WORKPLACE HEALTH & SAFETY GUIDELINES

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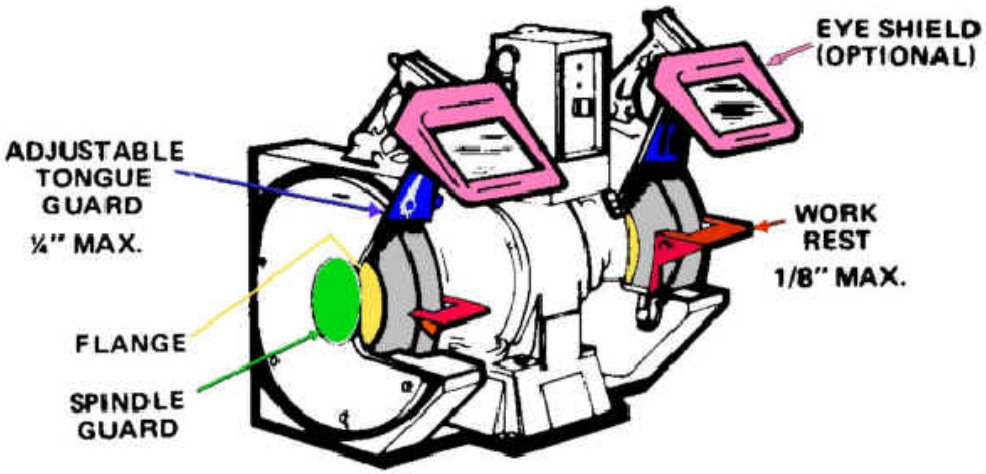
Health and Safety Guidelines

1. Checklist for Abrasive Wheel Equipment Grinders[1]



Standard 29 CFR 1910	Description	YES	NO
From the Abrasive Wheel standard			
215(a)(2)	Do side guards cover the spindle, nut and flange and 75% of the wheel diameter?		
215(a)(4)	Is the work rest used and kept adjusted to within 1/8-inch of the wheel?		
215(b)(9)	Is the adjustable tongue guard on the top side of the grinder used and kept to within 1/4-inch of the wheel?		
215(d)(1)	Is the maximum RPM rating of each abrasive wheel compatible with the RPM rating of the grinder motor?		
215(d)(1)	Before new abrasive wheels are mounted, are they visually inspected and ring tested?		
From other OSHA standards			
22(a)	Is cleanliness maintained around grinders?		
94(b)(2)	Are dust collectors and powered exhausts provided on grinders used in operations that produce large amounts of dust?		
133(a)(1)	Are goggles or face shields always worn when grinding?		
212(b)	Are bench and pedestal grinders permanently mounted?		
304(f)(4)	Is each electrically operated grinder effectively grounded?		
305(g)(1)(iii)(A)	Are fixed or permanently mounted grinders connected to their electrical supply system with metallic conduit or other permanent method?		
305(j)(4)(ii)(F)	Does each grinder have an individual on and off control switch?		

Footnotes:

[1] This check list does NOT include ALL elements of 29 CFR 1910.215; it is a only a guide.
[2] A mark in the “NO” column indicates a need for corrective actions.

2. Aerial Devices and Manlifts

Aerial Devices

Aerial devices are vehicle-mounted, elevated and rotating work platforms. OSHA defines a vehicle as, “any carrier that is not manually propelled,” and a platform as, “any personnel-carrying device (basket or bucket that is a component of an aerial device.” Vehicle-mounted devices—telescoping, articulating or both—used to position personnel are considered aerial devices. This includes extensible and articulating boom platforms, aerial ladders, vertical towers and a combination of any of the above. Regulations regarding these platforms are found in 29 CFR 1910.67.

Manlifts

A manlift is a device consisting of a power-driven end-less belt that moves in one direction only. It usually includes steps or a platform with attached handholds and transports personnel from floor to floor. Manlifts are covered under 29 CFR 1910.68.

