HEALTH HAZARDS IN CONSTRUCTION FIELD GUIDE:

- **JOB-SITE DOCUMENTATION & COMPLIANCE CHECKLISTS**
- **HEALTH HAZARD ANALYSIS (JHA)**
- **RESPIRATORY PROTECTION PROGRAM**
- **HEARING CONSERVATION PROGRAM**
- **JOB-SITE STRETCH & FLEX EXERCISES**
- **PERSONAL PROTECTIVE EQUIPMENT (PPE) HAZARD ASSESSMENT**
- **JOB-SITE REFERENCE TOOLS**

Purpose

The purpose of this field guide is to serve as documentation and record for a job-site specific analysis of health hazards; this includes a job-site specific hazard communication *"Right-to-Know"* program, a job-site specific personal protective equipment (PPE) hazard assessment & respiratory protection program and job-site specific hearing conservation program.

Employer Information

Company: _____

Address: _____

_____

Contact Person: _____

Phone Number: _____

Job-Site Information

Host Employer: _____

Address: _____

_____

Contact Person: _____

Phone Number: _____

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Qualified & Competent Person

An employer has the responsibility to ***anticipate***, ***recognize***, ***evaluate***, and ***control*** workplace conditions that may cause workers' injury or illness. To ensure a safe and healthful job-site, a qualified and competent person must be identified by the employer to satisfy the following:

- An employer must assign a qualified person to every job-site to perform a health hazards analysis and to put in place the controls necessary to safeguard employees.
- An employer must provide for frequent and regular inspections of the job-site, materials, and equipment to be made by a competent person.
- The employer must instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his/her work environment to control or eliminate any hazards or other exposure to illness or injury.
- Employees required to handle or use poisons, caustics, and other harmful substances must be instructed regarding the safe handling and use, and be made aware of the potential hazards, personal hygiene, and personal protective measures required.
- In Job-site areas where harmful plants or animals are present, employees who may be exposed must be instructed regarding the potential hazards, and how to avoid injury, and the first aid procedures to be used in the event of injury.
- Employees required to handle or use flammable liquids, gases, or toxic materials must be instructed in the safe handling and use of these materials.
- An employer must develop and implement a written respiratory protection program with required worksite-specific procedures and elements for required respirator use. This program must be administered by a suitably trained program administrator.

Job-Site Responsibility & Authority

A ***qualified person*** is one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

Job-Site Qualified Person: _____

Contact Information: _____

Alternate Qualified Person: _____

Contact Information: _____

Competent person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Job-Site Competent Person: _____

Contact Information: _____

Alternate Competent Person: _____

Contact Information: _____

A ***program administrator*** must oversee all aspects of a job-site respiratory protection program.

Job-Site Respiratory Protection Program Administrator: _____

Contact Information: _____

All employees must be informed of their rights under OSHA (Occupational Safety & Health Administration) laws.

EMPLOYEES:

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in that inspection.
- You can file a complaint with OSHA within 30 days of retaliation or discrimination by your employer for making safety and health complaints or for exercising your rights under the OSH Act.
- You have a right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violation.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records or records of your exposure to toxic and harmful substances or conditions.
- Your employer must post the OSHA Job Safety and Health "It's the Law" poster (OSHA 3165-12-06R) in your workplace.
- You must comply with all occupational safety and health standards issued under the *OSH Act* that apply to your own actions and conduct on the job.

EMPLOYERS:

- Employers have the responsibility to provide a safe workplace. Employers MUST provide their employees with a workplace that does not have serious hazards and follow all OSHA safety and health standards.
- Employers must find and correct safety and health problems. OSHA further requires that employers must try to eliminate or reduce hazards first by making feasible changes in working conditions – such as switching to safer chemicals, enclosing processes to trap harmful fumes, or using ventilation systems to clean the air are examples of effective ways to get rid of or minimize risks – rather than just relying on personal protective equipment such as masks, gloves, or earplugs.

EMPLOYERS MUST ALSO:

- Inform employees about hazards through training, labels, alarms, color-coded systems, chemical information sheets and other methods.
- Keep accurate records of work-related injuries and illnesses.
- Perform tests in the workplace, such as air sampling required by some OSHA standards.
- Provide hearing exams or other medical tests required by OSHA standards.

Right to Know about Chemical Hazards

The Hazard Communication standard, known as the "right-to-know" law, requires employers to inform and train workers about hazardous chemicals and substances in the workplace. Employers must:

- Provide workers with effective information and training on hazardous chemicals in their work area.
- Training must be in a language and vocabulary that employees can understand;
- Keep a current list of hazardous chemicals that are in the workplace;
- Make sure that hazardous chemical containers are properly labeled with the identity of the hazardous chemical and appropriate hazard warnings; and
- Have and make available to workers and their representatives Material Safety Data Sheets (MSDS) for each substance that provide detailed information about chemical hazards, their effects, how to prevent exposure, and emergency treatment if an exposure occurs.

Right to Get Copies of Workplace Injury and Illness Records

OSHA's Recordkeeping Rule requires employers in construction with more than ten employees to keep accurate and complete records of work-related injuries and illnesses. Employers must enter any serious injury and illness that requires more than first-aid treatment, light duty or days away from work on the OSHA Form 300. Each year from February 1 through April 30, employers must post a summary of the injury and illness log from the previous year on the OSHA Form 300A in a place where workers can see it. Details of each incident are entered on the OSHA Form 301. Workers and their representatives have the right to get copies of the full OSHA 300 log.

Right to Exposure Data

Many OSHA standards require employers to run tests of the workplace environment to find out if their workers are being exposed to hazards such as toxic chemicals, hazardous substances such as lead or asbestos or high levels of noise or radiation. These types of tests are called exposure monitoring. OSHA gives workers the right to get the results of these tests.

- Employee exposure records must be kept by the employer for at least 30 years* (personal air monitoring results).

Right to Your Medical Records

Some OSHA standards require medical tests to find out if a worker's health has been affected because of exposures at work. For example, employers must test for hearing loss or decreased lung function in workers exposed to asbestos. Workers have a right to their medical records. Workers' representatives also have a right to review these records but they must first get written permission from the worker to gain access to the employee's medical information. These rights and responsibilities can be found in OSHA's standard 29 CFR 1926.33 (see 29 CFR 1910.1020 – Access to Employee Exposure and Medical Records).

- Employee medical records must be retained by the employer for at least the duration of the employee's employment plus 30 years*.

* If the employer should go out of business and ceases to exist, then all exposure data and medical records are to be filed with the National Institute for Occupational Safety & Health (NIOSH).

Workers have the right to refuse to do a job if they believe in good faith that they are exposed to an *imminent danger*. "Good faith" means that even if an imminent danger is not found to exist, the worker had reasonable grounds to believe that it did exist.

A worker has the right to refuse to do a task if all of the following conditions are met:

- ☐ The employee has asked the employer to eliminate the danger, and the employer failed to do so; and
- ☐ The employee refused to work in "good faith." This means that the worker must genuinely believe that an imminent danger exists. The refusal cannot be a disguised attempt to harass an employer or disrupt business; and
- ☐ A reasonable person would agree that there is a real danger of death or serious injury (illness).

Job-Site Health Hazards Complaint Documentation

Description of Health Hazard: _____

Feasible Engineering Controls: _____

Administrative Control Options: _____

Personal Protective Equipment Needed: _____

Filing an OSHA Complaint

A complaint can be filed in a number of ways:

1. **Mail or submit the OSHA Complaint Form** - Download the OSHA complaint form from our website (or request a copy from your local OSHA Regional or Area Office), complete it and then fax or mail it back to your nearest OSHA Regional or Area Office. Written complaints that report a serious hazard and is signed by a current worker or representative and submitted to the closest OSHA Area Office are given priority and are more likely to result in on-site OSHA inspections. A worker or their representative can request (on the form) that OSHA not let their employer know who filed the complaint. Please include your name, address and telephone number so we can contact you to follow up. This information is confidential.
2. **Online** - Go to the Online Complaint Form on the OSHA website, at www.osha.gov. Complaints that are sent in online will most likely be investigated using OSHA's phone/fax system whereby the employer is contacted by phone or fax (not an actual inspection) about the hazard. **A written complaint that reports a serious hazard and is signed by a current worker(s) or their representative and mailed or otherwise submitted to an OSHA Area or Regional Office is more likely to result in on-site OSHA inspections.** Complaints received online from workers in OSHA-approved State Program states will be forwarded to the appropriate State Program for response.
3. **Telephone** – Call your local OSHA Regional or Area Office. OSHA staff can discuss your complaint and respond to any questions you have. **If there is an emergency or the hazard is immediately life threatening, call your local OSHA Regional or Area Office or 1-800-321-OSHA (6742).**

When all of these conditions are met, you take the following steps:

- ☐ Ask your employer/host employer (controlling contractor) to correct the hazard;
- ☐ Ask your employer/host employer (controlling contractor) for other work;
- ☐ Tell your employer/host employer (controlling contractor) that you won't perform the work unless and until the hazard is corrected; and
- ☐ Remain at the worksite until ordered to leave by your employer/host employer (controlling contractor).

IF	THEN
You believe working conditions are unsafe or unhealthful.	Call your employer's (controlling contractor) attention to the problem.
Your employer does not correct the hazard or disagrees with you about the extent of the hazard.	You may file a complaint with OSHA.
Your employer discriminates against you for refusing to perform the dangerous work.	Contact OSHA immediately. (800) 321-OSHA

Job Hazard Analysis (JHA) Overview

A job hazard analysis (JHA) is a technique that focuses on the relationship between the worker, the task, the tools, and the work environment; it's an essential first step that helps an employer determine the sources of potential problems.

During a ***job hazard analysis***, a qualified person will examine all ***materials & equipment*** being used; look at the ***process*** in which work is being performed and assess the ***people*** performing the work.

Questions that are asked during a job hazard analysis are…

What is it?

- ✓ ***Materials & Equipment*** – What building materials, chemicals, tools and equipment are being used; what is the likelihood that these things will cause a potential health hazard (gases, vapors, fumes, dusts/fibers, noise, vibration, radiation, etc.)?

How does it?

- ✓ ***Process*** – How & where is the work being performed; potential health hazards can turn into toxic exposures if the process is not controlled.

Who are exposed?

- ✓ ***People*** – Who are exposed to the hazards; are these workers properly trained, qualified and wearing appropriate personal protective equipment (PPE)?

What do you see?

- ✓ **Visible material in the air –** Visible clouds of vapor or particles may mean a serious exposure problem. Remember, however, that most gases and vapors are invisible, and that often the most dangerous particles are too small to see.
- ✓ **Settled dust –** If there is dust on the ground or other surfaces, it probably got there by settling out of the air. If disturbed, settled dust can become airborne again.
- ✓ **Warning signs, labels & decals –** As required by OSHA's Hazard Communication Standard (29 CFR 1910.1200) and other applicable standards.

Concrete cutting with saw creates obvious dust exposure.

Do you smell or taste anything?

- ✓ **Odor –** If you smell a chemical, you are inhaling it!
- ✓ **Taste –** If you inhale a chemical or accidentally get some in your mouth, it may have a particular taste that warns you're being exposed (e.g., metal fumes).

Do you hear anything?

- ✓ **Loud noise can severely damage your hearing!**

  Sources of loud noise in construction:

  - ➢ Hand tools (e.g., metal hammers)
  - ➢ Power tools (e.g., jackhammers, grinders, saws, powder actuated tools)
  - ➢ Equipment (e.g., generators, excavators, cranes, trucks)
  - ➢ Blasting

Do you feel immediate symptoms?

- ✓ **Particles in you respiratory system** – Your nose and airways have mucous which traps particles and removes them when you cough or blow your nose.
- ✓ **Narcotic effect –** When solvents are breathed in, they enter the blood stream and travel to other parts of the body, particularly the nervous system causing dizziness, headache, feelings of “drunkenness”, and tiredness. One result of these symptoms may be poor coordination which can contribute to falls and other accidents.

Immediately Dangerous to Life & Health Environments (IDLH)

A work environment that poses an immediate or delayed threat to an employee's life and health or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a space is considered to be *immediately dangerous to life and health (IDLH)*. A substance IDLH value is often listed on its Material Safety Data Sheet (MSDS).

NOTE: *Some toxic materials may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse hours after exposure.*

Because of their potential to contain hazardous atmospheres, confined or enclosed spaces are suspect IDLH environments. Confined spaces include, but are not limited to the following:

- Storage Tanks
- Process Vessels
- Bins
- Boilers
- Ventilation or Exhaust Ducts
- Sewers & Manholes
- Underground Utility Vaults
- Tunnels
- Pipelines
- Open top spaces more than 4 feet in depth
- Temporary Enclosures (heating enclosures for break)
- Dumpsters
- Stair-wells
- Elevator Shafts
- Basements
- Attics
- Trenches & Excavations
- Underground Construction
- Caissons
- Cofferdams
- Closets
- Any space in which its purpose is something other than human occupancy.

Confined & Enclosed Spaces

"Confined or enclosed space" means any space having a limited means of egress, which is subject to the accumulation of toxic or flammable contaminants or has an oxygen deficient atmosphere, and its primary function is other than human occupancy.

