



Chemical hazards in the workplace

How to protect yourself; and your right to know

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Training materials developed with grant funds will be posted at <http://www.osha.gov/dte/library>

Course objective

At the end of this training, you will know:

- **how to recognize chemical exposure**
- **how to properly protect yourself from chemical exposure**
- **your right to know about the chemicals you work with**
- **your right to work in a safe and healthy workplace**

This training will help reduce injuries and illnesses in the workplace, keep you safe, and healthy so that you do not lose income from being sick and out of work.



Your right-to-know

OSHA's hazard communication standard is also known as OSHA's Right-To-Know Law.

The federal government wants to prevent all possible injuries and illnesses relating to working with hazardous chemicals in your workplace. All employers with hazardous chemicals in their workplaces must have labels and safety data sheets for their exposed workers, and train them to handle the chemicals properly.



Your right-to-know

In addition to knowing about the chemicals you work with, the OSHA hazard communication standard allows you to:

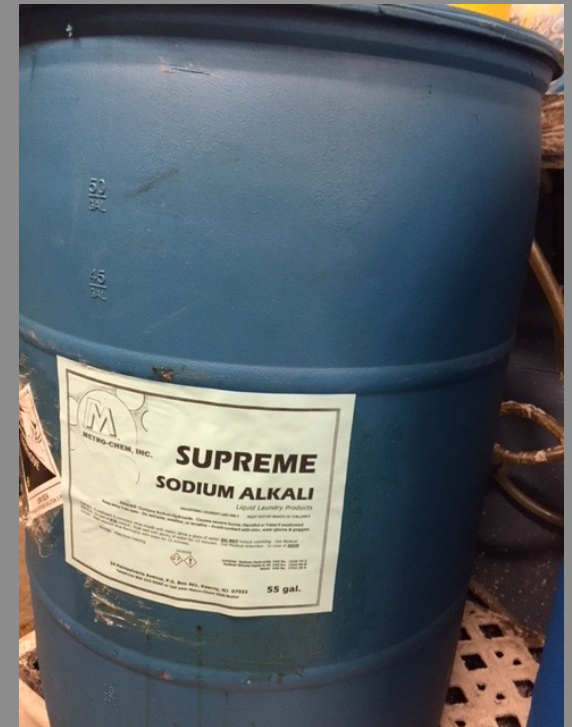
- **Ask your employer for records of work-related injuries and illnesses (OSHA Form 300)**
- **Ask your employer for information on workplace monitoring for health hazards such as chemical, noise and radiation exposure**
- **Ask your employer for details of the health hazards of chemicals used in the workplace, and access to the Safety Data Sheets (SDS) of each chemical you work with**

A summary (Form 300A) of injuries and illnesses that have occurred at the workplace for the year should be posted in a visible location so that all employees are aware.

What are chemicals?

Each year, millions of workers work with and are potentially exposed to one or more chemical hazards. There are more than 600,000 existing chemical products, and hundreds of new ones being introduced every year. This is a serious problem for exposed workers and their employers.

According to the Oxford Living Dictionary, a chemical is *“A distinct compound or substance, especially one which has been artificially prepared or purified.”*



What are chemicals?

A chemical can be in a solid, liquid or gas form. It can be mist, vapors, fumes, fibers or dust.

The form that it is in has a lot to do with how it gets into your body. The soap we use to wash our hands has chemicals. The salt we use to melt the ice has chemicals. The lotion we use when our skin is dry has chemicals.

A chemical can also change forms. For example, liquid solvents can evaporate and give off vapors that you can inhale. Sometimes chemicals are in a form that can't be seen or smelled, so they can't be detected.



Are chemicals dangerous?

Some chemicals are safe for our skin, and our bodies. Other chemicals are dangerous and can cause problems when we come in contact with them.

Touching certain chemicals with your bare hands, or breathing in the chemicals can cause many serious health problems such as heart ailments, damage to the central nervous system, kidney and lungs, sterility, cancer, burns, and rashes. Some chemicals may also be safety hazards and can cause fires and explosions and other serious accidents.