General Requirements

Aerial devices (aerial lifts) acquired on or after July 1st, 1995, shall be designed and constructed in accordance with ANSI A92.2-1969, “Vehicle Mounted Elevating and Rotating Work Platforms.” These lifts may be modified for uses other than those intended by the manufacturer, provided the modification has been certified in writing by the manufacturer or a testing agency and conforms with all applicable provisions of the ANSI standard.

All new manlifts shall meet the design requirements of ANSI A90.1-1969, “American National Safety Standard for Manlifts.” The OSHA regulations apply to manlifts used to carry only personnel trained and authorized by the employer and does not cover moving stairways, elevators with enclosed platforms, gravity lifts nor conveyors used only for conveying material.

Specific Requirements for Aerial Devices

Summary of OSHA Standard 29 CFR 1910.67: Before a vehicle is moved for highway travel, aerial ladders shall be secured in the lower traveling position. Lift controls for extensible boom platforms shall be tested each day prior to use and used only by trained individuals. A body belt for positioning shall be worn with a lanyard attached to the boom or basket when working from an aerial lift. Belting off to an adjacent pole or structure is not permitted.

When preparing an aerial lift for use, brakes shall be set and outriggers (when used) shall be positioned on pads or a solid surface. If the lift will be used on an incline, wheel chocks must be installed beforehand. Once a boom is elevated in working position with people in a basket, the vehicle may not be moved unless such equipment is specifically designed for this type of operation.

Articulating and extensible boom platforms designed as personnel carriers shall have both upper controls on the platform and lower controls at vehicle or ground level. Although lower controls shall be able override upper controls, lower level controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of an emergency.

Safety testing, including electrical tests and bursting safety factors for hydraulic and pneumatic components must comply with the requirements of ANSI A92.2-1969. Any welding operations must conform to the American Welding Society (AWS) Standards, specifically:

- Standard Qualification Procedure, AWS B3.0-41
- Recommended Practices for Automotive Welding Design, AWS D8.4-61
- Standard Qualification of Welding Procedures and Welders for Piping and Tubing, AWS D10.9-69
- Specifications for Welding Highway and Railway Bridges, AWS D2.0-69

Special Design Requirements for Manlifts

The OSHA standard specifies several requirements for the location and design of manlifts. The following is an overview of each requirement:

Floor Openings—Sizes of floor openings are dependent on the size of belt in use. All openings need to be uniform in size and approximately circular.

Landings—Clearance between floor and lower edge of conical guard shall be at least 7’ 6". Space next to openings shall be kept clear at all times and shall provide safe footing at all times. Lighting of at least 5-footcandles shall be provided at each floor landing. Floor or emergency landings shall be provided every 25 feet or less.

Guards on underside of floor openings— A bevel guard or cone shall be provided on the ascending side of the floor opening.

Protection of entrances and exits—Entrances and exits at all floor landings to manlifts shall be guarded by a maze (staggered railing) or handrail equipped with self-closing gates. Rail construction must comply with ANSI A12.1-1967, Safety Requirements for Floor and Wall Openings, Railings and Toeboards, and 29 CFR 1910.23.

Guards for openings—Openings shall be guarded on all sides not used for movement by a wall, railings or panels. Guards shall be at least 42" high on up-running sides and 66" high on down-running sides.

Bottom arrangement—Specific design requirements cover location and maintenance of the bottom landing, lower pulley, mounting platform and location of guardrails.

Top arrangements—There must be a top clearance of at least 11' above the top terminal landing and a clearance of at least 5' between the center of the head pulley shaft and any ceiling obstruction. If the distance to the head pulley is over 6' above the top landing, an emergency grab rail or bar must be provided at the head pulley.

Illumination—Both up and down runs of a manlift shall be illuminated at all times when the lift is in operation.

Weather protection—The entire manlift and its driving mechanism shall be protected from the weather at all times.