All employees required to enter into confined or enclosed spaces must be instructed as to the nature of the hazards involved, the necessary precautions to be taken, and in the use of protective and emergency equipment required.

When an employer (host employer) arranges to have employees of another employer (contractor) perform work that involves permit-required confined space work, the host employer must:

- Inform the contractor that the workplace contains permit-required confined spaces and that entry is allowed only through compliance with a permit space program.
- Apprise the contractor of the hazards identified and the host employer's experience with the space.
- Apprise the contractor of any precautions or procedures that the host employer has implemented for the protection of employees.
- Coordinate entry operations when both host employer personnel and contractor personnel will be working in or near permit spaces.
- Debrief the contractor at the conclusion of the entry operations.

Test all confined spaces before you enter!

- Oxygen Content
- Flammable Environments
- Toxic Substances

Employees must not be permitted to work in hazardous and/or toxic atmospheres! A *hazardous atmosphere* means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute and/or chronic illness from one or more of the following causes:

- Flammable gas, vapor, or mist in excess of 10 percent of its *lower flammable limit (LFL)*.
- Airborne combustible dust at a concentration that meets or exceeds its LFL (*dust obscures vision at a distance of 5 feet or less*
- Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.
- Atmospheric concentration of any substance for which a permissible exposure limit (PEL) is published in OSHA's standards.

Acceptable Entry Conditions

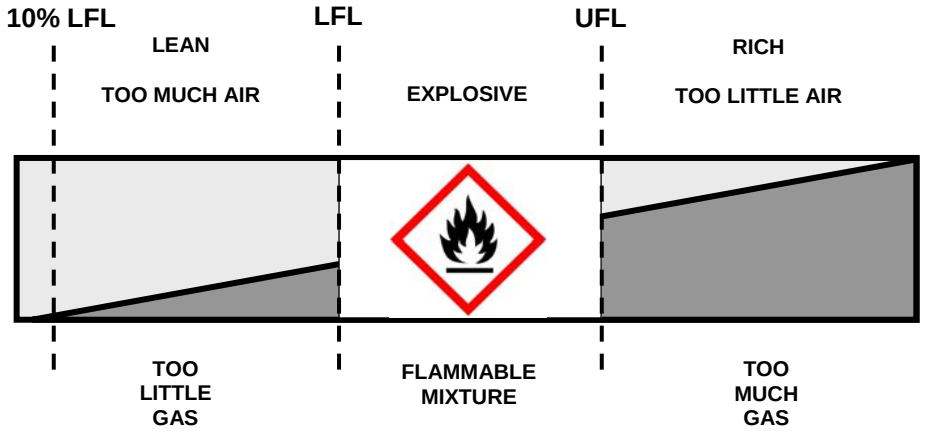
Acceptable entry conditions are those conditions that exist in a space and would allow safe entry by employees. All spaces suspected to be hazardous must be evaluated by a competent person qualified in industrial hygiene tools, techniques and strategies. Employees may only enter into atmospheres that are determined acceptable.

Composition of Normal Breathable Air

Substance (Gas)	*% by Volume (ppm)*
Nitrogen, N_2	**78% (780,000)**
Oxygen, O_2	**20.9% (209,000)**
Argon, Ar	**0.9% (9,000)**
Carbon Dioxide, CO_2	**0.1% (1,000)**

Lower Flammable Limit (LFL)

Flammable limits are defined as the concentration range in which a flammable substance can produce a fire or explosion when an ignition source (such as a spark or open flame) is present. The concentration is generally expressed as percent fuel by volume. The lower flammable limit (LFL) is the minimum amount of fuel required for ignition, the upper flammable limit (UFL) is the maximum amount of fuel allowed for ignition. A hazardous atmosphere exists when a concentration of a flammable gas, vapor or mist reaches 10% of its lower flammable limit (LFL). Gases, vapors and mists have different LFLs; consult the MSDS for exact data.



Occupational Safety & Health Administration (OSHA)

OSHAs health standards relating to exposure to gases, vapors, fumes, dusts/fibers and mists; noise and radiation, are based on established exposure limits. These standards limit the amount or concentration of a material (chemical, noise or radiation) that can be present in the workplace. To describe the limits, or amounts of these exposures, the term ***Permissible Exposure Limit (PEL)*** is used. Consult OSHA standards and applicable Material Safety Data Sheets (MSDSs) for OSHA established PELs.

Permissible Exposure Limit (PEL); a legal standard set by OSHA for the maximum concentration of a chemical or substance in the air. PELs are enforceable by OSHA.

IMPORTANT! *To comply with OSHA's health standards related to environmental exposures to harmful gases, vapors, fumes, dust/fibers & mists; noise and radiation, employers must first attempt to eliminate or reduce exposure through* ***administrative*** *or* ***engineering controls.***

- ***Administrative*** or ***engineering controls*** must first be implemented whenever feasible.
- When administrative or engineering controls are not feasible to achieve full compliance, personal protective equipment (PPE) or other protective measures can and must be used to keep the exposure of employees to air contaminants within the limits prescribed.

The American Conference of Governmental Industrial Hygienists (ACGIH)

Since the early 1900's, the ACGIH has been investigating, recommending, and annually reviewing exposure limits for chemical substances. The best known efforts by the ACGIH is the creation of the *Threshold Limit Values of Airborne Contaminants*; this publication contains a list of contaminants and their respected Threshold Limit Values (TLVs)®. Today's list of TLVs® includes 642 chemical substances and physical agents, as well as 47 Biological Exposure Indices (BEIs)® for selected chemicals.

For more information on the ACGIH and to view current TLVs and BEIs, visit www.acgih.org

Threshold Limit Value (TLV)®; Levels of contaminants established by the American Conference of Governmental Industrial Hygienists (ACGIH) to which it is believed that workers can be exposed to with minimal adverse health effects.

OSHA Standard:

29 CFR 1926.55 Gases, Vapors, Fumes, Dusts (Fibers) & Mists…

Exposure of employees to inhalation, ingestion, skin absorption, or contact with any material or substance at a concentration above those specified in the "Threshold Limit Values of Airborne Contaminants for 1970" of the American Conference of Governmental Industrial Hygienists, shall be avoided!

National Institute for Occupational Safety and Health (NIOSH)

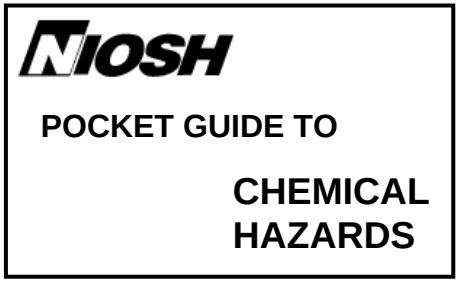
NIOSH is a Federal agency established to help assure safe and healthful working conditions for working men and women by providing research, information, education, and training in the field of occupational safety and health.

A Recommended Exposure Limit (REL) is an occupational exposure limit that has been recommended by NIOSH to the Occupational Safety and Health Administration (OSHA).

Recommended Exposure Limit (REL); Levels that NIOSH believes would be protective of worker safety and health over a working lifetime if used in combination with engineering and work practice controls, worker training and personal protective equipment.

NIOSH Pocket Guide to Chemical Hazards

The NIOSH Pocket Guide to Chemical Hazards is a publication of NIOSH and is intended as a source of general industrial hygiene information on several hundred chemicals/classes for workers, employers, and occupational health professionals. The information found in the NIOSH Pocket Guide should help users recognize and control occupational chemical hazards.



For more information on NIOSH and to access the Pocket Guide to Chemical Hazards, go to www.cdc.gov/niosh

Time Weighted Average (TWA)

The 8-Hour Time Weighted Average (TWA) is the average employee exposure over an 8-hour period, based on chemical measurements close to the worker. The measured level may sometimes go above the TWA value, as long as the 8-hour average stays below it. Most chemicals with PELs have a TWA value. Some chemicals have ***Ceiling*** or ***Short Term Exposure Limits*** in addition to – or instead of – TWA values.

Action Level (AL)

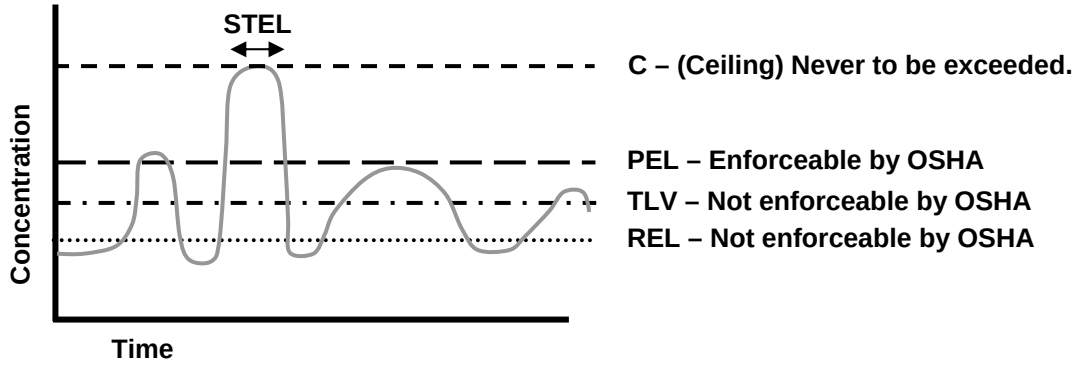
The exposure level (concentration in air) at which some OSHA regulations set to protect employees takes effect; for example, workplace air analysis, employee training, medical monitoring, and recordkeeping. Exposure at or above action level is termed occupational exposure. Exposure below this level can also be harmful. This ***Action Level (AL)*** is generally half the PEL.

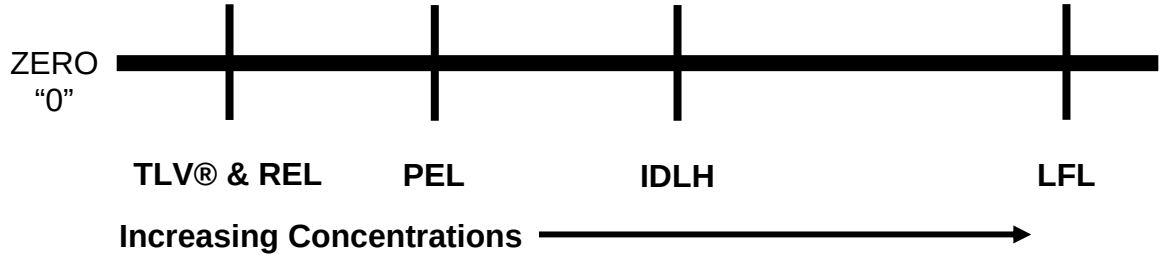
Ceiling Limit (C)

The ***Ceiling Limit (C)*** is the maximum allowable level. It must never be exceeded, even for an instant.

Short Term Exposure Limit (STEL)

The ***Short Term Exposure Limit (STEL)*** is a level that must not be exceeded when averaged over a specified short period of time (usually 15 minutes). When there is an STEL for a substance, exposure still must never exceed the Ceiling Limit, and the 8-hour average still must remain at or below the TWA.


STEL
C – (Ceiling) Never to be exceeded.
PEL – Enforceable by OSHA
TLV – Not enforceable by OSHA
REL – Not enforceable by OSHA
Concentration
Time

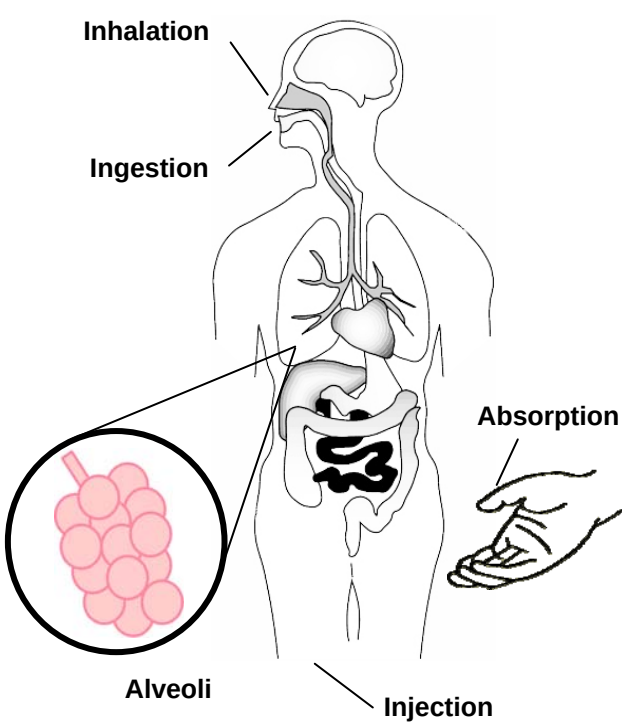

ZERO
"0"
TLV® & REL
PEL
IDLH
LFL
Increasing Concentrations

Inhalation is the primary route of entry for hazardous chemicals in the work environment. Nearly all materials that are airborne can be inhaled. The smallest, respirable size particles can be inhaled deep into the alveoli; the final branch of the respiratory system that acts as the primary gas exchange units of the lung.

Absorption through the skin is *another* route of entry. The skin is the largest organ of your body and a common exposure site for liquid and airborne chemicals. Absorption through the skin can occur quite rapidly if the skin is cut or abraded. Intact skin is an effective barrier to many hazardous materials.

