- Learning Evaluation: Level 2 evaluations focus on the skills and information that you retain. The results will not affect you receiving your certification. This evaluation is shared with the Funder to demonstrate how the training program was effective.

Level 3-Training Impact Assessment: Level 3 evaluations will occur a few months after the conclusion of the CSIP program. The last evaluation demonstrates how much of what was learned has been applied to the workplace. This will measure the impact of your training in the workplace.

MODULE 1-1: HAZARD IDENTIFICATION PLAN

Activity 1: Group Discussion

Work in groups to answer the following questions

What are some hazards that you can think of? (Doesn't need to be relevant to your job)

I. _____

IV. _____

II. _____

V. _____

III. _____

VI. _____



Eliminate the hazards you came up with.

I. _____

IV. _____

II. _____

V. _____

VI. _____

Identifying Workplace Hazards

List the hazards you encounter at your workplace:

- I. _____
- II. _____
- III. _____
- IV. _____
- V. _____
- VI. _____



What can be done (by the company, colleagues, and/or you personally) to mitigate these hazards to prevent injury?

- I. _____
- II. _____
- III. _____
- IV. _____
- V. _____
- VI. _____

MODULE 1-1: HAZARD IDENTIFICATION PLAN

Activity 2: Identifying Hazards: Hidden Messages

Work in groups to answer the following questions

Identify some unclear/ vague messages that employees receive regarding work and/or safety

Example: Lift Properly

- I. _____
- II. _____
- III. _____
- IV. _____
- V. _____

How can these messages be clearer to strongly emphasize safety as the priority?

Example: Remember to always use the 4-step lift method when lifting heavy objects:

1. Size up the load 2. Lift with your legs 3. Move the load 4. Get set and lower

- I. _____
- II. _____
- III. _____
- IV. _____
- V. _____

MODULE 1-2: WORKPLACE SAFETY RULES & HAZARD CONTROL

Activity 1: Workplace Safety Rules

Safety Rules are intended to prevent accidents ensuring safe and successful business operations.



Pic

DISCUSSION! Develop some general safety rules that can be used to avoid Focus Four injuries at this site.

Rules to prevent electrical incidents

Rules to prevent falls

Rules to prevent "struck by" incidents

Rules to prevent caught in/ between incidents

MODULE 1-2: WORKPLACE SAFETY RULES & HAZARD CONTROL

Activity 2: Worksite Analysis: Spot the Hazards

Work in groups to identify any hazards posted in the picture.



This company was cited for numerous hazards. How many can you find?

MODULE 1-2: WORKPLACE SAFETY RULES & HAZARD CONTROL

Handout 1: Job Safety Analysis

JOB HAZARD ANALYSIS (J.H.A.)			
Job: Putting Out A Fire — Using A Dry Chemical Fire Extinguisher			
Tools/Equipment Required		Material Required	Personal Protective Equipment
Dry Chemical Fire Extinguisher _____		_____	Hard Hat _____ Safety Glasses _____
Steps	Sequence of Steps	Potential Accidents or Hazards	Recommended Safe Job Procedure
1.	Remove Extinguisher from hanger.	Extinguisher may fall.	Grasp extinguisher securely.
2.	Carry extinguisher in upright position to fire.	Fall by tripping or slipping.	Observe walking areas, obstacles, slippery surfaces.
3.	Pull pin of extinguisher, hold hose or horn in one hand.	Contact with contents.	Maintain control of extinguisher, avoid exposing individuals to contents.
4.	Use the extinguisher.	a. Caught in spread of fire. b. Clothing catches on fire. c. Resurgence of fire.	a. Use contents with rapid sweeping motion at base of flame. b. Keep proper distance. c. Move away when extinguisher empties. never turn your back to fire. Renew attack when indicated.
5.	Promptly report use of extinguisher.	If not re-charged, potential for serious fire.	Always check extinguisher after use and have it re-charged and put back in service immediately.
6.	Take extinguisher out of service and have it re-charged.		
Developed By: 1. _____		2. _____	3. _____
Reviewed By: 1. _____ (Name) (Position)		Approved By: _____ (Name) (Position)	
Revised By: _____		Date: _____	

MODULE 1-2: WORKPLACE SAFETY RULES & HAZARD CONTROL

Handout 2: Sample Standard Operating Procedure (SOP)

SOP HS-039 HAND AND POWER TOOLS SAFETY PROGRAM

1.0 POLICY

ECC's Hand and Power Tools Safety Program is prepared in accordance with 29 CFR 1910 Subpart P - *Hand and Portable Powered Tools and Other Hand-Held Equipment* (1910.241 to 1910.244); and 29 CFR 1926 Subpart I - *Tools - Hand and Power* (1926.300 to 1926.307).

2.0 OBJECTIVE

The objective of ECC's Hand and Power Tool Safety Program is to reduce the likelihood of injuries and accidents caused by improper handling.

3.0 SAFE OPERATING REQUIREMENTS

All hand tools shall be kept in good repair and used only for the purpose intended. Defective tools shall be acceptably repaired or removed from service. Tools shall not be thrown from one level to another, and when used overhead, shall be secured or placed in holders when not in actual use. All electrical tools shall be of the approved double or triple insulated type or grounded. Hand and portable power tools and equipment shall be guarded IAW 29 CFR 1910.243. Training on the use of hand tools/electrical tools shall be conducted by a competent person. Only trained/qualified employees shall operate tools.

4.0 HAND ARM VIBRATION (HAVs) – REYNAUD'S SYNDROME

Power tools designed to have minimal vibrations will be more comfortable to use and less likely to result in hand arm vibration (HAVS) also known as Reynaud's syndrome. Hand-arm vibration is caused by the use of vibrating hand-held tools. The nature of these tools involves vibration (a rapid back-and-forth type of motion) that is transmitted from the tool to the hands and arms of the person holding the tool. HAVS causes numbness and blanching of the hands, and can progress to complete disability if the worker is not removed from exposure.