Because of the seriousness of these safety and health problems, and because many employers and employees know little or nothing about them, OSHA put together the Hazard Communication Standard. The goal is to be sure employers and employees know about work hazards and how to protect themselves; this should help to reduce the incidence of chemical source illness and injuries.

How to know if a chemical is hazardous

Since 1986, OSHA has required companies that manufacture chemical products to provide Safety Data Sheets (SDS) for hazardous materials. At the very least, companies have to provide:

1. Identification of the chemical
2. Hazard identification (can be in the form of a picture)
3. Ingredients, and what other names the chemical is known as
4. First aid measures (most important symptoms, effects, and attention needed)
5. Fire-fighting measures (special protective equipment, what to let firefighters know). Not all chemical fires can safely be put out with a fire extinguisher or water.
6. Accidental release measures (what to do to protect yourself, safe containment and safe cleanup)
7. Handling and storage (precautions for safe handling and safe storage)
8. Exposure controls and personal protection
9. Physical and chemical properties
10. Stability and reactivity
11. Toxicological information



Recognizing a few symbols










- If you are working with a chemical and see these signs, you need to protect yourself:



Recognizing a few symbols

- Here are other signs you should pay attention to:

HAZARDOUS HOUSEHOLD PRODUCT SYMBOLS
*Label each safety symbol by **LEVEL** and **TYPE** of hazard.*

 danger poisonous	 caution explosive	 warning poisonous	 danger flammable
 caution corrosive	 warning explosive	 danger explosive	 caution poisonous
 caution flammable	 danger corrosive	 warning flammable	 warning corrosive

How do chemicals get into the body?

- **Chemicals cause health problems when they get into your body. These problems can be acute or chronic.**
- **Acute (short-term) effects show up immediately or soon after exposure to the chemical. They may be minor, like nose or throat irritation, or they could be serious, like eye damage or passing out from chemical vapors. What all these effects have in common is that they happen right away.**
- **Chronic (long-term) effects may take years to show up. They are usually caused by regular exposure to a harmful substance over a long period of time. These effects are usually permanent.**
- **Some chemicals cause both acute and chronic effects. For example, breathing solvent vapors might make you dizzy right away (an acute effect). But breathing the same vapors all the time for many years might eventually cause liver damage (a chronic effect).**

What harm can chemicals cause?