Ingestion **-** toxic materials can be swallowed and enter the body through the gastrointestinal tract. In the workplace, people can unknowingly ingest harmful chemicals when you eat, drink, or smoke in a contaminated work areas.

Injection occurs when a sharp object punctures the skin, allowing a chemical or infectious agent to enter your body. For example, injection can occur when a contaminated object such as a rusty nail punctures the skin.



<table>
<tr>
<td>Used to determine an average exposure over a period of time (time weighted average).

Samples taken in the “breathing zone” of the employee.</td>
<td> 
Filter Cassette</td>
<td rowspan="3"> 
Personal Monitoring - Determines individual worker exposure during a specific time period, often as an 8-hour shift or 15 minute period. The pump pulls air through the filter or tube, which traps the dust or toxin.</td>
<td> 
Noise Badge</td>
<td>Indicates that user is being exposed to high levels of noise. Real time instant reading; used as a personal alarm.</td>
</tr>
<tr>
<td>Device worn to passively measure exposure to specific gases and vapors. Simple to use; just put it on and go to work.</td>
<td> 
Passive Badge Gas/Vapor Sampler</td>
<td> 
Sound Level Meter</td>
<td>Measures ambient noise levels and is used as a surveying instrument; provides real time instant reading.</td>
</tr>
<tr>
<td>Real time measurement device that provides instant results; can be used as personal alarm monitors. Detects a variety of toxic gases and explosive environments.</td>
<td> 
Multi or single gas/vapor detector</td>
<td> 
Personal Dosimeter</td>
<td>Measures personal exposures to noise and determines exposure over a period of time (time weighted average).</td>
</tr>
</table>

Units of Concentration & Measurement

(ppm) **Parts per Million**	(mg/m³) **Milligrams per Cubic Meter of Air**	(µg/m³) **Micrograms per Cubic Meter of Air**	(f/cc) **Fibers per Cubic Centimeter of Air**	(dB) **Decibel**
Used to express the amount of a gas or vapor; one part of a gas or vapor per million parts of air.	Used to express the amount of a toxic fume, dust or mist; the amount of a substance (mg) in a given amount of space (m^3).	Used to express the amount of a highly toxic fume, dust or mist; the amount of a substance (µg) in a given amount of space (m^3).	Fibers are any particle longer than 5 microns (µm), one millionth of a meter, and have an aspect ratio (length : width) greater than 3:1	Noise is measured using sound level meters, and the decibel (abbreviated dB) is the unit used to measure the intensity of a sound.
1 x 10^{-6} or .000001	**1 milligram (mg) =** **1/1,000 gram =** **(0.001 gram)**	**1 microgram (µg) =** **1/1,000,000 gram =** **(0.000001 gram)**	**1 micron (µm) =** **1/1,000,000 meter**	In determining occupational noise exposure, measurements must be taken using the A-scale of a standard sound level meter at slow response. The A-weighted response most resembles the sensitivity of the human ear.
10,000 ppm = **1% volume of air**	**One cubic meter (m^3) =** **35.31 cubic feet (f^3)**	**One cubic meter (m^3) =** **35.31 cubic feet (f^3)**	**One cubic centimeter (cc) = 0.061 cubic inches**	
Example (PEL)… **Carbon Monoxide (CO)** **(50 ppm)**	***Example (PEL)…*** **Iron Oxide Fume** **(10 mg/m³)**	***Example (PEL)…*** **Lead** **(50 µg/m³)**	***Example (PEL)…*** **Asbestos** **(0.1 f/cc)**	***OSHA PEL (Noise)*** ***90 dBA***

Medical Services & First Aid (29 CFR 1926.50)

- ☐ Medical personnel available for advice and consultation on matters of occupational health.
- ☐ Provisions made for prompt medical attention in case of serious injury.
- ☐ In the absence of an infirmary, clinic, hospital, or physician, that is reasonably accessible in terms of time and distance to the worksite, which is available for the treatment of injured employees, a person who has a valid certificate in first-aid training must be available at the worksite to render first aid.
- ☐ First aid supplies must be easily accessible when required.
- ☐ The contents of the first aid kit must be placed in a weatherproof container with individual sealed packages for each type of item, and shall be checked by the employer before being sent out on each job and at least weekly on each job to ensure that the expended items are replaced.
- ☐ Proper equipment for prompt transportation of the injured person to a physician or hospital, or a communication system for contacting necessary ambulance service, must be provided.
- ☐ In areas where 911 is not available, the telephone numbers of the physicians, hospitals, or ambulances must be conspicuously posted.
- ☐ Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body must be provided within the work area for immediate emergency use.

☐ ***First Aid Kits (Appendix A to § 1926.50)***

Minimal contents of a generic first aid kit as described in American National Standard (ANSI) Z308.1

Item	*Minimum Size or Volume*	*Quantity per Package*	*Unit Package Size*	*Item*	*Minimum Size or Volume*	*Quantity per Package*	*Unit Package Size*
Absorbent compress	32 sq. in.	1	1	Burn treatment	1/32 oz.	6	1
Adhesive bandage	1” x 3”	16	1	CPR barrier		1	1 or 2
Adhesive tape	5 yd. (total)	1 or 2	1 or 2	Cold pack (4” x 5”)	4” x 5”	1	2
Antibiotic treatment	1/32 oz.	6	1	Eye covering, with means of attachment	2.9 sq. in.	2	1
Antiseptic swab	0.14 fl. oz.	10	1	Eye wash	1 fl. oz. total	1	2
Antiseptic towelette	24 sq. in.	10	1	Gloves		2 pair	1 or 2
Bandage compress (2 in.)	2” x 36”	4	1	Roller bandage (4 in.)	4” x 6 yd.	1	1
Bandage compress (3 in.)	3” x 60”	2	1	Roller bandage (2 in.)	2” x 6 yd.	1	1
Bandage compress (4 in.)	4” x 72”	1	1	Sterile pad	3” x 3”	2	1
Burn dressing	4” x 4”	1	1 or 2	Triangular bandage	40” x 40” x 56”	4	1

Sanitation of Job-Sites (29 CFR 1926.51)

- ☐ An adequate supply of potable water (drinking water) must be provided in all places of employment.
- ☐ Portable containers used to dispense drinking water must be capable of being tightly closed, and equipped with a tap. Water must not be dipped from containers.
- ☐ Any container used to distribute drinking water must be clearly marked as to the nature of its contents and not used for any other purpose.
- ☐ The common drinking cup is prohibited.
- ☐ Toilets must be provided for employees and cleaned regularly.

Table D-1 Toilets at Construction job-Sites

Toilets at Construction Jobsites [29 CFR 1926.51(c)]

- ☐ At least one toilet provided for every jobsite.
- ☐ Cleaned regularly.
- ☐ No eating or drinking allowed in any toilet facility.

Number of Employees	Minimum Number of Facilities
20 or less.	**1.**
20 or more.	**1 toilet seat and I urinal per 40 workers.**
200 or more.	**1 toilet seat and 1 urinal per 50 workers.**

Washing Facilities [29 CFR 1926.51(f)]

- ☐ Adequate washing facilities provided for employees engaged in the application of paints, coatings, herbicides, or insecticides or in other operations where contaminants may be harmful to the employees.
- ☐ Washing facilities are in near proximity to the worksite.
- ☐ Washing facilities are maintained in a sanitary condition.
- ☐ Good personal hygiene is encouraged on the job-site and workers are allowed time to wash hands (decontaminate) before eating and drinking.

Eating and Drinking Areas [29 CFR 1926.51(g)]

- ☐ Designate <u>No</u> Eating and Drinking areas where necessary.
  - ✓ No employee shall be allowed to consume food or beverages neither in a toilet room nor in any area exposed to a toxic material.

Hazard Communication [29 CFR 1926.59 (see 29 CFR 1910.1200)]

A job-site hazard communication program is to ensure that the hazards of all chemicals handled are communicated to employees and others that may be exposed either through routine handling or as a result of a foreseeable emergency. This communication shall be accomplished through container labeling, Safety Data Sheets (SDSs), appropriate information and training programs, and notification of affected contractors.

- ☐ Obtained a copy of the rule (29 CFR 1910.1200).
- ☐ Read and understood the requirements.
- ☐ Assigned responsibility for tasks.
- ☐ Prepared an inventory of chemicals.
- ☐ Ensured containers are labeled.
- ☐ Obtained SDS for each chemical.
- ☐ Prepared written program.
- ☐ Made SDSs available to workers.
- ☐ Conducted training of workers.
- ☐ Established procedures to maintain current program.
- ☐ Established procedures to evaluate effectiveness.

Safety Data Sheets (SDSs):

In order to ensure that a current SDS for each chemical is on the job-site as required, and that employees have access to these SDSs, the following information must be in your written program:

- ☐ Designated person(s) responsible for obtaining and maintaining the SDSs;
- ☐ Procedures on how SDSs are maintained in the workplace (e.g., in notebooks in the work area(s) or in a computer with terminal access), and how employees can obtain access to them when they are in their work area during the work shift;
- ☐ Procedures to follow when the SDS is not received at the time of the first shipment;
- ☐ Procedures to update the SDS when new and significant health information is found; and,
- ☐ Employee training on the 16-section SDS format as required by OSHA.

Sections of a Safety Data Sheet (SDS)

- ✓ Section 1. Identification
- ✓ Section 2. Hazard(s) Identification
- ✓ Section 3. Composition/Information on Ingredients
- ✓ Section 4. First-aid Measures
- ✓ Section 5. Fire-fighting Measures
- ✓ Section 6. Accidental Release Measures
- ✓ Section 7. Handling & Storage
- ✓ Section 8. Exposure Controls/Personal Protection
- ✓ Section 9. Physical & Chemical Properties
- ✓ Section 10. Stability & Reactivity
- ✓ Section 11. Toxicological Information
- ✓ Section 12. Ecological Information
- ✓ Section 13. Disposal Considerations
- ✓ Section 14. Transportation Information
- ✓ Section 15. Regulatory Information
- ✓ Section 16. Other Information

Employee Training (Hazard Communication):

- ☐ All employees know the location and requirements of the Federal Hazard Communication Standard, 29 CFR 1926.59 (see 29 CFR 1910.1200).
- ☐ All employees know the location and availability of the company's written hazard communication policy and program.
- ☐ All employees know the locations at the job-site where hazardous chemicals are present.
- ☐ All employees are trained in methods that may be used to detect the presence or release of a hazardous chemical in the work area.
- ☐ All employees have been explained of the potential physical and health hazards of chemicals stored and/or used at the job-site.
- ☐ All employees are aware of measures that can be taken to protect themselves from the hazards of chemicals in the work area (i.e., engineering controls, administrative & work practice controls and personal protective equipment).
- ☐ All employees are trained on specific actions to be taken in the event of an emergency spill, toxic exposure and/or hazardous release.
- ☐ All employees are aware of the hazardous chemical labeling system, can identify the sections of the SDS, can explain terminology used on the SDS, and knows how to request a printed copy of the SDS.

Hazard Communication Program & Compliance Checklist

Information:

- ☐ I have been informed of the new Hazard Communication Standard (29 CFR 1910.1200) requirements.
- ☐ I have been informed of the operations in my work area where hazardous chemicals are present.
- ☐ I have been informed of the location and availability of the written Hazard Communication Program, for my work area which includes a list of hazardous chemicals and their Safety Data Sheets (SDSs).

Training:

- ☐ I have been taught the methods and observations that will help me detect the presence or release of any hazardous chemical in my work area.
- ☐ I have been taught the physical and health hazards of the chemicals in my work area.
- ☐ I have been taught how to protect myself from the hazardous chemicals in my work area. This included appropriate work practices and personal protective equipment to be used.
- ☐ I have been taught emergency procedures to be followed in the event of accidental contact with or release of a hazardous chemical in my work area.
- ☐ I have been taught how to use the labeling system and the Safety Data Sheets (SDSs) in my work area.
- ☐ I have read the policy statements contained in the written Hazard Communication Program.
- ☐ I am aware that a copy of the policy statements contained in the written Hazard Communication Program is available to me upon my request.