The harmful health effects of vibrating tools are related to the length of time that a worker has been using vibrating tools and to the frequency of the vibration. The longer a person uses a vibrating tool, and the faster the tool vibrates the greater the risk of health effects. Temporary tingling or numbness during or soon after use of a vibrating hand tool is not considered to be HAVS; however, tingling and numbness in the fingers lasting more than an hour after finishing work may indicate early stages of HAVS.

Many of the symptoms of vibration syndrome will disappear shortly after a worker stops using the types of tools with transmit vibration to the hands and arms. Fatigue and muscular pain in

VII. Which of the following is considered approved eye protection?

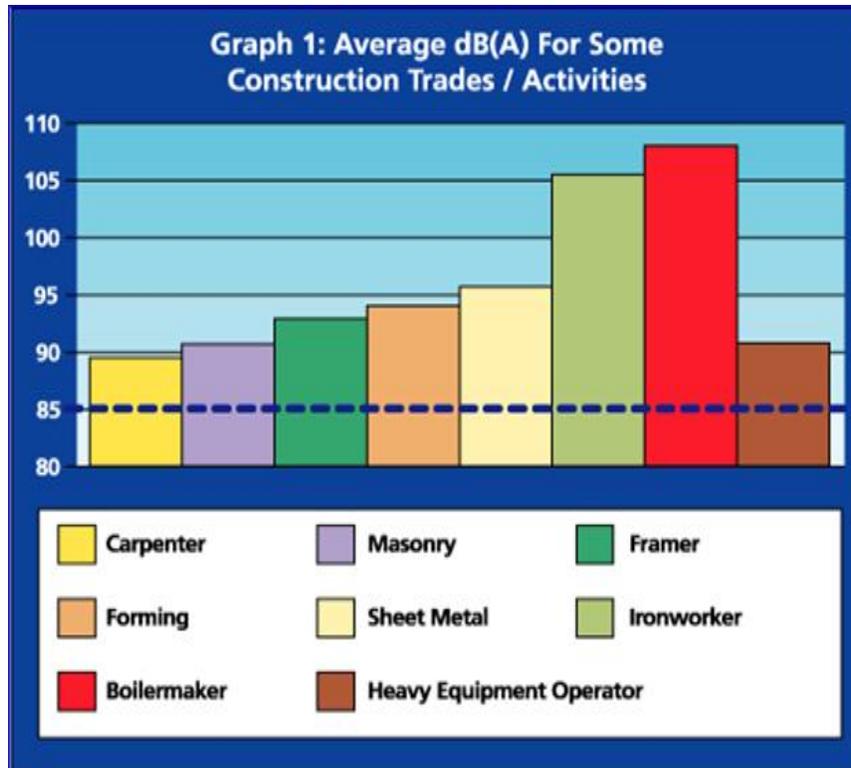
- a. Sun glasses
- b. Prescription glasses
- c. Reading glasses
- d. Glasses meeting ANSI standard Z87

VIII. Which of the following is not considered PPE?

- a. Rubber gloves
- b. Glasses meeting ANSI Z87
- c. Sports shoes
- d. Hearing muffs

MODULE 2-1: PERSONAL PROTECTIVE EQUIPMENT

Handout 1: Noise Levels



DECIBEL - dB(A)	EQUIPMENT
112	Pile driver
110	Air arcing gouging
108	Impact wrench
107	Bulldozer - no muffie
102-104	Air grinder
102	Crane - uninsulated cab
101-103	Bulldozer - no cab
97	Chipping concrete
96	Circular saw and hammering
96	Jack hammer
96	Quick-cut saw
95	Masonry saw
94	Compactor - no cab
90	Crane - insulated cab
87	Loader/backhoe - insulated cab
86	Grinder
85-90	Welding machine
85	Bulldozer - insulated cab
60-70	Speaking voice

Double protection recommended above 105 dB(A)

Hearing protection recommended above 85 dB(A)

Table 1: Some typical noise levels found on construction sites

MODULE 2-1: PERSONAL PROTECTIVE EQUIPMENT

Group Activity 1: PPE Assessment

Working in groups, brainstorm as many common tasks as you can that would require PPE. Tasks can be generalized, such as “painting,” “using liquid chemical,” “sanding,” etc.

REQUIRED PPE	TASKS TO BE PERFORMED
Hearing Protection	
Head Protection	
Hand Protection	
Feet Protection	
Eye Protection	
Respiratory Protection	
Body/Skin Protection	

MODULE 2-2: DISCIPLINARY POLICY & EMPLOYER RESPONSIBILITIES

Employer Responsibility & Disciplinary Policy

Answer some brief questions about your workplace

What are some disciplinary policies in place at your work?

- I. _____
- II. _____
- III. _____
- IV. _____
- V. _____

What are some disciplinary actions that you would change, add, or eliminate at work? Why?

- I. _____
- II. _____
- III. _____
- IV. _____
- V. _____

GROUP DISCUSSION!

List three inviolable rules that you feel are important

- I. _____
- II. _____
- III. _____

MODULE 2-3 WORKER RIGHTS AND ANTI-RETALIATION

Activity 1: Worker Rights and Anti-Retaliation

Filing A Complaint: Use the information below to draft a complaint to OSHA.