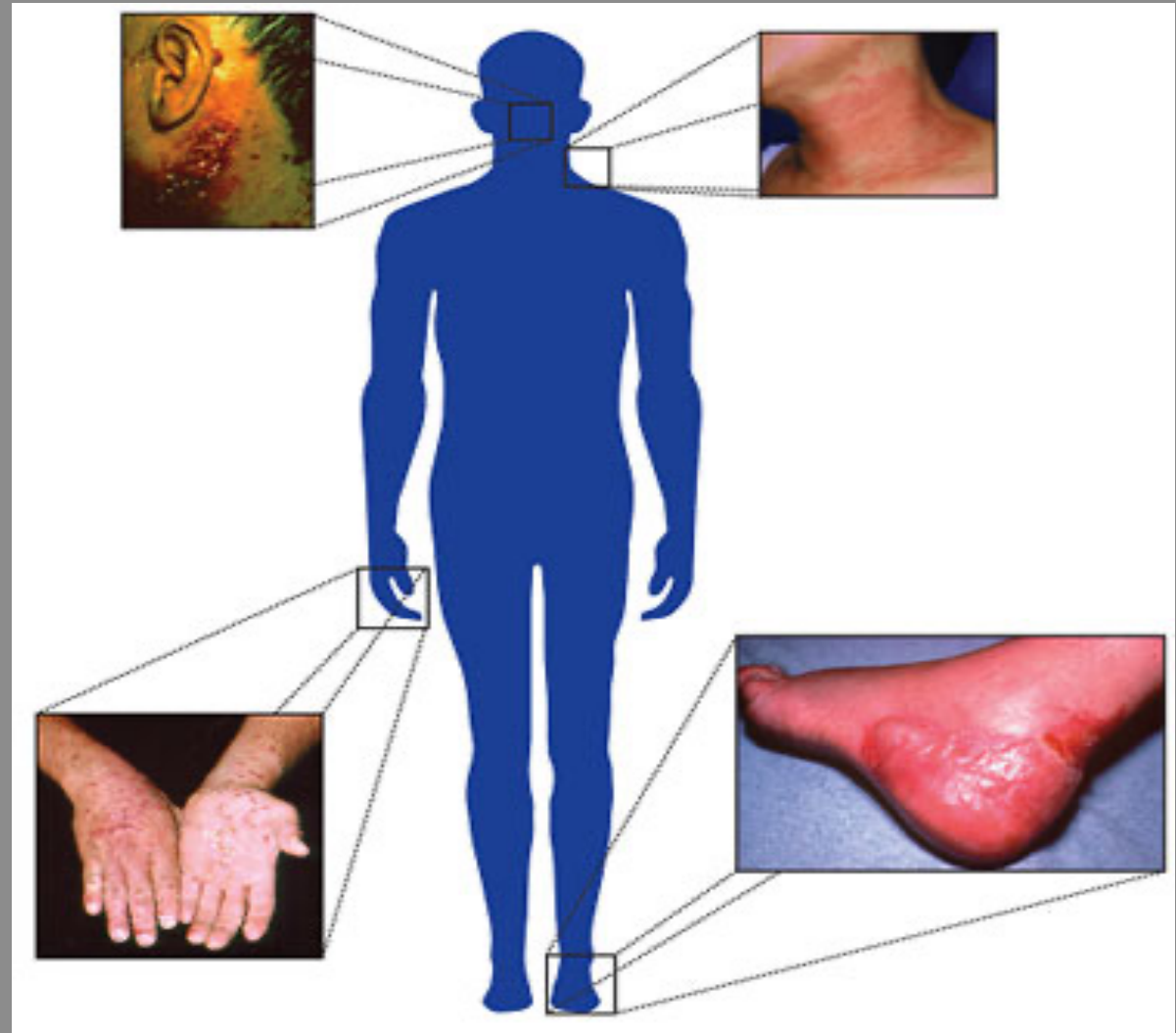
	SYMPTOMS	COMMON CAUSES
Head	Dizziness, headache	Solvents, paint, ozone, smoke (including tobacco)
Eyes	Red, watery, irritated, grainy feeling	Smoke, gases, various dusts, vapors from paint and cleaners
Nose and Throat	Sneezing, coughing, sore throat	Smoke, ozone, solvents, various dusts, vapors and fumes from paint and cleaners
Chest and Lungs	Wheezing, coughing, shortness of breath, lung cancer	Metal fumes, various dusts, smoke, solvents, vapors from paint and cleaners
Stomach	Nausea, vomiting, stomachache, diarrhea	Some metal fumes, solvents, paint vapors, long-term lead exposure
Skin	Redness, dryness, rash, itching, skin cancer	Solvents, chromium, nickel, detergents and cleaners, paint on skin

What harm can chemicals cause?

	SYMPTOMS	COMMON CAUSES
Nervous System	Nervousness, irritability, sleeplessness, tremors, loss of balance, coordination	Long-term solvent exposure, long-term lead exposure
Reproductive System	For men: low sperm count, damage to sperm For women: irregularities in menstruation, miscarriage, damage to egg or fetus	Lead, toluene, some other solvents, ethylene oxide gas