Employee Signature _____ **Date** _____

Chemical Health Hazards Found on Job-Site (Check all that Apply):

☐ Gases ☐ Vapors ☐ Fumes ☐ Dusts ☐ Fibers ☐ Mists

Physical Health Hazards Found on Job-Site (Check all that Apply):

☐ Temperature ☐ Noise ☐ Repetitive Motion & Awkward Postures ☐ Radiation

Biological Health Hazards Found on Job-Site (Check all that Apply):

☐ Fungi (Mold) ☐ Bloodborne Pathogens ☐ Bacteria ☐ Poisonous Plants & Infectious Animals

- ☐ Confined or enclosed spaces (hazardous atmospheres).
- ☐ Contaminated soil conditions (hazardous atmospheres).
- ☐ Unsanitary conditions (poor housekeeping, poorly kept toilet facilities, etc.).
- ☐ Presence of hazardous materials (dangerous coatings on structures & metal containing alloys).
- ☐ The use of hazardous chemicals (gases, solvents, glues and concrete).
- ☐ The presence of residues left by degreasing agents, usually chlorinated hydrocarbons (chloroform and carbon tetrachloride).
- ☐ Older buildings and structures; unoccupied dwellings (fungi/mold, asbestos & lead).
- ☐ Homes built before 1978 – suspect to contain lead-based paint, according to the EPA.
- ☐ Extreme temperatures (hot & cold environments).
- ☐ Radiological exposures (nuclear power plants, antennas, hospitals, laboratories and the sun).
- ☐ Loud noise (use of tools and equipment).
- ☐ Hot work (welding and cutting).
- ☐ The presence of plant and/or animal wildlife (poisonous venom, feces, rabies…).
- ☐ Other: _____

JHA Worksheet (Hazard Identification)

Description of Health Hazard: _____

☐ Gas ☐ Vapor ☐ Fume ☐ Dust/Fiber ☐ Mist ☐ Fungi (Mold)

☐ Noise ☐ Radiation ☐ Other _____

C.A.S # _____ Flash Point (FP) _____ Vapor/Gas Density _____ Lower Flammable Limit (LFL) _____

PEL: _____ TLV: _____ REL: _____ AL: _____ C: _____ STEL: _____

- Is there a safe alternative? Yes/No (If yes, describe: _____)
- Is the work being performed by qualified people? Yes/No (List special training, certification and/or licensing required): _____
- Does the work involve entry into confined or enclosed spaces? Yes/No (if yes, follow confined space entry procedures).
- Is there a Safety Data Sheet (SDS) available on the job-site for all hazardous chemicals? Yes/No
- Are hazard controls being implemented in order of preference? Yes/No

1. Engineering; ventilation & wet methods.
2. Administrative; work practices, scheduling workers to minimize exposure, extended breaks, etc.
3. Personal Protective Equipment (PPE); respiratory and hearing protection, protection of face, hand, feet, eyes & whole body.

Health Hazard Route of Entry(s)

☐ Inhalation ☐ Ingestion ☐ Absorption ☐ Injection ☐ Ears (Noise) ☐ Other _____

Environmental & Personal Air Monitoring:

- Air monitoring does not measure you or what you are doing, but rather what you are exposed to on the job.
- Air monitoring must be done by a trained health professional (industrial hygienist or technician).
- Monitoring can be done by measuring the air in a fixed location in the work area *(area monitoring)* or by placing the monitoring equipment on individual workers and measuring the amount they are exposed to *(personal monitoring)*.

Hazard Evaluation (Employee Exposure Monitoring and/or Medical Surveillance)

☐ Exposure Records: TWA: _____ C: _____ STEL: _____
(This information must be maintained by employer for 30 years.)

☐ Medical Records (List):

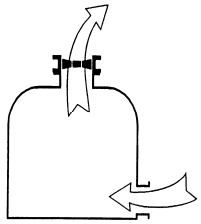
(This information must be maintained by employer for duration of employment, plus 30 years.)

JHA Worksheet (Engineering Control Options)

Engineering Controls (Select engineering controls to be implemented):

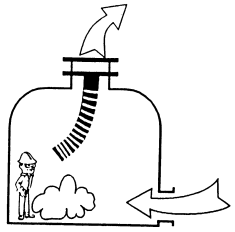
- ☐ Dust suppression (*wet methods*): _____
- ☐ Dust collection systems *(vacuum)*: _____
- ☐ General (dilution) ventilation; works best when air contaminants are widely disbursed through the area.
- ☐ Local (exhaust) ventilation system; works well when air contaminants are generated at a single source.

  Describe mechanical ventilation system used:



General (Dilution) Ventilation…

Forces fresh air into an area and dilutes contaminants; this allows air to move through a space which ensures a fresh continual supply.



Local (Exhaust) Ventilation…

Removes contaminated air at its source; this prevents harmful dust, fumes & mists from contaminating the breathing air of the worker.

If no engineering controls are being implemented, person authorizing the non-use of engineering controls:

Name: _____ Date: _____ Reason (explain):

Administrative Controls (used with personal protective equipment):

- ☐ Gather all specialty equipment, including, ventilators, warning signs, personal protective equipment, etc. (list all specialty equipment needed for job): _____
- ☐ Operations that involve toxic substances are scheduled at times when other workers are not present? Yes/No (describe): _____
- ☐ Work is isolated to just a few protected employees; signs posted and controlled access zones established? Yes/No (describe): _____
- ☐ Employees are rotated in and out of jobs to minimize exposure? Yes/No (describe):

  _____
- ☐ Employees removed from working around hazardous substances once they have reached a predetermined level of exposure? Yes/No (describe): _____
- ☐ Are hot and cold work environments considered? Yes/No (describe): _____
- ☐ Employees trained on proper housekeeping & good personal hygiene? Yes/No
- ☐ Employees trained on the proper procedures that minimize exposures? Yes/No
- ☐ Employees trained on how to inspect and maintain process and equipment on a regular basis? Yes/No
- ☐ No eating, drinking, smoking, chewing tobacco or gum, and applying cosmetics in hazardous areas? Yes/No

Employer Obligations	Worker Responsibility:
☐ Perform a "hazard assessment" of the workplace to identify and control physical and health hazards. ☐ Identify and provide appropriate PPE for employees. ☐ Train employees in the use and care of the PPE. ☐ Maintain PPE, including replacing worn or damaged PPE. ☐ Periodically review, update and evaluate the effectiveness of the PPE program.	☐ Properly wear PPE. ☐ Attend training sessions on PPE. ☐ Care for, clean and maintain PPE. ☐ Inform a supervisor of the need to repair or replace PPE. *Note: The employer must pay for replacement PPE, except when the employee has lost or intentionally damaged the PPE.*

Employers Must Pay for Personal Protective Equipment (PPE)

With few exceptions, OSHA requires employers to pay for personal protective equipment used to comply with OSHA standards; employers cannot require workers to provide their own PPE. Even when a worker provides his or her own PPE, the employer must ensure that the equipment is adequate to protect the worker from hazards at the workplace.

Controlling a hazard at its source is the best way to protect workers. However, when engineering, work practices and administrative controls are not feasible* or do not provide sufficient protection, employers must provide ***personal protective equipment (PPE)*** to the employee and ensure its proper use.

Description of personal protective equipment being used: ☐ Eye/Face Protection ☐ Foot Protection

☐ Body Protection ☐ Gloves ☐ Respirator ☐ Other _____ ☐ Other _____

- ☐ Is the device approved? Yes/No (describe): _____
- ☐ Is the device appropriate for the type of hazard? Yes/No (explain): _____
- ☐ Is the worker wearing the device properly trained to understand the use, limitations and care instructions of the device? Yes/No (explain): _____
- ☐ Does the material have sufficient strength to withstand the environment? Yes/No (explain): _____
- ☐ Will the material withstand repeated use after contamination and decontamination? Yes/No (explain): _____
- ☐ Is the material flexible or pliable enough to allow end users to perform needed tasks? Yes/No (describe): _____
- ☐ Will the material maintain its protective integrity and flexibility under hot and cold extremes? Yes/No (explain):

Eye & Face Protector Selection Guide

Table E-1. Eye and Face Protector Selection Guide

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 Sideshields

**7. WELDING GOGGLES, Eyecup Type, Tinted Lenses (Illustrated)
7A. CHIPPING GOGGLES, Eyecup Type, Clear Safety Lenses (Not Illustrated)
**8. WELDING GOGGLES, Coverspec Type, Tinted Lenses (Illustrated)
8A. CHIPPING GOGGLES, Coverspec Type, Clear Safety Lenses (Not Illustrated)
**9. WELDING GOGGLES, Coverspec Type, Tinted Plate Lends

10. FACE SHIELD (Available with Plastic or Mesh Window)
**11. WELDING HELMETS

* Non-side shield spectacles are available for limited hazard use requiring only frontal protection.
** See Table E-2. Filter Lends Shade Numbers for Protection against Radiant Energy.

Applications		
Operation	**Hazards**	**Recommended Protectors: Numbers Signify Preferred Protection**
Acetylene – Burning, Acetylene – Cutting, Acetylene – Welding	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 severe exposure add 10)
Machining	Flying particles	1, 3, 4, 5, 6, 10
Spot Welding	Flying particles, sparks	1, 3, 4, 5, 6, 10

Filter Lens Shade Number for Protection Against Radiant Energy

Table E-2: Filter Lens Shade Number for Protection against Radiant Energy

Welding Operation	Shade Number
Shielded metal-arc welding 1/16-, 3/32-, 1/8-, 5/32-inch diameter electrodes	10
Gas-shielded arc welding (nonferrous) 1/16-, 3/32-, 1/8-, 5/32-inch diameter electrodes	11
Gas-shielded arc welding (ferrous) 1/16-, 3/32-, 1/8-, 5/32-inch diameter electrodes	12
Shielded metal-arc welding 3/16-, 7/32-, 1/4-inch diameter electrodes	12
5/16-, 3/8-inch diameter electrodes	14
Atomic hydrogen welding	10 - 14
Carbon-arc welding	14
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1 to 6 inches	4 or 5
Heavy cutting, more than 6 inches	5 or 6
Gas welding (light), up to 1/8-inch	4 or 5
Gas welding (medium), 1/8- to 1/2-inch	5 or 6
Gas welding (heavy), more than 1/2-inch	6 or 8

Chemical Resistant Gloves Types & Definitions

Chemical-resistant gloves are made with different kinds of rubber: natural, butyl, neoprene, nitrile and fluorocarbon (viton); or various kinds of plastic: polyvinyl chloride (PVC), polyvinyl alcohol and polyethylene. These materials can be blended or laminated for better performance. As a general rule, the thicker the glove material, the greater the chemical resistance but thick gloves may impair grip and dexterity, having a negative impact on safety.

Chemical-resistant gloves include:

Butyl Gloves	Natural (Latex) Rubber Gloves	Neoprene Gloves	Nitrile Gloves
Synthetic rubber that protects against chemicals, such as peroxide, rocket fuels, highly corrosive acids (nitric acid, sulfuric acid, hydrofluoric acid and red-fuming nitric acid), strong bases, alcohols, aldehydes, ketones, esters and nitro-compounds. Butyl gloves also resist oxidation, ozone corrosion and abrasion, and remain flexible at low temperatures. Butyl rubber does not perform well with aliphatic and aromatic hydrocarbons and halogenated solvents.	Most popular general-purpose glove; outstanding tensile strength, elasticity and temperature resistance. Use with acids, alkalis, salts and ketones. Latex gloves have caused allergic reactions in some individuals and may not be appropriate for all employees. Hypoallergenic gloves, glove liners and powderless gloves are possible alternatives for workers who are allergic to latex gloves.	Made of synthetic rubber and offer good pliability, finger dexterity, and high density and tear resistance. They protect against hydraulic fluids, gasoline, alcohols, organic acids and alkalis. They generally have chemical and wear resistance properties superior to those made of natural rubber.	Made of a copolymer and provide protection from chlorinated solvents such as trichloroethylene and perchloroethylene. Although intended for jobs requiring dexterity and sensitivity, nitrile gloves stand up to heavy use even after prolonged exposure to substances that cause other gloves to deteriorate. They offer protection when working with oils, greases, acids, caustics and alcohols but are generally not recommended for use with strong oxidizing agents, aromatic solvents, ketones and acetates.

Respiratory Protection Types & Definitions

Use only NIOSH (National Institute for Occupational Safety & Health) approved respirators.

 **Filtering Facepiece**	 **Air-Purifying Respirator**	 **Powered Air-Purifying Respirator**	 **Self-Contained Breathing Apparatus (SCBA)**
A negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.	A respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.	An air-purifying respirator that used a blower to force the ambient air through air-purifying elements to the inlet covering.	An atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

* Not pictured: Escape-Only Respirator and Loose-Fitting Facepiece.