You are a construction worker for Capital Construction, Inc, 66 Nimitz Highway, Honolulu, HI 96817. Your company does non-residential plumbing, heating, and airconditioning work. You have been with the company for 3 years. You, along with 7 co-workers, have been installing sheetmetal ductwork in the lower level of the Ala Moana Mall, which has been undergoing renovation for the past few weeks. The site is located in the lower, Northwest quadrant. One of your coworkers has been operating a 65-horsepower concrete cutting saw in the area. The saw is being run in the propane mode. You and several coworkers get headaches from the fumes whenever the saw is used and have told your supervisor about the problem. The supervisor said that nothing could be done, because the General Contractor, BLC Management, has control over the site and this job will be complete in another month. You did some research and found out that exposure to propane in a confined, unventilated area can cause headaches, dizziness, difficulty breathing and unconsciousness. There is no ventilation or monitoring of the air in the area. After talking to your union representative, you decide to file a complaint with OSHA.

Source: https://www.osha.gov/dte/grant_materials/fy11/sh-22224-11/2_Filing_an_OSHA_Complaint.pdf

Please Indicate Your Desire:

- Do NOT reveal my name to my Employer
- My name may be revealed to the Employer

The Undersigned believes that a violation of an Occupational Safety or Health standard exists which is a job safety or health hazard at the establishment named on this form.

(Mark "X" in ONE box)

- Former Employee
- Current Employee
- Federal Safety and Health Committee
- Representative of Employees Other (specify)_____

Complainant Name

Telephone

Address (Street, City, State, Zip)

Signature

Date

APPENDIX 1: ANSWERS

Worksite Analysis: Spot the Hazards (Page 6)

Observations: The make-shift ramp and make-shift tent, saw horse on the left and the flimsy wood brace on the right side, the spot where the ramp meets the wall: it's not easy for a worker to transition from the ramp to the scaffold, no one is wearing a hardhat, the worker in the window isn't wearing a fall protection harness, tools and clutter are all over the ground, creating trip hazards, the bags of mortar outside of the "tent" are trip hazards

PPE QUIZ (Page 9-10)

- | | |
|---|--|
| I. Who is responsible for providing PPE? | a) Employer |
| II. Common causes of foot injuries include: crushing, penetration, molten metal, chemicals, slippery surfaces, and sharp objects. | a) True |
| III. Safety controls must meet the following order of priority | d) Substitution, engineering, administrative, and PPE |
| IV. Which type of hard hat would provide the most protection from electrical hazards? | c) Class E |
| V. The need for hearing protection is triggered at which decibel level? | b) When it exceeds 90 decibels |
| VI. Who is responsible for providing specialized work footwear? | a) The employer |
| VII. Which of the following is considered approved eye protection? | d) Glasses meeting ANSI standard Z87 |
| VIII. Which of the following is not considered PPE? | c) Sports shoes |

Personal Protective Equipment Assessment (Page 12)

Source: https://www.osha.gov/dte/library/ppe_assessment/ppe_assessment.html

SCENARIO	REQUIRED PPE
Gas and vapor contaminants, smoke and other fire-related contaminants, particulate contaminants, oxygen deficiency, gas, vapor contaminants and other highly toxic air contaminants	Respiratory Protection
Machining, grinding, sanding, work near conveyors, pneumatic equipment, generators, ventilation fans, motors, punch and brake presses	Hearing Protection
Pouring, mixing, painting, cleaning, syphoning, dip tank operations, machining, sawing, battery charging, installing fiberglass insulation, compressed air or gas operations, cutting, grinding, sanding, sawing, glazing, material handling, welding, pouring molten metal, baking, cooking, drying, pouring, mixing, painting, cleaning, syphoning, dip tank operations	Body Protection
Pouring, mixing, painting, cleaning, syphoning, dip tank operations, welding, pouring molten metal, baking, cooking, drying, cutting, sanding, grinding, hammering, chopping, pouring, mixing, painting, cleaning, syphoning, work stations or traffic routes located under catwalks or conveyor belts, construction, trenching, utility work, construction, confined space operations, building maintenance, building maintenance; utility work; construction; wiring; work on or near communications, computer, or other high tech equipment; arc or resistance welding	Face/ Head Protection
Grinding, sanding, sawing, hammering, material handling, pouring, mixing, painting, cleaning, syphoning, dip tank operations, health care and dental services, welding, pouring molten metal, baking, cooking, drying, building maintenance; utility work; construction; wiring; work on or near communications, computer, or other high tech equipment; arc or resistance welding;	Hand Protection
Anthrax related, chemicals, liquids, corrosives (acids, bases), flammable liquids, air or water reactive chemicals	Skin Protection

<p>Construction, plumbing, building maintenance, trenching, utility work, grass cutting, building maintenance; utility work, construction, wiring, work on or near communications, computer, or other high tech equipment; arc or resistance welding, welding, foundry work, casting, demolition, explosives manufacturing, grain milling, spray painting, abrasive blasting, work with highly flammable materials</p>	<p>Feet Protection</p>
<p>Sawing, cutting, drilling, sanding, grinding, hammering, chopping, abrasive blasting, punch press operations, pouring, mixing, painting, cleaning, syphoning, dip tank operations, dental and health care services, welding, cutting, laser operations</p>	<p>Eye Protection</p>

APPENDIX 2: OSHA HAZARDOUS MATERIALS

1910.120 App B: General Description and Discussion of the Levels of Protection and Protective Gear

This appendix sets forth information about personal protective equipment (PPE) protection levels, which may be used to assist employers in complying with the PPE requirements of this section.

As required by the standard, PPE must be selected which will protect employees from the specific hazards, which they are likely to encounter during their work on-site.

Selection of the appropriate PPE is a complex process, which should take into consideration a variety of factors. Key factors involved in this process are identification of the hazards, or suspected hazards; their routes of potential hazard to employees (inhalation, skin absorption, ingestion, and eye or skin contact); and the performance of the PPE materials (and seams) in providing a barrier to these hazards. **The amount of protection provided by PPE is material-hazard specific.** That is, protective equipment materials will protect well against some hazardous substances and poorly, or not at all, against others. In many instances, protective equipment materials cannot be found which will provide continuous protection from the particular hazardous substance. In these cases, the breakthrough time of the protective material should exceed the work durations.