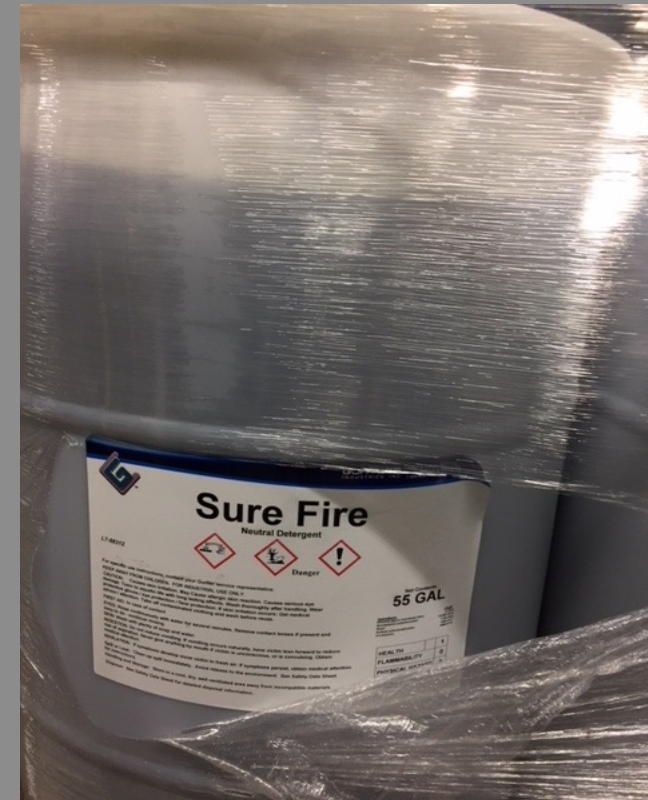
What harm can chemicals cause?

This shows how your skin can be affected if you come in contact with chemicals.



Proper work practices when working with hazards

- If you see these signs or symbols, make sure you are taking it seriously, and wear the necessary personal protective equipment (PPE) so you do not get injured or sick.



Proper work practices when working with hazards



Wear boots



**Eye protection
must be worn**



**Wear
gloves**



**HEAD PROTECTION
MUST BE WORN
IN THIS AREA**



**Wear ear
protectors**



**Wear protective
clothing**

Always follow all recommended directions



SAFETY FIRST

STORAGE AND HANDLING OF CHEMICALS

All chemicals shall be kept out of reach of children.

Chemicals shall be stored in original containers; with the original lids securely in place; out of the sunlight; in a cool, dry, well ventilated area. Chemicals supplied in bulk bag form shall be stored in clearly marked corrosive resistant containers with tightly fitted lids.

Chemicals shall not be stored near a heat source, open flame, or electrical equipment.

Sanitizers or oxidizers shall not be stored in the same area as pool equipment.

Liquid chemicals shall not be stored above or adjacent to dry chemicals.

Pool chemicals shall not be stored in the same area as insecticides, herbicides, fertilizers, or liquid petroleum products.

Chemicals shall not be stored above eye level.

Shelving used for chemical storage shall be secure.

Acids shall be stored separately from all bases.

Chemicals packaged in absorbent containers shall be kept at least six (6) inches off the floor on nonflammable surfaces.

All chemical storage areas shall be kept clean.

Manufacturers label instruction shall be complied with.

Separate measuring devices for each chemical shall be used. These measuring devices shall be clean, dry, and constructed of material with the chemical to be measured. Glass shall not be used.

Chemicals shall be added to water, water shall never be added to chemicals.

Oxidizers shall not be mixed with any other chemicals.

Chemicals shall not be mixed with powdered chlorine or liquid chlorine.

Smoking, eating, or drinking shall not be allowed when using chemicals.

Disposal of chemicals and/or empty containers shall be in accordance with label instructions.