The allowable use of a respirator depends on certain circumstances; two scenarios in which an employee may wear a respirator are:

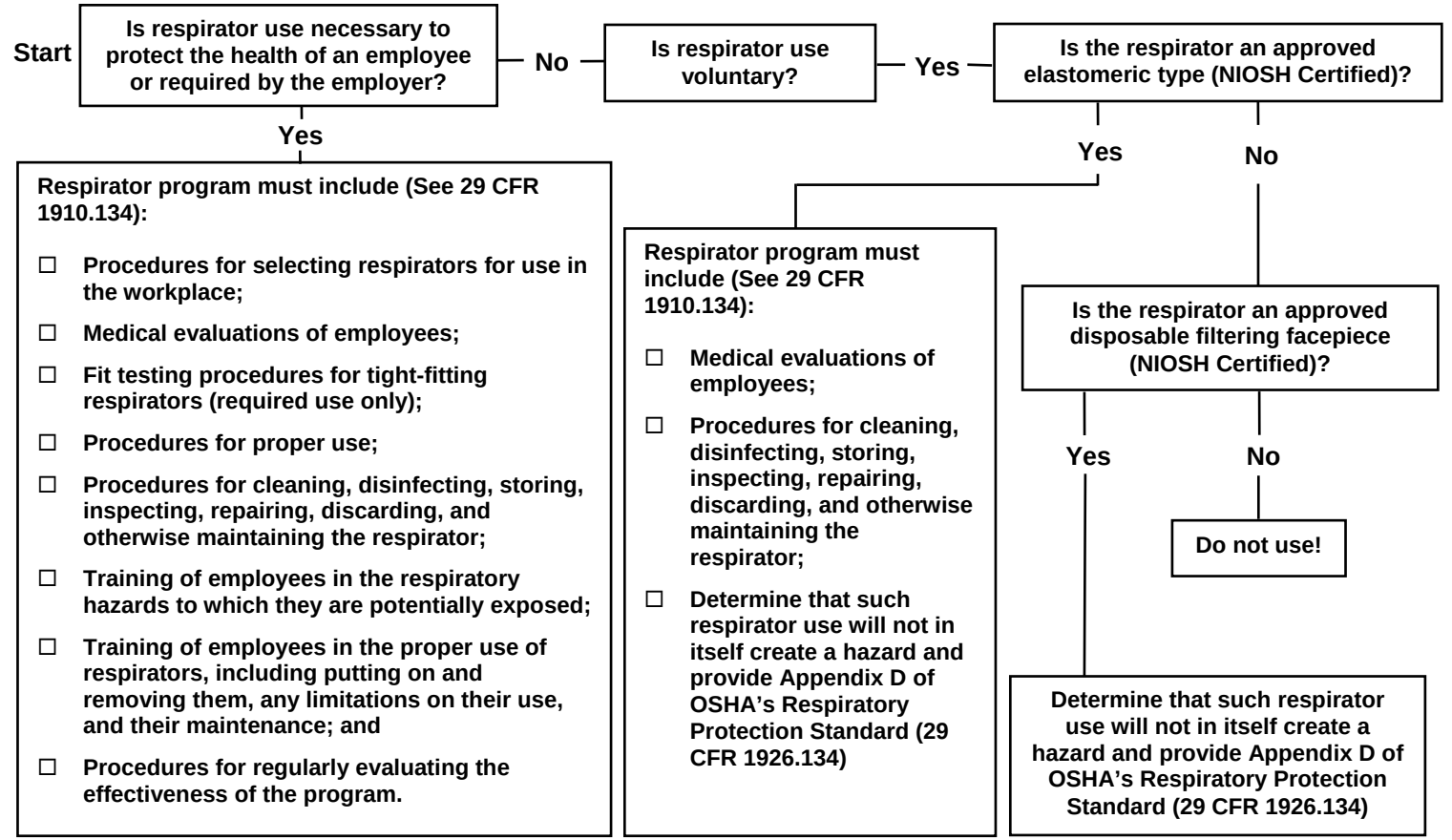
1. ***Employee must wear a respirator due to job-site conditions;*** if concentrations of airborne contaminants cannot be effectively minimized to below permissible exposure limits through engineering or administrative controls then respiratory protection must be worn.
2. ***Voluntary use by employee;*** an employee may choose to wear a respirator under voluntary conditions when concentrations of airborne contaminants are below legal permissible exposure limits.

Respiratory Protection Program Compliance Checklist

An employer is required to have at the job-site a written program that details specifically each aspect of respirator use at that site. Respirator program details include:

- ☐ Program Administrator on job-site.
- ☐ Engineering controls infeasibility study completed.
- ☐ Respirator properly selected based on exposure assessment.
- ☐ Medical clearance obtained.
- ☐ Fit testing performed.
- ☐ Training conducted.
- ☐ Written program on job-site with up-to-date annual audit completed.
- ☐ Administrative and work practice controls being implemented along with respirator use.

Respiratory Protection Program – Decision Flow Chart



An effective respiratory protection program needs to be able to perform the following key functions:

- Determine whether respirators are required due to hazards in the work environment.
- Identify which respirator will be needed to provide the best protection.
- Ensure that all employees required to do so are medically able to wear a respirator and perform their work.
- Ensure that the selected respirator properly fits each employee required to wear one.
- Ensure that each employee is trained on the respirator's use, limitations, storage, maintenance, cleaning and disinfecting.
- Ensure that each of the above is properly documented and reviewed for its effectiveness as part of a site-specific written respiratory protection program.

Respirators are ***required*** to be worn by workers whenever the following three conditions arise:

1. Exposures exceed the OSHA Permissible Exposure Limit for a chemical or substance;
2. Engineering controls are being put in place, but have not yet reduced exposures below the OSHA Permissible Exposure Limit; or
3. The employer ***requires*** respirators to be worn.

If the above three conditions do not exist, then the use of respirators is not required.

The appropriate respirator will depend on the contaminant(s) to which you are exposed and the protection factor (PF) required. Required respirators must be NIOSH-approved and medical evaluation, fit testing and training must be provided before use.

Approved filtering facepieces – can be used for dust, mists, welding fumes, mold, etc. They do not provide protection from gases or vapors. DO NOT USE FOR ASBESTOS.	Disposable & easy to breathe through – easier to use under welding hoods/helmets and with face shields. Least protection (rated the same as elastomeric half-face). Not allowed for use in atmospheres with less than 19.5% oxygen.	 ***Filtering Facepiece***
Half-face respirators (elastomeric) – can be used for protection against most vapors, acid gases, dust or welding fumes, mold. Cartridges/filters must match contaminant(s) and be changed periodically.	Can be used with a variety of cartridges/filters. Hard to get a good fit with some people. Requires regular cleaning and periodic disinfecting, requires maintenance and replacement of parts. Not allowed for use in atmospheres with less than 19.5% oxygen.	 ***Half-Face (Elastomeric)***
Full-face respirators (elastomeric) – are more protective than half-face respirators. They can be used for protection against most vapors, acid gases, dust or welding fumes and mold. The face-shield protects face and eyes from irritants and contaminants. Cartridges/filters must match contaminant(s) and be changed periodically.	Can be used with a variety of cartridges/filters. Built in safety eye protection (ANSI Z87). Requires regular cleaning and periodic disinfecting, requires maintenance and replacement of parts. Not allowed for use in atmospheres with less than 19.5% oxygen.	 ***Full-Face (Elastomeric)***

The appropriate respirator will depend on the contaminant(s) to which you are exposed and the protection factor (PF) required. Required respirators must be NIOSH-approved and medical evaluation, fit testing and training must be provided before use.

Powered-air-purifying respirators (PAPR) – offers breathing comfort from a battery powered fan which pulls air through filters and blows air into the facepiece or hood. Hooded PAPR's may be worn by workers who have beards under certain circumstances. Cartridges/filters must match contaminant(s) and be changed periodically.	May be loose-fitting or tight-fitting. Can be used with a variety of cartridges/filters. Built in safety eye protection (ANSI Z87). Easier to fit, easier on heart and lungs. Requires regular cleaning and periodic disinfecting, requires maintenance and replacement of parts. Not allowed for use in atmospheres with less than 19.5% oxygen.	 ***Loose Fitting PAPR***
Self-Contained Breathing Apparatus (SCBA) – is used for entry and escape from atmospheres that are considered immediately dangerous to life and health (IDLH) or oxygen deficient. They use their own air tank.	Built in safety eye protection (ANSI Z87). Easier to fit. Requires regular cleaning and periodic disinfecting, requires maintenance and replacement of parts. Requires Compressed Gas Association (CGA) Grade D breathing air. Can be used in Oxygen deficient atmospheres (less than 19.5% oxygen).	 ***SCBA***

Table 1. (29 CFR 1910.134) -- Assigned Protection Factors[5]

Type of respirator[1], [2]	Quarter mask	Half mask	Full facepiece	Helmet/ hood	Loose-fitting facepiece
Air-Purifying Respirator	**5**	**[3]10**	**50**	**.....**	**.....**
Powered Air-Purifying Respirator (PAPR)	**.....**	**50**	**1,000**	**[4]25/1,000**	**25**
Supplied-Air Respirator (SAR) or Airline Respirator					
• **Demand mode**	**.....**	**10**	**50**	**.....**	**.....**
• **Continuous flow mode**	**.....**	**50**	**1,000**	**[4]25/1,000**	**25**
• **Pressure-demand or other positive-pressure mode**	**.....**	**50**	**1,000**	**.....**	**.....**
Self-Contained Breathing Apparatus (SCBA)					
• **Demand mode**	**.....**	**10**	**50**	**50**	**.....**
• **Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)**	**.....**	**.....**	**10,000**	**10,000**	**.....**

Notes for Table 1. (29 CFR 1910.134) -- Assigned Protection Factors[5]

[1] Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.

[2] The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.

[3] This APF category includes filtering facepieces, and half masks with elastomeric facepieces.

[4] The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.

[5] These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

Respirator cartridges and filters are made to protect against a variety of vapors, gases, fumes, dusts, fibers and mists. The type of cartridge/filter used is based on a particular hazard. Color coding schemes used by different manufacturers are the same for each type of cartridge/filter.

"P" rated filters are designated as oil proof.

"R" rated filters are designated as oil resistant.

"N" rated filters are not oil proof.

Respirator Cartridge/filter Color-Codes	
Organic Vapor	Black
Acid Gas	White
Organic Vapor/Acid Gas	Yellow
Ammonia	Green
P-100 (HEPA)	Magenta
Multi-Gas/Vapor	Olive

Particulate Air Filter Use Description

Oil Designation / **Efficiency**	**P**	**R**	**N**
95	Oil Proof Low Efficiency	Oil resistant Low Efficiency	Not Oil Proof Low Efficiency
99	Oil Proof Medium Efficiency	Oil resistant Medium Efficiency	Not Oil Proof Medium Efficiency
100	Oil Proof High Efficiency	Oil resistant High Efficiency	Not Oil Proof High Efficiency

Dust & Fiber Respirator Selection Guide		
Hazard	***Efficiency***	***Comments***
Silica	100 (HEPA)	Atmosphere supplying respirators may be required.
Asbestos	100 (HEPA)	Requires specific respirators to be used based on task and exposure level. No disposable filtering facepieces allowed! Atmosphere supplying respirators may be required.
Lead	100 (HEPA)	Requires specific respirators to be used based on task and exposure level. Atmosphere supplying respirators may be required.
Fiberglass Insulation	95, 99 or 100 (HEPA)	No specific respirator required. Select approved respirator bases on exposure level, use and comfort.
Nuisance Dust	95, 99 or 100 (HEPA)	No specific respirator required. Select approved respirator bases on exposure level, use and comfort.

The medical evaluation is performed in one of two manners. First, a confidential questionnaire (Appendix C of the Respirator Standard, 29 CFR 1910.134) can be given during work hours or at a time and location convenient for the workers. It must be given in a language that the employee can read. OSHA has translated the questionnaire into Spanish. If the employee cannot read, they may bring someone from home to read the questions to the employee. The employer may not provide this person, or be present during the questioning. After completing the questionnaire, the employee puts it into an envelope and seals it. The employer can then send the sealed questionnaire to their designated Physician or Licensed Health Care Professional (PLHCP).

Another method of medical evaluation is to send the employee to the PLHCP for a face-to-face evaluation where the PLHCP asks the same questions as those found on the questionnaire. The employer must provide a copy of their written respirator program to the PLHCP as well as the medical evaluation section of the Respirator Standard.

After evaluating the employees, the PLHCP sends a letter back to the employer stating four things:

1. The employee can or cannot wear the respirator;
2. Any limitations on respirator use for that employee;
3. The need and frequency for follow-up evaluations; and
4. That the PLHCP has communicated this information to the employee.

This is the Medical Record, which must be kept for the employee's duration of employment plus thirty (30) years thereafter. At no time does the employer ever see the questionnaire.

There are four methods of fit testing qualitatively (pass/fail) and three methods quantitatively (measures actual fit). These are detailed in Appendix A of the Respiratory Protection Standard, 29 CFR 1910.134. OSHA allows qualitative testing for all respirators except full-face, negative pressure, air-purifying respirators – These are ***required*** to be quantitatively fitted.

Qualitative Fit Test

The qualitative fit test is done using a taste test (saccharin or Bitrex®), an odor test (banana oil/iso amyl acetate), or a reaction test to irritant smoke. A qualitative fit test kit includes a hood and odorant – testing must be performed by qualified person.

3M FT-10 Qualitative Fit Test Kit

Quantitative Fit Test

The quantitative tests use machines to measure the actual leakage through the face seal of particles or the change in pressure due to air leakage. The three tests are corn oil mist particle counting, condensation nuclei counter (CNC) or PortaCount, and the Dynatech FitTester 3000, which measures pressure difference. They all need adapters to allow sampling inside the mask. Quantitative fit tests must be performed by qualified persons.

Dynatech FitTester 3000

Any half mask air purifying respirator (disposable or elastomeric): ➢ May use qualitative fit test or quantitative fit test. ➢ Maximum Assigned Protection Factor (APF) = 10		
Full face elastomeric air purifying respirator: ➢ Must use quantitative fit test. ➢ Maximum Assigned Protection Factor (APF) = 50		

Employees must be re-fitted at least annually and if employee experiences any of the following:

- Has substantial weight gain or loss (> 10% of their body weight);
- Has cosmetic surgery;
- Has had extensive dental work; or
- If the employee reports that the respirator is not passing a fit check.

* ***Only properly trained persons are allowed to administer an employee respirator fit test – follow the procedures in 29 CFR 1910.134.***

Prior to wearing a respirator, a seal check is performed to make sure a good seal is obtained. Seal checks are done both negatively and positively.