Other factors in this selection process to be considered are matching the PPE to the employee's work requirements and task-specific conditions. The durability of PPE materials, such as tear strength and seam strength, should be considered in relation to the employee's tasks. The effects of PPE in relation to heat stress and task duration are a factor in selecting and using PPE. In some cases, layers of PPE may be necessary to provide sufficient protection, or to protect expensive PPE inner garments, suits, or equipment.

The more that is known about the hazards at the site, the easier the job of PPE selection becomes. As more information about the hazards and conditions at the site becomes available, the site supervisor can make decisions to up-grade or downgrade the level of PPE protection to match the tasks at hand.

The following are guidelines, which an employer can use to begin the selection of the appropriate PPE.

As noted above, the site information may suggest the use of combinations of PPE selected from the different protection levels (i.e., A, B, C, or D) as being more suitable to the hazards of the work. It should be cautioned that the listing below does not fully address the performance of the specific PPE material in relation to the specific hazards at the job site, and that PPE selection, evaluation and re-selection is an ongoing process until sufficient information about the hazards and PPE performance is obtained.

Part A. Personal protective equipment is divided into four categories based on the degree of protection afforded. (See Part B of this appendix for further explanation of Levels A, B, C, and D hazards.)

I. Level A - To be selected when the greatest level of skin, respiratory, and eye protection is required.

The following constitute Level A equipment; it may be used as appropriate;

1. Positive pressure, full face-piece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA, approved by the National Institute for Occupational Safety and Health (NIOSH).
2. Totally-encapsulating chemical-protective suit.
3. Coveralls
4. Long underwear.
5. Gloves, outer, chemical-resistant.
6. Gloves, inner, chemical-resistant.
7. Boots, chemical-resistant, steel toe, and shank.
8. Hard hat (under suit)
9. Disposable protective suit, gloves, and boots (depending on suit construction, may be worn over totally-encapsulating suit).

II. Level B - The highest level of respiratory protection is necessary but a lesser level of skin protection is needed.

The following constitute Level B equipment; it may be used as appropriate.

1. Positive pressure, full-face piece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA (NIOSH approved).
2. Hooded chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls).
3. Coveralls
4. Gloves, outer, chemical-resistant.
5. Gloves, inner, chemical-resistant.
6. Boots, outer, chemical-resistant steel toe and shank.
7. Boot-covers, outer, chemical-resistant (disposable)
8. Hard hat
9. [Reserved]
10. Face shield

III. Level C - The concentration(s) and type(s) of airborne substance(s) is known and the criteria for using air-purifying respirators are met.

The following constitute Level C equipment; it may be used as appropriate.

1. Full-face or half-mask, air-purifying respirators (NIOSH approved).
2. Hooded chemical-resistant clothing (overalls; two-piece chemical-splash suit; disposable chemical-resistant overalls).
3. Coveralls
4. Gloves, outer, chemical-resistant.
5. Gloves, inner, chemical-resistant.
6. Boots (outer), chemical-resistant steel toe and shank
7. Boot-covers, outer, chemical-resistant (disposable)
8. Hard hat.
9. Escape mask
10. Face shield

IV. Level D - A work uniform affording minimal protection: used for nuisance contamination only.

The following constitute Level D equipment; it may be used as appropriate:

1. Coveralls.
2. Gloves
3. Boots/shoes, chemical-resistant steel toe and shank.
4. Boots, outer, chemical-resistant (disposable)
5. Safety glasses or chemical splash goggles
6. Hard hat
7. Escape mask
8. Face shield

Part B. The types of hazards for which levels A, B, C, and D protection are appropriate are described below:

I. Level A - Level A protection should be used when:

1. The hazardous substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either the measured (or potential for) high concentration of atmospheric vapors, gases, or particulates; or the site operations and work functions involve a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through the skin,
2. Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible; or
3. Operations must be conducted in confined, poorly ventilated areas, and the absence of conditions requiring Level A have not yet been determined.

II. Level B protection should be used when:

1. The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection.
 2. The atmosphere contains less than 19.5 percent oxygen; or
 3. The presence of incompletely identified vapors or gases is indicated by a direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin.
- Note: This involves atmospheres with IDLH concentrations of specific substances that present severe inhalation hazards and that do not represent a severe skin hazard; or that do not meet the criteria for use of air-purifying respirators.

III. Level C - Level C protection should be used when:

1. The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin;
2. The types of air contaminants have been identified, concentrations measured, and an air-purifying respirator is available that can remove the contaminants; and
3. All criteria for the use of air-purifying respirators are met.

IV. Level D - Level D protection should be used when:

1. The atmosphere contains no known hazard; and
2. Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

Note: As stated before, combinations of personal protective equipment other than those described for Levels A, B, C, and D protection may be more appropriate and may be used to provide the proper level of protection.