If you accidentally come in contact with the chemicals

Type of exposure	First aid
On the skin	Remove contaminated clothing Run under water the area affected for at least 10 minutes Seek medical treatment if irritation persists
In the eye	Flush the eye with water for several minutes After the eye has been rinsed, seek medical treatment
Inhalation	Move to an area where the air is fresh If the person has difficulty breathing, give oxygen Keep the person warm and at rest Apply CPR if the person stops breathing Call 911
Ingestion	Wash mouth with water Seek medical treatment
First and second degree burns	Flush the area gently with cold water for at least 15 minutes, unless the MSDS says not to Put ice packs or place burn gel on the affected area Seek medical treatment

How to interpret SDS sheets



Safety Data Sheets give you helpful information about the chemicals you work with

A screenshot of the NIOSH Pocket Guide to Chemical Hazards website. The page is titled "Starch" and provides various safety and identification data. The browser address bar shows the URL: D:\nioshdbs\npgd0567.html. The page includes a table with chemical properties and exposure limits.

NIOSH Pocket Guide to Chemical Hazards		
Introduction		
Chemical Names, Synonyms and Trade Names		
CAS Numbers		
RTECS Numbers		
Appendices		
Comments?		
NIOSH Publication Number 2010-168c		
September 2010		
Starch		
Synonyms & Trade Names Corn starch, Rice starch, Sorghum gum, α -Starch, Starch gum, Tapioca starch		
CAS No. 9005-25-8	RTECS No. GM5090000	DOT ID & Guide
Formula $(C_6H_{10}O_5)_n$	Conversion	IDLH N.D. See: IDLH INDEX
Exposure Limits		Measurement Methods
NIOSH REL : TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp) OSHA PEL : TWA 15 mg/m ³ (total) TWA 5 mg/m ³ (resp)		NIOSH 0500 , 0600 See: NMAM or OSHA Methods
Physical Description Fine, white, odorless powder. [Note: A carbohydrate polymer composed of 25% amylose & 75% amylopectin.]		
MW: varies	BP: Decomposes	MLT: Decomposes
		Sol: Insoluble
		VP: 0 mmHg (approx)
		IP: NA

The OSH Act of 1970 protects your rights to work in a safe and healthy workplace

The OSH Act protects workers who complain to their employer, OSHA or other government agencies about unsafe or unhealthful working conditions .

Help is available from OSHA for whistleblowers. *

However, you have a limited right under the OSH Act to refuse to do a job because conditions are hazardous. You may refuse to do a job only when

- **You believe that you face death or serious injury (and the situation is so clearly hazardous that any reasonable person would believe the same thing);**
- **You have tried, where possible but unsuccessfully, to get your employer to correct the condition and there is no other way to do the job safely; and**
- **The situation is so urgent that you do not have time to eliminate the hazard through regulatory channels such as calling OSHA.**

What are your rights?

Under federal law, you are entitled to a safe workplace. Your employer must provide a workplace free of known health and safety hazards.

If you have concerns, you have the right to speak up about them without fear of retaliation.

Be trained in a language you understand

Work on machines that are safe

Be protected from toxic chemicals

Request an OSHA inspection, and speak to the Compliance Safety and Health Officer (CSHO)

Report an injury or illness, and get copies of your medical records

See copies of the workplace injury and illness log

Review records of work-related injuries and illnesses

Get copies of test results done to find hazards in the workplace



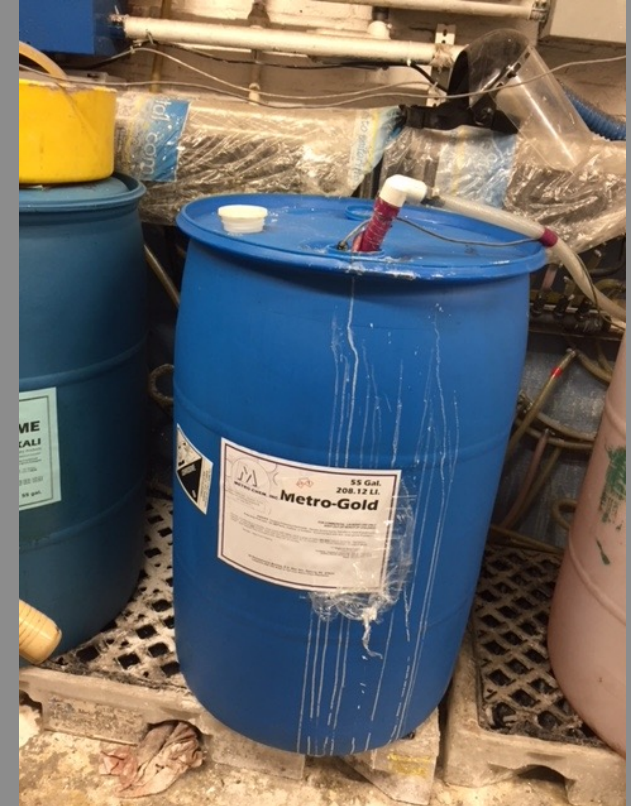
(See OSHA Workers' webpage <https://www.osha.gov/workers/index.html>)