- ***To perform a negative pressure seal check;*** cover the inlets to the filters or cartridges, and inhale to cause the face piece to pull against the face. The employee then holds their breath. If the face piece relaxes, there is a substantial leak and either another mask is selected or the mask is adjusted.
- ***To perform a positive pressure seal check;*** cover or block the exhalation valve and blow out steadily, as if blowing out a candle. The face piece should expand, but no air should be felt leaking out.

Positive Pressure Seal Check

Negative Pressure Seal Check

Employee Training

A program administrator must be appointed by the employer to ensure the proper administration of an effective respiratory protection program. This person will ensure the following:

- ☐ Employees receive training on how to use, maintain, store, clean and disinfect their respirators.
- ☐ The wearer is trained on the respirator's limitations.
- ☐ Training is conducted prior to using the respirator.
- ☐ Annual refresher training and re-training is conducted when an employee demonstrates misuse.
- ☐ The training is in a language that the employee understands.

Limitations & Use of Respirators

- ➢ All respirators leak!
- ➢ Respirators provide adequate protection only if employers ensure, on a constant basis, that they are properly fitted and worn.
- ➢ Respirators protect only the employees who are wearing them from a hazard, rather than reducing or eliminating the hazard from the workplace as a whole (which is what engineering and work practice controls do).
- ➢ Respirators are uncomfortable to wear, cumbersome to use, and interfere with communication in the workplace, which can often be critical to maintaining safety and health.

Appendix D to Sec. 1910.134 (Mandatory) – Information for Employees Using Respirators When Not Required Under the Standard

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

When using a respirator, do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

Respirator User’s Signature: _____ Date: _____

The manufacturer's guidance for cleaning and sanitizing a respirator should always be followed and is included with the packaging of all products. If you do not have access to that copy, check the manufacturer's web site. If still not accessible, general cleaning and sanitizing guidance is provided by the Occupational Safety and Health Administration (OSHA).

Procedures for Cleaning Respirators

A. Remove filters, cartridges, or canisters. Disassemble facepieces by removing speaking diaphragms, demand and pressure- demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.

B. Wash components in warm (43 °C [110 °F] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.

C. Rinse components thoroughly in clean, warm (43 °C [110 °F] maximum), preferably running water. Drain.

D. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:

    1. Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43 °C (110 °F); or,

    2. Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at 43 °C (110 °F); or,

    3. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.

E. Rinse components thoroughly in clean, warm (43 °C [110 °F] maximum), preferably running water. Drain and allow drying thoroughly.

The Occupational Safety and Health Administration (OSHA) has determined that an effective hearing conservation program consists of the following elements:

1. Monitoring of employee noise exposures; (e.g., frequent and regular inspecton of the job-site is required by competent person).
2. The institution of engineering, work practice, and administrative controls for excessive noise; (e.g., maintain equipment to run smooth and quiet, rotate workers, put up signs and barriers to warn workers of high noise levels).
3. The provision of each overexposed employee with an individually fitted hearing protector with an adequate *noise reduction rating*; [e.g., attenuation to below 85 decibels (dBA)].
4. Employee training and education regarding noise hazards and protection measures; (e.g., inform workers of the hazards of noise and when and where to wear hearing protectors).
5. Baseline and annual audiometry; before beginning work, have an audiometry test conducted to establish pre-work conditions and periodically re-test to determine any hearing loss.
6. Procedures for preventing further occupational hearing loss by an employee whenever such an event has been identified (e.g., requiring employee use of hearing protective device at 85 decibels (dbA), and;
7. Recording Keeping (e.g., audiometry tests, inspection logs & noise monitoring data).

Every construction industry employer's hearing conservation program must incorporate as many of the above elements as are feasible*.

**** Feasible means – capable of being done.***

OSHA Permissible Noise Exposures

Employers have the responsibility to protect against the effects of noise exposure when the sound levels exceed those shown in Table D-2 of 29 CFR 1926.52 when measured on the **A-weighted scale** of a standard sound level meter at slow response.

Table D-2 Permissible Noise Exposures

Duration per day, hours	*Sound level dBA slow response*
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ or less	115

OSHA Requirement…

When employees are subjected to sound levels exceeding those listed in Table D-2, feasible administrative or engineering controls must first be utilized. If such controls fail to reduce sound levels within the levels of the table (D-2), ear protective devices must be provided and used.*

**** Feasible means – capable of being done.***

Contractors can analysis jobs, tasks and equipment; once loud operations are identified, employers can then seek out alternative tools and equipment that are less noisy (eliminate the hazard).

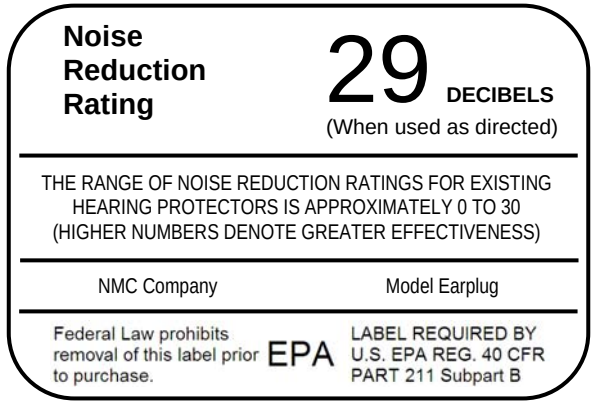
- Enclose equipment operators inside cabs.
- Routine maintenance on tools and equipment can help to reduce sound; replace worn, loose, or unbalanced machine parts that cause vibration.
- Keep machine parts well lubricated to reduce friction.
- Place acoustical enclosures and barriers around generators.
- Use sound absorbing material and vibration isolation systems on hand tools.
- Use rubber mallets to erect and dismantle scaffolding and formwork.
- Rotate workers performing loud tasks, and post signs warning of areas where hearing protection is required.
- Train all employees on how to properly wear hearing protective devices.
- Plain cotton is not an acceptable protective device against noise.

Noise Reduction Rating (NRR)

The ***Noise Reduction Rating (NRR)*** is the measurement, in decibels (dB), of how well a hearing protector reduces noise. The higher the NRR number the greater the noise reduction. This noise reduction rating is based on the C-weighted sound level scale. Because noise exposures are measured on the A-weighted sound level scale, an adjustment must be made to determine the actual noise reduction (*see NRR Adjustment Calculation).*

Noise Reduction Ratings (NRR)…

- A hearing protector's ability to reduce noise is its Noise Reduction Rating (NRR).
- The greater the NRR, the better the noise reduction.
- The NRR is usually listed on the hearing protector box.



NRR Required Adjustment (OSHA)

OSHA requires that the manufacturers' Noise Reduction Rating (NRR) be adjusted downward by subtracting 7 from the listed NRR.

For example, ear plugs with a listed NRR of 29…

29 – 7 = 22

NIOSH NRR Adjustment

NIOSH recommends the following NRR adjustment:

Earmuffs 	Subtract 25% from the manufacturer's adjusted NRR. **(Listed NRR – 7) x .75 = NIOSH Recommended Adjustment**
Formable Ear Plugs 	Subtract 50% from the manufacturer's adjusted NRR. **(Listed NRR – 7) x .5 = NIOSH Recommended Adjustment**
All Other Ear Plugs (Canal Caps) 	Subtract 70% from the manufacturer's adjusted NRR. **(Listed NRR – 7) x .3 = NIOSH Recommended Adjustment**

Hearing Protection Checklist

- ☐ All employees who are exposed to the Recommended Exposure Limit (REL) of 85 decibels (dBA) are provided with hearing protection.
- ☐ All employees who wear hearing protection are individually fitted by a competent person.

Job-Site Competent Person: _____

Dual Hearing Protection

Workers whose 8-hour time weighted average exposures exceed 100 decibels should wear double hearing protection (wearing earplugs and earmuffs simultaneously).

NOTE: *The term "double hearing protection" is misleading. The attenuation provided from any combination earplug and earmuff is not equal to the sum of their individual attenuation values.*

To calculate the dual hearing protection using the noise reduction rating, take the higher NRR and add five (5) to the field adjusted NRR (listed NRR – 7 + 5); the extra five (5) is all that is added for the second device.

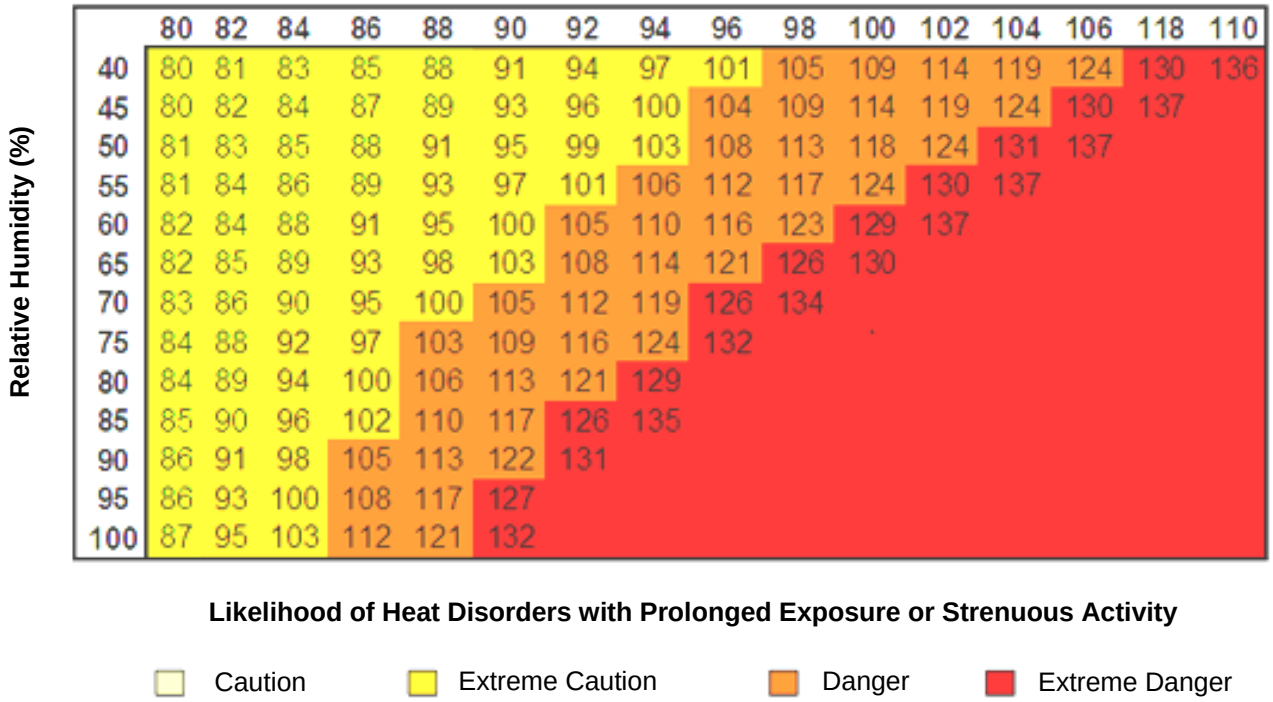
Example of dual protection calculation using noise reduction rating (NRR)…

Formable Ear Plugs
Listed NRR = 29
Adjusted NRR (29 – 7) = 22

Earmuffs
Listed NRR = 16
Adjusted NRR for Dual Protection = 5

NOAA (National Oceanic and Atmospheric Administration)

Heat Index
Temperature (ºF)



Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

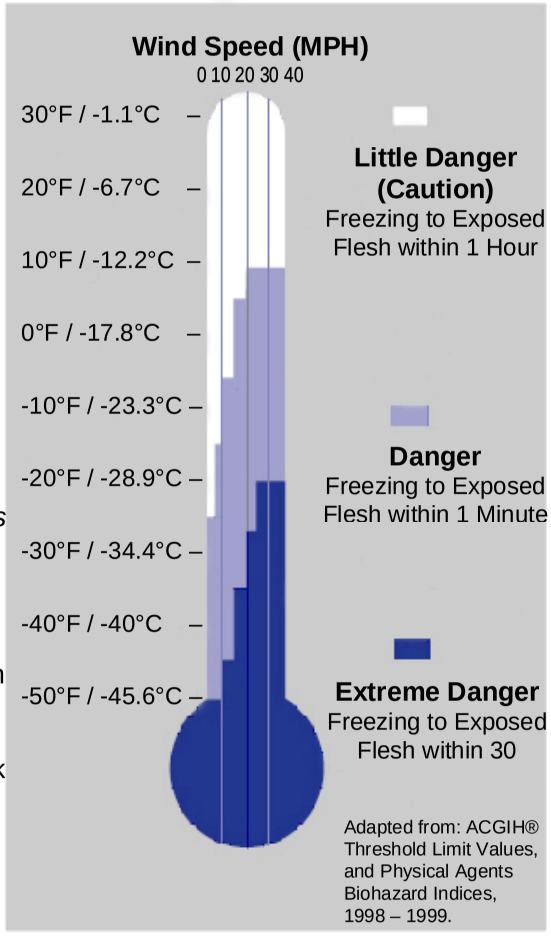
Caution | Extreme Caution | Danger | Extreme Danger

THE COLD STRESS

LOW TEMPERATURE + WIND SPEED + WETNESS
= INJURIES & ILLNESS

When the body is unable to warm itself, serious cold-related illnesses and injuries may occur, and permanent tissue damage and death may result.