Source: https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=9767

Protecting Employees from Workplace Hazards

- OSHA regulations require employers to protect their employees from workplace hazards such as machines, work procedures, and hazardous substances that can cause injury
- Employers must institute all feasible engineering and work practice controls to eliminate and reduce hazards before using PPE to protect against hazards

Eye and Face Protection

Criteria

- Protect against specific hazard(s) encountered by employees
- Comfortable to wear
- Must not restrict vision or movement
- Durable and easy to clean and disinfect
- Must not interfere with the function of any other required PPE
- Meet requirements of ANSI Z87.1-1989 for devices purchased after July 5, 1994, and ANSI Z87.1-1968 for devices purchased before that date

Eye Protection for Employees Who Wear Eyeglasses

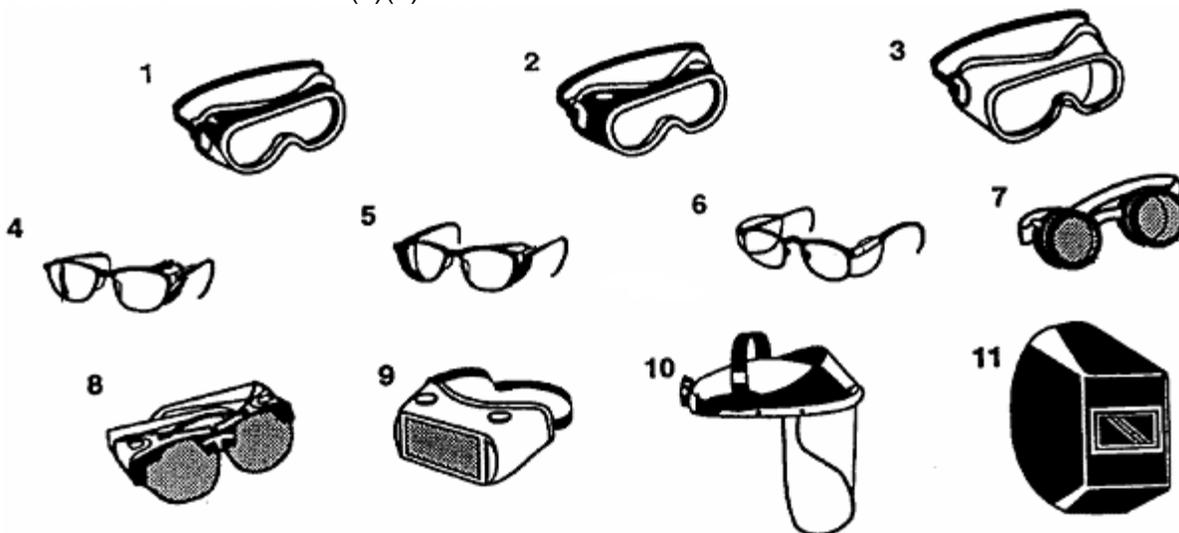
- Prescription spectacles, with side shields and protective lenses meeting requirements of ANSI Z87.1
- Goggles that can fit comfortably over corrective eyeglasses without disturbing their alignment
- Goggles that incorporate corrective lenses mounted behind protective lenses

Face Shields

- Do not protect employees from impact hazards
- Use face shields in combination with goggles or safety spectacles when you must protect your employees from impact hazards, even in the absence of dust or potential splashes

Figure 1. Recommended Eye and Face Protectors

Source: 29 CFR 1926.102 (a)(5) Table E-1



Eye and face protectors are identified below by number and type. Refer to Table 1 for recommended usage applications.

1. GOGGLES, Flexible Fitting, Regular Ventilation
2. GOGGLES, Flexible Fitting, Hooded Ventilation
3. GOGGLES, Cushioned Fitting, Rigid Body
4. SPECTACLES, Metal Frame, With Sideshields*
5. SPECTACLES, Plastic Frame, With Sideshields*
6. SPECTACLES, Metal-Plastic Frame, With Flat-Fold Side shields*
7. WELDING GOGGLES, Eyecup type, Tinted Lenses**
- 7A. CHIPPING GOGGLES, Eyecup Type, Clear Safety Lenses (not illustrated)
8. WELDING GOGGLES, Eyecup type, Tinted Plate Lens**
- 8A. CHIPPING GOGGLES, Coverspec Type, Clear Safety Lenses (not illustrated)
9. WELDING GOGGLES, Coverspec Type, Tinted Plate Lens**
10. FACE SHIELD (Available With Plastic or Mesh Window, Tinted/Transparent)
11. WELDING HELMETS**

*These are also available without side shields for limited use requiring only frontal protection.

** See Table 2, Filter Lens Shade Numbers for Protection Against Radiant Energy.

Table 1. Eye and Face Protector Selection Guide

Source: 29 CFR 1926.102(a)(5)

Operation	Hazards	Recommended protectors: (see Figure 1)
Acetylene-burning, Acetylene-cutting, Acetylenewelding	Sparks, harmful rays, molten metal, flying particles	7,8,9
Chemical handling	Splash, acid burns, fumes	2,10 (for severe exposure add 10 over 2)
Chipping	Flying particles	1,3,4,5,6,7A, 8A
Electric (arc) welding	Sparks, intense rays, molten metal	9,11 (11 in combination with 4,5,6 in tinted lenses advisable)
Furnace operations	Glare, heat, molten metal	7,8,9 (for severe exposure add 10)
Grinding - light	Flying particles	1,3,4,5,6,10
Grinding - heavy	Flying particles	1,3,7A, 8A (for sever exposure add 10)
Laboratory	Chemical splash, glass	2 (10 when in breakage combination with 4,5,6)
Machining	Flying particles	1,3,4,5,6,10
Molten metals	Heat, glare, sparks, splash	7,8 (10 in combination with 4,5,6 in tinted lenses)
Spot welding	Flying particles, sparks	1,3,4,5,6,10

Classes of Hard Hats

Class A

- Used for general service (e.g., mining, building construction, shipbuilding, lumbering, manufacturing)
- Provide good impact protection but limited voltage protection

Class B

- Used for electrical work
- Protect against falling objects and high-voltage shock and burns

Class C

- Designed for comfort, offer limited protection
- Protect heads that might bump against fixed objects, but do not protect against falling objects or electrical shock

Foot and Leg Protection



Some of the potential hazards that would require foot and leg protection include:

- Heavy objects such as barrels or tools that might roll onto or fall on employees' feet
- Sharp objects such as nails or spikes that might pierce the soles or uppers of ordinary shoes
- Molten metal that might splash on feet or legs
- Hot or wet surfaces
- Slippery surfaces

Foot Protection Requirements

- Protective footwear purchased after July 5, 1994 must meet the requirements of ANSI Z41-1991
- Protective footwear purchased before that date must comply with ANSI Z41-1967A

Foot and Leg Protection Choices

- **Leggings.** Protect lower legs and feet from heat hazards, like molten metal or welding sparks. Safety snaps allow leggings to be removed quickly.
- **Metatarsal Guards.** Strapped to outside of shoes to protect instep area from impact and compression. Made of aluminum, steel, fiber or plastic.
- **Toe Guards.** Fit over the toes of regular shoes to protect only the toes from impact and compression. Made of steel, aluminum, or plastic.
- **Combination Foot and Shin Guards.** May be used in combination with toe guards when greater protection is needed.
- **Safety Shoes.** These have impact-resistant toes and heat-resistant soles that protect against hot work surfaces common in roofing, paving, and hot metal industries.
 - May have metal insoles to protect against puncture wounds
 - May be designed to be electrically conductive for use in explosive atmospheres
 - May be designed to be electrically nonconductive to protect from workplace electrical hazards

Hand and Arm Protection

- When engineering and work practice controls fail to eliminate the risk of injury to your employees' hands or arms, protective gloves are the primary means of protecting their hands
- When the risk of injury includes the arm, protective sleeves, often attached to the gloves, may be appropriate
- Nature of the hazard(s) and the operation to be performed will determine your selection of gloves

Types of Gloves

- Durable work gloves made of metal mesh, leather or canvas
- Fabric and coated fabric gloves
- Chemical and liquid resistant gloves
- Insulating rubber gloves*

Asbestos gloves and asbestos linings **are prohibited.**

* Detailed requirements for selection and use of insulating rubber gloves for use against electrical hazards are provided in 29 CFR 1910.137, and are therefore not included in this discussion.

Metal Mesh, Leather, or Canvas Gloves

Sturdy gloves made from metal mesh, leather, or canvas provide protection from cuts, burns, and sustained heat.

- **Leather Gloves**
 - Protect against sparks, moderate heat, blows, chips, and rough objects
 - Welders in particular need the durability of higher-quality leather gloves
- **Aluminized Gloves**
 - Provide reflective and insulating protection against heat
 - Usually used for welding, furnace, and foundry work
 - Require an insert made of synthetic materials that protect against heat and cold
 - Asbestos inserts are prohibited

- **Aramid Fiber Gloves**
 - Aramid is a synthetic material that protects against heat and cold
 - Many glove manufacturers use aramid fiber to make gloves that are cut- and abrasive-resistant and wear well
- **Other Synthetic Materials**
 - Several manufacturers make gloves with other synthetic fabrics that offer protection against heat and cold
 - Cut- and abrasive-resistant and may withstand some diluted acids
 - Do not stand up well against alkalis and solvents

Fabric and Coated Fabric Gloves

- Gloves made of cotton or other fabric protect against dirt, slivers, chafing, and abrasion but do not provide sufficient protection to be used with rough, sharp or heavy materials
- Cotton flannel gloves coated with plastic transform fabric gloves into general-purpose hand protection offering slip-resistant qualities
- Coated fabric gloves are used for tasks ranging from handling bricks and wire rope to handling chemical containers in laboratory operations
- For protection against chemical exposure hazards, always check with the manufacturer to determine the gloves' effectiveness against the specific chemicals and conditions in the workplace

Chemical and Liquid-Resistant Gloves

- Gloves made of rubber (latex, nitrile, or butyl), plastic, or synthetic rubber-like material such as neoprene protect workers from burns, irritation, and dermatitis caused by contact with oils, greases, solvents, and other chemicals
- Use of rubber gloves also reduces the risk of exposure to blood and other potentially infectious substances

Common Gloves Used for Chemical Protection

- **Butyl Rubber Gloves**
 - Protect against nitric acid, sulfuric acid, hydrofluoric acid, red fuming nitric acid, rocket fuels, and peroxide
 - Resist oxidation and ozone corrosion.
 - Resist abrasion and remain flexible at low temperatures.
- **Natural Latex or Rubber Gloves**
 - Comfortable wear and pliability along with their protective qualities make them a popular general purpose glove
 - Resist abrasions caused by sandblasting, grinding, and polishing and protect workers' hands from most water solutions of acids, alkalis, salts, and ketones
 - Hypoallergenic gloves, glove liners, and powerless gloves possible alternatives for those allergic to latex
- **Neoprene Gloves**
 - Good pliability, finger dexterity, high density, and tear resistance
 - Provide protection from hydraulic fluids, gasoline, alcohols, organic acids, and alkalis
- **Nitrile Rubber Gloves**
 - Provide protection from chlorinated solvents such as trichloroethylene and perchloroethylene
 - Intended for jobs requiring dexterity and sensitivity, yet stand up to heavy use even after prolonged exposure that cause other gloves to deteriorate

Resist abrasion, puncturing, snagging, and tearing

Body Protection

Workplace hazards that could injure your employees' bodies include the following:

- Intense heat
- Splashes of hot metals and other hot liquids
- Impacts from tools, machinery, and materials
- Cuts
- Hazardous chemicals
- Contact with potentially infectious materials, like blood
- Radiation

Types of Body Protection

- Vests
- Jackets
- Aprons
- Coveralls
- Surgical gowns
- Full body suits

Materials for Protective Clothing

- **Paper-Like Fiber.** Disposable suits made of this material provide protection against dust and splashes.
- **Treated Wool and Cotton.** Adapts well to changing workplace temperatures. Comfortable and fire resistant. Protects against dust, abrasions, and rough and irritating surfaces.
- **Duck.** Protects employees against cuts and bruises while they handle heavy, sharp, or rough materials.
- **Leather.** Often used against dry heat and flame.
- **Rubber, Rubberized Fabrics, Neoprene, and Plastics.** Provides protection against certain acids and other chemicals.