What are your responsibilities?

- **Read the OSHA poster**
- **Follow employers' safety and health rules and wear or use all required gear and equipment**
- **Follow safe work practices for your job, as directed by your employer**
- **Report hazardous conditions to a supervisor or safety committee**
- **Report hazardous conditions to OSHA if employers do not fix them**
- **Cooperate with OSHA Compliance Safety and Health Officers (CSHO)**

What are employers' responsibilities and rights?

- **Providing a safe and healthful workplace free of recognized hazards**
- **Following the OSHA standards**
- **Providing training, medical examinations and record keeping**
- **OSH Act gives rights, particularly during and after an OSHA inspection.**

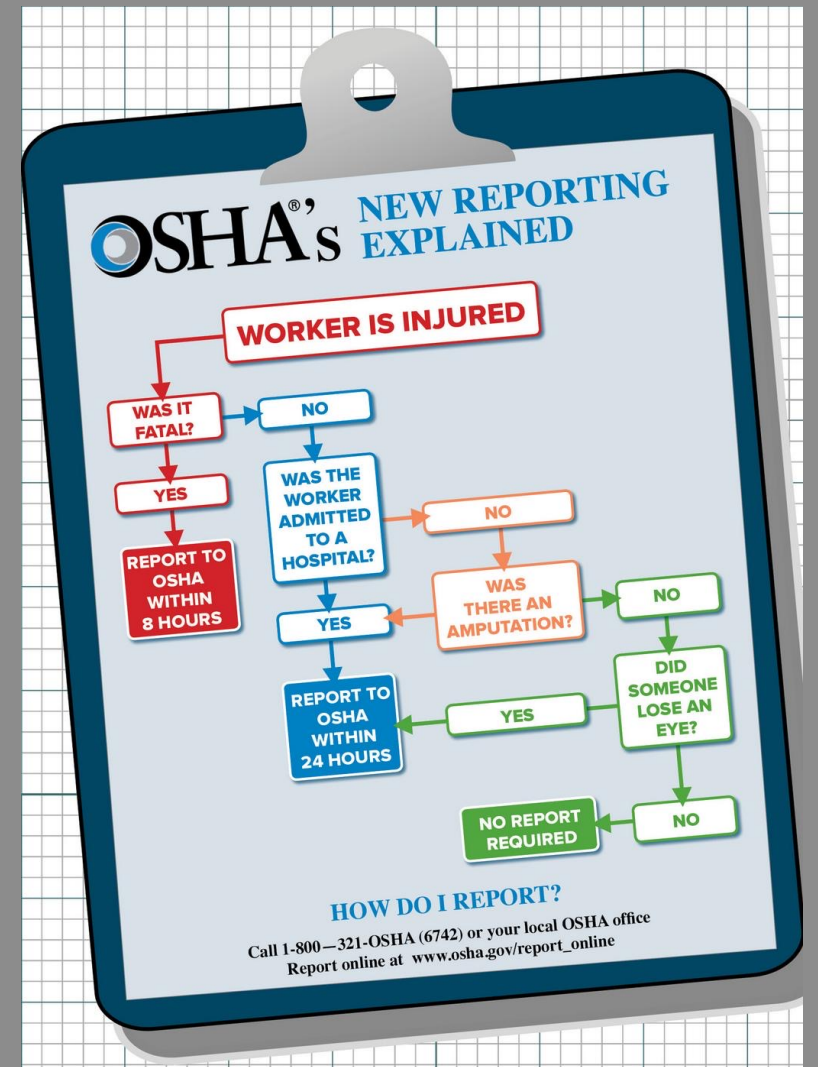


How to report concerns, incidents to OSHA

- **If you, your co-workers and/or your union representative determine that an OSHA inspection is needed to get workplace hazards corrected, you have several options.**
- **You can call 215-597-4955 to ask for a copy of the complaint form.**
- **You can download the complaint form from OSHA's website, complete it and mail or fax it to OSHA at 215- 597-1956 (Philadelphia) or 856-596-5201 (Marlton, NJ). You can file a complaint online at www.osha.gov.**
- **You can visit your area office in Marlton NJ or Philadelphia to discuss your concerns.**
- **Note that if a hazard is life-threatening, call the local office or 1-800-321-OSHA immediately.**
- *** You do not have to be a U.S. citizen to file a complaint with OSHA. You can also tell OSHA not to reveal your name. OSHA will keep your name off the complaint, if you wish.**

Your report to OSHA

- Can be in any language
- Can result in an investigation. If you want, you can ask OSHA to leave your name out of the complaint.
- Protects you from retaliation from your employer. Your employer is breaking the law if they react to your complaint by doing the following:



Protection from workplace retaliation (adverse reaction)

If you file a complaint with OSHA and your employer retaliates with the following actions, they will be breaking the law. The actions may include:

- **Applying or issuing a policy which provides for an unfavorable personnel action due to activity protected by a whistleblower law enforced by OSHA.**
- **Blacklisting**
- **Demoting**
- **Denying overtime or promotion**