Hypothermia can occur when *land temperatures* are **above** freezing or *water temperatures* are below 98.6°F/37°C. Cold-related illnesses can slowly overcome a person who has been chilled by low temperatures, brisk winds, or wet



OSHA 3156
1998

WARNING: *Before beginning any stretching program, check with your healthcare provider. If you question any of the following stretches, or feel any discomfort while doing any of these stretches, stop immediately and check with your healthcare provider before continuing.*

Trunk & Low Back

Side Bend

- Feet shoulder width apart, arms at side.
- With one hand, reach up overhead and slowly lean towards opposite side. Keep both feet flat on ground.
- Hold for 3 – 5 seconds.
- Return to starting position and repeat as desired.

Back Bend

- Feet shoulder width apart, hands on hips.
- Looking straight ahead slowly and gently bend backwards.
- Caution – you should feel tension, not pain in the low back.
- Hold for 3 – 5 seconds (do not hold your breath).
- Return to starting position and repeat as desired.

Pre-Work Stretch & Flex Exercises

WARNING: *Before beginning any stretching program, check with your healthcare provider. If you question any of the following stretches, or feel any discomfort while doing any of these stretches, stop immediately and check with your healthcare provider before continuing.*

Legs

Hamstring Stretch

- Raise your foot on an elevated surface, at least 10” to 12” high (a truck’s running board or overturned bucket).
- Looking forward, slowly bend at the hip keeping raised leg straight.
- Stop when you feel tension and hold 3 – 5 seconds.
- To increase tension, pull toes towards body.
- Switch legs and repeat stretch.

Quadriceps Stretch

- Holding on for balance with your left hand, grab your right foot or ankle with your right hand.
- Hold for 3 – 5 seconds and feel the pull in the front of your thigh.
- Repeat on opposite side.

WARNING: *Before beginning any stretching program, check with your healthcare provider. If you question any of the following stretches, or feel any discomfort while doing any of these stretches, stop immediately and check with your healthcare provider before continuing.*

Upper Body

Chest & Shoulder Stretch

- Standing up straight, raise your arms with your elbows bent so that your upper arms are parallel to the floor, fingers pointing up.
- Slowly squeeze your shoulder blades together and hold for 3 – 5 seconds.
- Return to the starting position and repeat.

Forearm Stretch

- Hold your arms out straight in front of you with your palms facing down.
- Make a loose fist with your hands.
- Slowly and gently bend your fists down towards the floor.
- Now, slowly and gently rotate your fists.
- Hold for 3 – 5 seconds. You should feel a stretch from the topside of the wrists out to the elbow.
- Relax and shale out your hands and arms.

Personal Protective Equipment (PPE) Hazard Assessment

Name of job-site: _____ **Assessment conducted by**: _____

Work place address: _____ **Date of Assessment:** _____

Work area(s): _____ **Job/Task(s):** _____

Work Activity:		**Hazardous Exposure:**		**Controls:**
☐ Abrasive Blasting	☐ Sawing	☐ Gas	☐ Fungi (Mold)	Can hazard be eliminated without the use of PPE? ☐ Yes ☐ No
☐ Chipping	☐ Grinding	☐ Vapor	☐ Noise	PPE Required:
☐ Cutting	☐ Hammering	☐ Fume	☐ Radiation	☐ Eye & Face Protection
☐ Drilling	☐ Chemical Handling	☐ Dust/Fiber	☐ Temperature	☐ Head Protection
☐ Welding	☐ Environmental	☐ Mist	☐ Other _____	☐ Hand & Body Protection
☐ Burning	☐ Other _____	**Routes of Entry:**		☐ Respiratory Protection
☐ Sanding		☐ Inhalation	☐ Injection	☐ Other _____
Describe:		☐ Ingestion	☐ Ears (Noise)	Describe:
		☐ Absorption	☐ Other _____	
		Describe:		

Globally Harmonized System Pictograms		
	**Gas**	This is the symbol that will appear on chemicals that are; gases under pressure, compressed gases, liquefied gases, refrigerated liquefied gases, dissolved gases.
	**Aquatic Hazard**	This is the symbol that will appear on chemicals which are acutely hazardous to fish, crustacea, or aquatic plants.
	**Explosive**	This is the symbol that will appear on chemicals which are; unstable, explosive, self-reactive substances and mixtures, and organic peroxides.
	**Flammable**	This is the symbol that will appear on chemicals that are flammable. Depending on the properties of the chemical(s); flammable gas, flammable aerosol, flammable liquid and vapor, flammable solid.
	**Corrosive**	This is the symbol that will appear on chemicals that have corrosive properties. Depending on the properties of the chemical(s); may be corrosive to metal, causes severe skin burns and eye damage, will cause serious eye damage.

Globally Harmonized System Pictograms		
	**Oxidizer**	This is the symbol that will appear on chemical that will release oxygen or behave like oxygen in a chemical reaction; causing a greater fire and explosion.
	**Irritant & Sensitizer**	This is the symbol that will appear on chemicals with less severe toxicity; harmful if swallowed, harmful in contact with skin, harmful if inhaled, causes skin and eye irritation, may cause allergic skin reaction.
	**Acute Toxicity**	This is the symbol that will appear on the most severely toxic chemicals. Depending on the toxicity of the chemical, the skull and crossbones indicate that the chemical may be toxic or fatal; inhaled, swallowed, and/or contact with skin.
	**Chronic Health Hazard**	This is the symbol that will appear on chemicals that poses chronic health hazards; respiratory sensitization, germ cell mutagenicity, carcinogenicity, reproductive toxicity, specific target organ toxicity, and/or aspiration hazard.

Hazard Class is the nature of the physical or health hazard, e.g., flammable solid, carcinogen, oral acute toxicity.

Flame	Flame Over Circle	Exclamation Mark	Exploding Bomb
			
Flammables **Self Reactives** **Pyrophorics** **Self-Heating** **Emits Flammable Gas** **Organic Peroxides**	**Oxidizers**	**Irritant** **Dermal Sensitizer** **Acute Toxicity (Harmful)** **Narcotic Effects** **Respiratory Tract Irritation**	**Explosives** **Self Reactives** **Organic Peroxides**

Hazard Class is the nature of the physical or health hazard, e.g., flammable solid, carcinogen, oral acute toxicity.

Corrosion	Gas Cylinder	Health Hazard	Skull & Crossbones
			
Corrosives	**Gases Under Pressure**	**Carcinogen** **Respiratory Sensitizer** **Reproductive Toxicity** **Target Organ Toxicity** **Mutagenicity** **Aspiration Toxicity**	**Acute Toxicity (Severe)**

Aquatic Toxicity

Hazard Category is the division of criteria within each hazard class.

Hazard Class	Hazard Category						
Explosive	Unstable Explosive	**Div 1.1**	**Div 1.2**	**Div 1.3**	**Div 1.4**	**Div 1.5**	**Div 1.6**
Flammable Gases	**1**	**2**					
Flammable Aerosols	**1**	**2**					
Oxidizing Gases	**1**						
Gases under Pressure **Compressed Gases** **Liquefied Gases** **Refrigerated Liquefied Gases** **Dissolved Gases**	**1**						
Flammable Liquids	**1**	**2**	**3**	**4**			
Self-Reactive Chemicals	**Type A**	**Type B**	**Type C**	**Type D**	**Type E**	**Type F**	**Type G**

Hazard Category is the division of criteria within each hazard class.

Hazard Class	Hazard Category						
Pyrophoric Liquids	**1**						
Pyrophoric Solid	**1**						
Pyrophoric Gases	Single Category						
Self-Heating Chemicals	**1**	**2**					
Chemicals, which in contact with water, emit flammable gases	**1**	**2**	**3**				
Oxidizing Liquids	**1**	**2**	**3**				
Oxidizing Solids	**1**	**2**	**3**				
Organic Peroxides	**Type A**	**Type B**	**Type C**	**Type D**	**Type E**	**Type F**	**Type G**
Corrosive to Metals	**1**						

Hazard Category is the division of criteria within each hazard class.

Hazard Class	Hazard Category			
Acute Toxicity	**1**	**2**	**3**	**4**
Skin Corrosion/Irritation	**1A**	**2A**	**1C**	**2**
Serious Eye Damage/Eye Irritation	**1**	**2A**	**2B**	
Respiratory or Skin Sensitization	**1**			
Germ Cell Mutagenicity	**1A**	**1B**	**2**	
Carcinogenicity	**1A**	**1B**	**2**	
Reproductive Toxicity	**1A**	**1B**	**2**	**Lactation**

Hazard Category is the division of criteria within each hazard class.

Hazard Class	Hazard Category			
STOT* – Single Exposure	**1**	**2**	**3**	
STOT* – Repeated	**1**	**2**		
Aspiration	**1**			
Simple Asphyxiants	**Single Category**			

*** STOT - Specific Target Organ Toxicity**

Environmental Hazards Classification

Acute Aquatic Toxicity means the intrinsic property of a material to cause injury to an aquatic organism in a short-term exposure.

Chronic Aquatic Toxicity means the potential or actual properties of a material to cause adverse effects to aquatic organisms during exposures that are determined in relation to the lifecycle of the organism.

Container Labeling Requirements

SAMPLE LABEL

CODE _____
Product Name _____

Product Identifier

Company Name _____
Street Address _____
City _____ State _____
Postal Code _____ Country _____
Emergency Phone Number _____

Supplier Identification

Hazard Pictograms

Signal Word
Danger

Keep container tightly closed. Store in a cool, well-ventilated place that is locked.
Keep away from heat/sparks/open flame. No smoking.
Only use non-sparking tools.
Use explosion-proof electrical equipment.
Take precautionary measures against static discharge.
Ground and bond container and receiving equipment.
Do not breathe vapors.
Wear protective gloves.
Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.
Dispose of in accordance with local, regional, national, international regulations as specified.

In Case of Fire: use dry chemical (BC) or Carbon Dioxide (CO_2) fire extinguisher to extinguish.

First Aid
If exposed call Poison Center.
If on skin (or hair): Take off immediately any contaminated clothing. Rinse skin with water.

Precautionary Statements

Highly flammable liquid and vapor.
May cause liver and kidney damage.

Hazard Statements

Supplemental Information

Directions for Use

_____
_____
_____

Fill weight: _____ Lot Number: _____
Gross weight: _____ Fill Date: _____
Expiration Date: _____

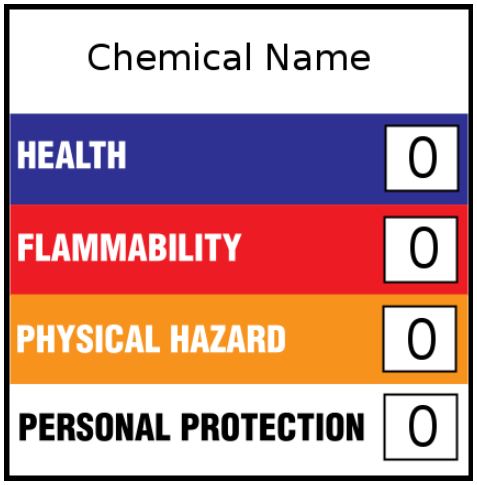
Symbols for Sources of Radiant Energy		
	**Ionizing Radiation**	Ionizing radiation is energy in the form of waves or particles that has enough force to remove electrons from atoms. This process is known as radioactive decay. The major types of radiation emitted during radioactive decay are ***alpha particles***, ***beta particles***, and ***gamma rays.***
	**Infrared Radiation (RF)**	The skin and eyes absorb infrared radiation (IR) as heat. Workers normally notice excessive exposure through heat sensation and pain. Sources of IR radiation include furnaces, heat lamps, and IR lasers.
	**Extremely Low Frequency (ELF)**	Extremely low frequency (ELF) fields includes alternating current (AC) fields and other electromagnetic, non-ionizing radiation from 1 Hz to 300 Hz. ELF fields at 60 Hz are produced by power lines, electrical wiring, and electrical equipment.
	**Microwave (MV) & Radiofrequency (RF)**	Microwave (MW) & Radiofrequency (RF) radiation are electromagnetic radiation in the frequency ranges 3 kilohertz (kHz) - 300 Megahertz (MHz), and 300 MHz - 300 gigahertz (GHz), respectively. Research continues on possible biological effects of exposure to MW/RF radiation.