Hearing Protection

- Noise exposure depends on:
 - Level of sound, measured in decibels on the A-scale (dBA)
 - Duration of employee's exposure to sound of various levels throughout the work day
- Measured with noise dosimeter, which indicates daily noise dose in percent

When is Hearing Protection Required?

- As with other types of hazards, you must implement feasible engineering and work practice controls before resorting to PPE, in this case hearing protection
- OSHA's noise standard (29 CFR 1910.95) requires the use of hearing protection when the employee's noise exposure exceeds an 8-hour time-weighted average sound level (TWA) of 90 dBA (dose of 100 percent)
- Employees who are exposed to an 8-hour TWA of 85 dBA (dose of 50 percent) and who have measured hearing loss (as prescribed by the OSHA standard) are also required to wear hearing protection

Hearing Conservation Program (HCP)

- All employees whose noise exposures equal or exceed an 8-hour TWA of 85 dBA must be included in a HCP
- HCP is comprised of five basic elements:
 - Exposure monitoring
 - Audiometric testing
 - Hearing protection\
 - Employee training
 - Recordkeeping

Monitoring

- Required to identify employees who are subjected to noise exposures of 85 dBA or more
- Must be repeated whenever change in production, process, equipment or controls increases noise exposures to extent that:
 - Additional employees may be over-exposed, or
 - Hearing protectors being used may be rendered inadequate

Audiometric Testing Program

- Monitors employee hearing acuity over time
- Includes baseline and annual audiograms and initiates training and follow-up procedures
- Tests must be conducted by a professional or trained technician in an appropriate test environment

Hearing Protection

- Must be made available to all employees exposed to an 8-hour TWA of 85 dBA or more
- Mandatory for those who have experienced hearing loss, defined as a “Standard Threshold Shift” in the OSHA standard
- Common types include ear plugs and earmuffs
- Hearing protector’s attenuation capacity shown by its Noise Reduction Rating (NRR) on package
- Proper fit very important

Training

Annual training required in:

- Effects of noise
- Purpose, advantages, disadvantages, and attenuation characteristics of various types of hearing protectors
- Selection, fitting and care of protectors
- Purposes and procedures of audiometric testing

Recordkeeping

- Noise exposure records must be kept for 2 years
- Records of audiometric test results must be maintained for duration of affected employee’s employment

Summary

- OSHA requires that you implement a PPE program to help you systematically assess the hazards in the workplace and select the appropriate PPE that will protect workers from those hazards
- As part of this PPE program, you must do the following:
 - Assess the workplace for hazards
 - Implement engineering controls and work practices to control or eliminate these hazards to the extent feasible
 - Select appropriate PPE to protect employees from hazards that cannot be eliminated or controlled through engineering controls and work practices
 - Inform your employees why the PPE is necessary and when it must be worn
 - Train your employees how to use and care for the selected PPE and how to recognize PPE deterioration and failure
- Require your employees to wear the selected PPE in the workplace
- Source: https://www.osha.gov/dte/library/ppe_assessment/ppe_assessment.html (Emphasis added)

APPENDIX 3: OSHA PPE REQUIREMENTS

1910.132 General Requirements

1910.132(a)

Application. Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

1910.132(b)

Employee-owned equipment. Where employees provide their own protective equipment, the employer shall be responsible to assure its adequacy, including proper maintenance, and sanitation of such equipment.

1910.132(c)

Design. All personal protective equipment shall be of safe design and construction for the work to be performed.

1910.132(d) Hazard assessment and equipment selection.

1910.132(d)(1)

The employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, the employer shall:

1910.132(d)(1)(i)

Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment;

1910.132(d)(1)(ii)

Communicate selection decisions to each affected employee; and,

1910.132(d)(1)(iii)

Select PPE that properly fits each affected employee.

Note: Non-mandatory appendix B contains an example of procedures that would comply with the requirement for a hazard assessment.

1910.132(d)(2)

The employer shall verify that the required workplace hazard assessment has been performed through a written certification that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment; and, which identifies the document as a certification of hazard assessment.

1910.132(e)

Defective and damaged equipment. Defective or damaged personal protective equipment shall not be used.

1910.132(f) Training.

1910.132(f)(1)

The employer shall provide training to each employee who is required by this section to use PPE. Each such employee shall be trained to know at least the following:

1910.132(f)(1)(i)

When PPE is necessary;

1910.132(f)(1)(ii)

What PPE is necessary;

1910.132(f)(1)(iii)

How to properly don, doff, adjust, and wear PPE;

1910.132(f)(1)(iv)

The limitations of the PPE; and,

1910.132(f)(1)(v)

The proper care, maintenance, useful life and disposal of the PPE.

1910.132(f)(2)

Each affected employee shall demonstrate an understanding of the training specified in paragraph (f)(1) of this section, and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE.

1910.132(f)(3)

When the employer has reason to believe that any affected employee who has already been trained does not have the understanding and skill required by paragraph (f)(2) of this section, the employer shall retrain each such employee. Circumstances where retraining is required include, but are not limited to, situations where:

1910.132(f)(3)(i)

Changes in the workplace render previous training obsolete; or

1910.132(f)(3)(ii)

Changes in the types of PPE to be used render previous training obsolete; or

1910.132(f)(3)(iii)

Inadequacies in an affected employee's knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill.