- **Disciplining**
- **Denying benefits**
- **Failing to hire or rehire**
- **Firing or laying off**
- **Intimidation**
- **Making threats**
- **Reassignment to a less desirable position, including on adversely affecting prospects for promotion**
- **Reducing pay or hours**
- **suspension**

What to do if your employer retaliates

The OSH Act protects workers who complain to their employer, OSHA or other government agencies about unsafe or unhealthful working conditions in the workplace or environmental problems.

You cannot be transferred, denied a raise, have your hours reduced, be fired, or punished in any other way because you used any right given to you under the OSH Act.

If you have been punished or discriminated against for using your rights, you must file a complaint with OSHA within 30 days of the alleged reprisal for most complaints. No form is required but you must send a letter or call the OSHA Area office nearest you to report the discrimination.

You have a limited right under the OSH Act to refuse to do a job because conditions are hazardous. You may do so under the OSH Act only when 1) you believe that you face death or serious injury and the situation is so clearly hazardous that any reasonable person would believe the same thing; 2) you have tried where possible, to get your employer to correct the condition and been unable to obtain a correction and there is no other way to do the job safely; 3) the situation is so urgent that you do not have time to eliminate the hazard through regulatory channels such as calling OSHA.

Local OSHA Area Offices

Philadelphia Area Office (Pennsylvania)

The Wanamaker Building

100 Penn Square East, 12th Floor

Philadelphia, Pennsylvania 19107

Phone: (215) 597-4955

Fax: (215) 597-1956

Marlton Executive Park, Building 2

701 Route 73 South, Suite 120

Marlton, New Jersey 08053

Phone: (856) 596-5200

Fax: (856) 596-5201

OSHA emergency hotline 1-800-321-OSHA (6742)

- **Report a workplace hazard**
- **Request information on OSHA**
- **Request an OSHA publication**

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Credits and Informational resources

- WOSH Specialist Training Supplemental Module: Understanding Chemical Hazards
- NIOSH Pocket Guide to Chemical Hazards, September 2007 edition
- OSHA Fact Sheet: Your Rights as a Whistleblower

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