Hazardous Materials Identification System

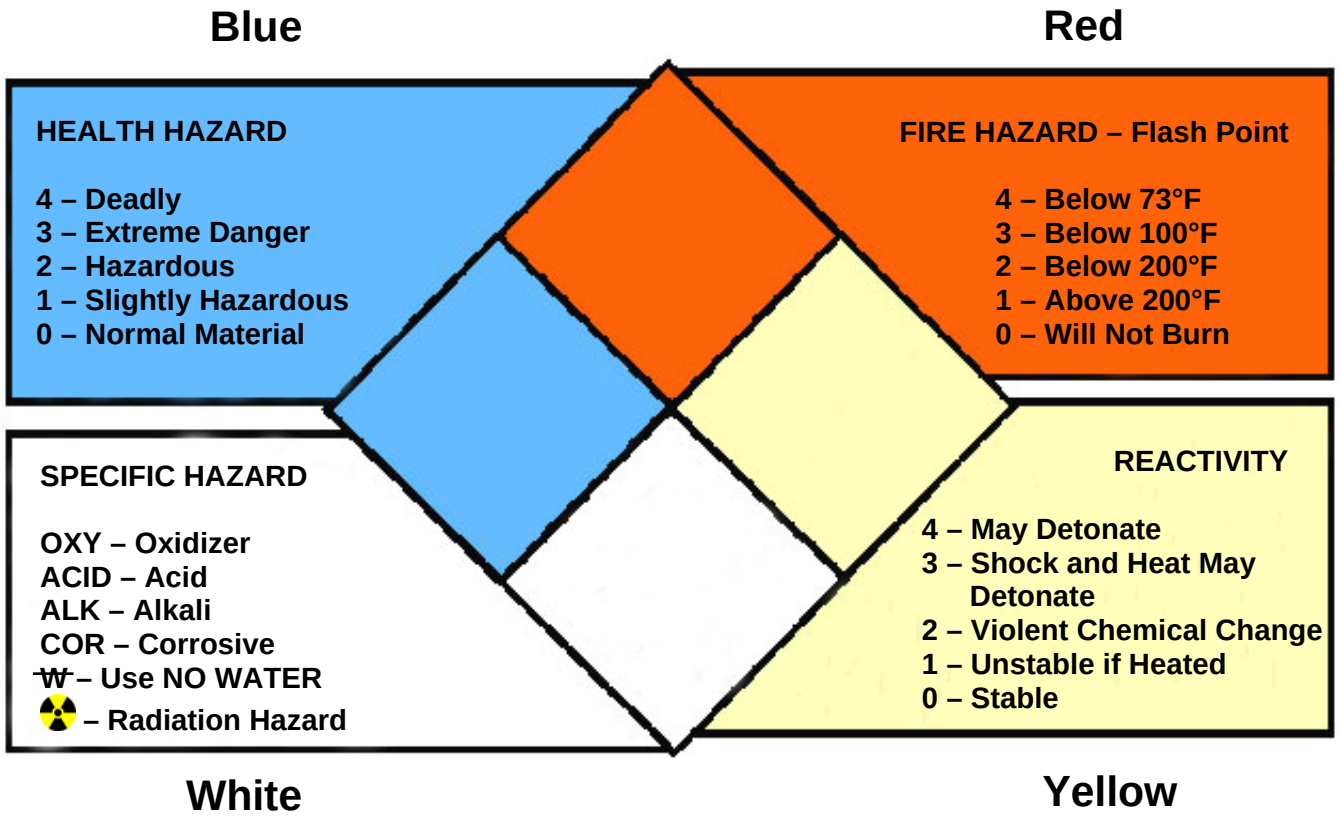
HMIS (Hazardous Materials Identification System), developed by the National Paint and Coatings Association (NPCA), is a numerical hazard rating that incorporates the use of labels with color-coded bars. A special code identifying appropriate personal protective equipment (PPE) is also listed.

HAZARD INDEX	
4 = SEVERE HAZARD	An asterisk (*) or other designation corresponds to additional information on a data sheet or separate chronic effects notification.
3 = SERIOUS HAZARD	
2 = MODERATE HAZARD	
1 = SLIGHT HAZARD	Additional Information
0 = MINIMAL HAZARD	

PERSONAL PROTECTION INDEX	
A	
B	+
C	+ +
D	+ +
E	+ +
F	+ + +
G	+ +
H	+ + +
I	+ +
J	+ + +
K	+ + +
X	Consult your supervisor for special handling instructions.



A Safety Glasses	n Splash Goggles	o Face Shield	p Gloves
q Boots	r Synthetic Apron	s Full Suit	t Dust Respirator
u Vapor Respirator	w Dust & Vapor Respirator	y Full Face Respirator	z Airline Hood or Mask


Blue
Red
HEALTH HAZARD
4 – Deadly
3 – Extreme Danger
2 – Hazardous
1 – Slightly Hazardous
0 – Normal Material
FIRE HAZARD – Flash Point
4 – Below 73°F
3 – Below 100°F
2 – Below 200°F
1 – Above 200°F
0 – Will Not Burn
SPECIFIC HAZARD
OXY – Oxidizer
ACID – Acid
ALK – Alkali
COR – Corrosive
W – Use NO WATER
– Radiation Hazard
REACTIVITY
4 – May Detonate
3 – Shock and Heat May Detonate
2 – Violent Chemical Change
1 – Unstable if Heated
0 – Stable
White
Yellow

List of Acronyms

ACGIH® American Conference of Governmental Industrial Hygienists

AIHA American Industrial Hygiene Association, Fairfax, Virginia. The broad professional association for Industrial Hygienists in the U.S. and Canada, with local sections also in parts of Europe. This association is the largest professional industrial hygiene/occupational hygiene association in the world.

ANSI American National Standards Institute. Publishes consensus standards on a wide variety of subjects, including safety equipment, procedures, etc.

ASP Associate Safety Professional, a temporary designation to show that an individual has passed the first examination leading to the CSP certification — the Safety Fundamentals examination.

ASSE American Society of Safety Engineers, the national professional society for Safety Engineers in the U.S.

BBP Bloodborne pathogens. Most often used in the context of a discussion of HIV and/or Hepatitis.

BEI® Biological Exposure Indices. A guidance value recommended by ACGIH® for assessing biological monitoring results.

BCSP Board of Certified Safety Professionals. The certifying organization that issues the ASP, CSP, and COHST credentials following review of experience and successful completion of written tests. In addition to an exam in the Comprehensive Practice of Safety, special exams are offered in Safety Management, Fire Protection, and Safety Engineering.

CAS Chemical Abstracts Service, Columbus, Ohio. CAS, a division of ACS, assigns the unique numerical identifiers known as CAS Registry Numbers® (CASRN), to chemical compounds. It is also the publisher of Chemical Abstracts and other publications and offers several database services.

CDC Centers for Disease Control. Based in Atlanta, Georgia, this is an agency within the U.S. Department of Health and Human Services, Public Health Service which specializes in recognition, evaluation and control of communicable diseases.

CFC	Chlorofluorocarbons, being phased out worldwide because of their detrimental effect on the ozone layer.
CFM	Cubic feet per minute, a unit of measure of air flow which is used in evaluating ventilation systems.
CFR	Code of Federal Regulations, the official compendium of regulations issued by agencies of the U.S. Federal Government. For example, 29 CFR refers to the regulations issued by the Department of Labor, and 29 CFR 1926 refers to the Construction Industry regulations (e.g., Part 1926) issued by OSHA, which is part of the Department of Labor.
CIH	Certified Industrial Hygienist. On good days, certification reflects education, training, and experience in the art and science of the anticipation, recognition, evaluation, and control of health hazards in the workplace and community. On bad days, it means you have a new appreciation for the "or should have known" part of liability law. On other days, it simply means education, 5 years of experience, and passing two brain-straining tests.
CPWR	Center to Protect Workers' Rights. A U.S.-based advocacy group.
CSP	Certified Safety Professional. The safety equivalent to a CIH. The initials CSP are also used by certified sales professionals, and certified speaking professionals. The Certified Safety Professional credential is issued by the BCSP.
CTD	Cumulative Trauma Disorder
dBA	Decibels on the A scale, a unit of measure of sound intensity.
ELF-EMF	Extremely low frequency electric and magnetic fields, a controversial area regarding the possibility of inducing cancer in exposed people.
EMR	Electro-Magnetic Radiation
EPA	Environmental Protection Agency. An agency of the U.S. Federal government which regulates chemical disposal, emissions to air, and water, and community pollution issues.

List of Acronyms

HAZMAT Hazardous Material

HAZWOPER Hazardous Waste Operations and Emergency Response, a term derived from U.S. EPA regulations.

HEPA filter High-Efficiency Particulate Air filter. At least 99.97% efficient in the filtration of air borne particles 0.3 microns in diameter or greater.

IARC International Agency for Research on Cancer

IAQ Indoor Air Quality. A general term combining a multitude of issues related to complaints by the occupants of buildings about illnesses or discomfort resulting from being in the building. Typically, no single agent or easily recognized group of agents is present in excess of a PEL or TLV®.

IDLH Immediately Dangerous to Life and Health. As defined by NIOSH. This represents a maximum concentration from which one could escape within 30 minutes without any escape-impairing symptoms or any irreversible health effects. Note that the NIOSH definition addresses airborne concentration only. It does not consider direct contact with liquids, etc.

IR Infrared. Infrared spectrophotometer, operates in the region of EMR of lower energy than visible, also known as heat waves, used primarily for identifying organic compounds.

IH Industrial Hygiene

LC_{50} or LC50 The concentration in air which is lethal to 50% of the test animals in a study. A convenient point of comparison between toxic materials with similar effects or target organs. Variants sometimes used include LC_{25} or LC_{75}, as well as LCLo (lowest detected lethal concentration).

LD_{50} or LD50 The experimental dose which is lethal to 50% of the test animals in a study. A convenient point of comparison between toxic materials with similar effects or target organs.

LEL Lower Explosive Limit. The minimum percent by volume of a gas or vapor, which when mixed with air, will form a flammable mixture.

MSDS	Material Safety Data Sheet. See SDS (Safety Data Sheet).
MSHA	Mine Safety and Health Administration. An agency of the US Department of Labor.
NFPA	National Fire Protection Association. Publishes useful hazard ratings on many chemicals.
NIH	National Institutes of Health. The primary health research umbrella organization of the U.S. government, consisting of 17 separate specialized institutes all housed in the U.S. Department of Health and Human Services. The National Library of Medicine falls under NIH.
NIHL	Noise Induced Hearing Loss
NIOSH	National Institute for Occupational Safety and Health. An arm of CDC that performs research and suggests guidelines for exposure control. NIOSH is not a regulatory agency.
NTP	National Toxicology Program. An interagency program of the U.S. government for the testing of chemical agents for long term toxic effects.
OSHA	Occupational Safety and Health Administration. The regulatory arm of the U.S. Department of Labor.
OSHAct	Occupational Safety and Health Act, the U.S. federal legislation that created OSHA (the administration) and NIOSH.
PEL	Permissible Exposure Limit. The maximum occupational exposure permitted under the OSHA regulations.
PPE	Personal Protective Equipment. Includes goggles, gloves, shoes, coveralls, respirators, hard hats, etc.
ppm	Parts of contaminant Per Million parts of air or other fluid. Usually called simply "parts per million," a unit of measure of the concentration of one material mixed or dissolved into another. This unit may be converted to milligrams per cubic meter.

List of Acronyms

REL	Recommended Exposure Limit. This abbreviation usually refers to a recommendation formally made by NIOSH and published in a Criteria Document for a particular agent or category of agents.
RTK	Right to Know. May refer to an individual employee's right to know about the nature and hazards of agents used in the workplace, and/or to the right of communities and their members to know about materials used and wastes generated by workplaces situated within or adjacent to the community.
SARA	Superfund Amendments and Reauthorization Act. U.S. federal legislation which reauthorized the "Superfund", a fund intended to clean up existing hazardous waste sites. It also established a federal community Right to Know and tightened industrial reporting requirements.
SDS	Safety Data Sheet. The Hazard Communication Standard requires chemical manufacturers, distributors, or importers to provide Safety Data Sheets to communicate the hazards of hazardous chemical products.
TB	tuberculosis
TLV®	Threshold Limit Value. An occupational exposure value recommended by ACGIH® to which it is believed nearly all workers can be exposed day after day for a working lifetime without ill effect.
UV	Ultraviolet Radiation
VOC	Volatile Organic Compound

Job-site Employee Log (Add Names as Necessary)

Employee Name:	**Notification of Rights ✓**	**HazCom Trained ✓**	**Respirator Use Authorized ✓**	**Fitted for Hearing Protection ✓**	**Fit for Duty ✓**
	☐ Date______	☐ Date______	☐ Date______	☐ Date______	☐ Date______
	☐ Date______	☐ Date______	☐ Date______	☐ Date______	☐ Date______
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	☐ Date______	☐ Date______	☐ Date______	☐ Date______	☐ Date______

Publications

Bertinuson, J., & Weinstein, S. (1978). *Occupational Health Hazards of Construction – A manual for Building Trades Apprentices*. U.S. Labor Occupational Health Program.

Plog, B. A., Niland, J., & Quinlan. P. J. (1996). *Fundamentals of Industrial Hygiene* (Fourth Edition). National Safety Council. Chicago, IL.

U.S. Department of Labor – Occupational Safety & Health Administration (OSHA). *OSHA Publication 3143 – Informational Booklet on Industrial Hygiene*. www.osha.gov

U.S. Department of Labor – Occupational Safety & Health Administration (OSHA). *OSHA Publication 3352 – Assigned Protection Factors for the Revised Respiratory Protection Standard*. www.osha.gov

U.S. Department of Labor – Occupational Safety & Health Administration (OSHA). *OSHA Publication 3074 – Hearing Conservation*. www.osha.gov

U.S. Department of Labor – Occupational Safety & Health Administration (OSHA). *OSHA Publication 3362 – Controlling Silica Exposures in Construction*. www.osha.gov

Phone Number "Hotlines"

Centers for Disease Control and Prevention Public Response Hotline (1-888-246-2675)

Agency for Toxic Substances and Disease Registry (1-888-422-8737)

Regional Poison Control Center (1-800-222-1222)

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