1910.132(g)

Paragraphs (d) and (f) of this section apply only to §§ 1910.133, 1910.135, 1910.136, 1910.138, and 1910.140. Paragraphs (d) and (f) of this section do not apply to §§ 1910.134 and 1910.137.

1910.132(h) Payment for protective equipment.

1910.132(h)(1)

Except as provided by paragraphs (h)(2) through (h)(6) of this section, the protective equipment, including personal protective equipment (PPE), used to comply with this part, shall be provided by the employer at no cost to employees.

1910.132(h)(2)

The employer is not required to pay for non-specialty safety-toe protective footwear (including steel-toe shoes or steel-toe boots) and non-specialty prescription safety eyewear, provided that the employer permits such items to be worn off the job-site.

1910.132(h)(3)

When the employer provides metatarsal guards and allows the employee, at his or her request, to use shoes or boots with built-in metatarsal protection, the employer is not required to reimburse the employee for the shoes or boots.

1910.132(h)(4) The employer is not required to pay for:

1910.132(h)(4)(i)

The logging boots required by 29 CFR 1910.266(d)(1)(v);

1910.132(h)(4)(ii)

Everyday clothing, such as long-sleeve shirts, long pants, street shoes, and normal work boots; or

1910.132(h)(4)(iii)

Ordinary clothing, skin creams, or other items, used solely for protection from weather, such as winter coats, jackets, gloves, parkas, rubber boots, hats, raincoats, ordinary sunglasses, and sunscreen.

1910.132(h)(5)

The employer must pay for replacement PPE, except when the employee has lost or intentionally damaged the PPE.

1910.132(h)(6)

Where an employee provides adequate protective equipment he or she owns pursuant to paragraph (b) of this section, the employer may allow the employee to use it and is not required to reimburse the employee for that equipment. The employer shall not require an employee to provide or pay for his or her own PPE, unless the PPE is excepted by paragraphs (h)(2) through (h)(5) of this section.

1910.132(h)(7)

This paragraph (h) shall become effective on February 13, 2008. Employers must implement the PPE payment requirements no later than May 15, 2008.

Note to §1910.132(h): When the provisions of another OSHA standard specify whether or not the employer must pay for specific equipment, the payment provisions of that standard shall prevail. [39 FR 23502, June 27, 1974, as amended at 59 FR 16334, April 6, 1994; 59 FR 33910, July 1, 1994; 59 FR 34580, July 6, 1994; 72 FR 64428, Nov. 15, 2007; 76 FR 33606, June 8, 2011; 81 FR 82999, Nov. 18, 2016]

Source: https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9777

APPENDIX 5: OSHA SAFETY POSTER



All workers have the right to:

- A safe workplace.
- Raise a safety or health concern with your employer or OSHA, or report a work-related injury or illness, without being retaliated against.
- Receive information and training on job hazards, including all hazardous substances in your workplace.
- Request an OSHA inspection of your workplace if you believe there are unsafe or unhealthy conditions. OSHA will keep your name confidential. You have the right to have a representative contact OSHA on your behalf.
- Participate (or have your representative participate) in an OSHA inspection and speak in private to the inspector.
- File a complaint with OSHA within 30 days (by phone, online or by mail) if you have been retaliated against for using your rights.
- See any OSHA citations issued to your employer.
- Request copies of your medical records, tests that measure hazards in the workplace, and the workplace injury and illness log.

This poster is available free from OSHA.

Contact OSHA. We can help.

Employers must:

- Provide employees a workplace free from recognized hazards. It is illegal to retaliate against an employee for using any of their rights under the law, including raising a health and safety concern with you or with OSHA, or reporting a work-related injury or illness.
- Comply with all applicable OSHA standards.
- Report to OSHA all work-related fatalities within 8 hours, and all inpatient hospitalizations, amputations and losses of an eye within 24 hours.
- Provide required training to all workers in a language and vocabulary they can understand.
- Prominently display this poster in the workplace.
- Post OSHA citations at or near the place of the alleged violations.

FREE ASSISTANCE to identify and correct hazards is available to small and medium-sized employers, without citation or penalty, through OSHA-supported consultation programs in every state.



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OSHA-3095-08-2016

APPENDIX 6: TIPS FOR FILING AN OSHA COMPLAINT

Try to complete the form as accurately and completely as possible. Describe each hazard you think exists in as much detail as you can. If the hazards described in your complaint are not all in the same area, please identify where each hazard can be found at the worksite. If there is any particular evidence that supports your suspicion that a hazard exists (for instance, a recent accident or physical symptoms of employees at your site) include the information in your description. If you need more space than is provided on the form, continue on any other sheet of paper. After you have completed the form, return it to your local OSHA office.

Here are tips for completing the form:

1. **Be specific and include appropriate details:** The information on the complaint form may be the only description of the hazard that the inspector will see before the inspection. The inspector will base his or her research and planning on this information.
2. **Establishment Name, Address, & Type of Business:** Be thorough and specific. The inspector's research on the company and the industry's hazards will be based on this information.
3. **Hazard Description/Location:** The hazard description is the most important part of the form. Your answer should explain the hazards clearly. If your complaint is about chemicals, identify them whenever possible and attach copies of labels or MSDSs if you can. Identify the location so the inspector will know where to look.
4. **Has this condition been brought to the attention of the employer or another government agency?** You should indicate on the form if you have tried to get the employer to fix the hazard before filing the complaint. Also, if another agency, such as a local fire or building department, has been notified of these hazards, OSHA may want to consult with them.
5. **Do NOT reveal my name:** OSHA will keep your name off the complaint, if you wish. Remember that discrimination for health and safety activity is illegal. If you are a union representative, you may wish to have your name on the complaint.
6. **Signature and address:** It is important to sign the complaint if you want OSHA to conduct an onsite inspection. Also, your address will allow OSHA to send copies of inspection related materials to you.