Mechanical Requirements for Manlifts

Brakes—Brakes used for stopping and holding shall be inherently self-engaging and have an external source to disengage. The brake shall be electrically released and capable of stopping and holding the manlift when the descending side is loaded with 250 pounds on each step.

Belt—Belts shall be strong enough to meet ANSI A90.1-1969, and the following width requirements: Not less than 12" wide for a travel distance not exceeding 100 feet; not less than 14" for a travel distance greater than 100 feet but less than 150 feet; and 16" for travel distance exceeding 150 feet.

Speed—The maximum allowable design speed of a manlift is 80 feet per minute.

Platforms or steps—Steps must be between 12" to 14" deep and at least as wide as the belt to which it is attached. The distance between steps shall be equally spaced and not less than 16' from the upper surface of one step to the upper surface of the next step above it.

Handholds—Handholds attached to the belt must be installed between 4' and 4' 8" above the step tread. The grab surface shall not be less than 4 1 /2 inches in width, not less than 3" in depth and shall provide 2" of clearance from the belt. All handholds must be of the closed type.

Up limit stops—There must be two separate automatic stop devices to cut off the power supply and apply the brake when a loaded step passes the upper terminal landing.

Emergency stop—An emergency stop must be pro-vided within easy reach of ascending and descending runs of the belt.

Instruction and warning signs—Conspicuous and easily read signs stating “Face the Belt”, “Use the Handholds” and “To Stop – Pull the Rope” must be placed at each landing. Additional signs are required for top floor warning and visitor warning.

Operating Rules for, and Inspection of Manlifts

No freight, packaged goods, pipe, lumber or construction materials of any kind shall be handled on any manlift. Manlifts need to be inspected by a competent designated person at intervals of not more than 30 days, and limit switches shall be checked weekly. These inspections must be maintained in a certification record.

Commonly Asked Questions

Q. ***What is the difference between an articulating boom and an extensible boom?***

A. An articulating boom is raised and lowered by two or more hinged sections. An extensible boom is raised and lowered through a telescoping motion.

Q. ***Can spliced belts be used on manlifts?***

A. A belt that has become torn while in use on a manlift shall not be spliced and put back in service.

Q. ***Can workers keep their lunches on a manlift?***

A. No. An early OSHA ruling interpreted a lunch box as a "packaged good," which is prohibited.

References

29 CFR 1910.67, Vehicle-mounted Elevating and Rotating Work Platforms

29 CFR 1910.68, Manlifts

ANSI A92.2-1969, Vehicle Mounted Elevating and Rotating Work Platforms, www.ansi.org

ANSI A90.1-1969, American National Safety Standards for Manlifts

American Welding Society, www.aws.org

Aerial Lifts Safety Tips Checklist

Aerial lifts include boom-supported aerial platforms, such as cherry pickers or bucket trucks. The major causes of fatalities are falls, electrocutions, and collapses or tip overs.

Safe Work Practices

- Ensure that workers who operate aerial lifts are properly trained in the safe use of the equipment.
- Maintain and operate elevating work platforms in accordance with the manufacturer's instructions.
- Never override hydraulic, mechanical, or electrical safety devices.
- Never move the equipment with workers in an elevated platform unless this is permitted by the manufacturer.
- Do not allow workers to position themselves between overhead hazards, such as joists and beams, and the rails of the basket. Movement of the lift could crush the worker(s).
- Maintain a minimum clearance of at least 10 feet, or 3 meters, away from the nearest overhead lines.
- Always treat powerlines, wires and other conductors as energized, even if they are down or appear to be insulated.
- Use a body harness or restraining belt with a lanyard attached to the boom or basket to prevent the worker(s) from being ejected or pulled from the basket.
- Set the brakes, and use wheel chocks when on an incline.
- Use outriggers, if provided.
- Do not exceed the load limits of the equipment. Allow for the combined weight of the worker, tools, and materials.

3. Bonding and Grounding

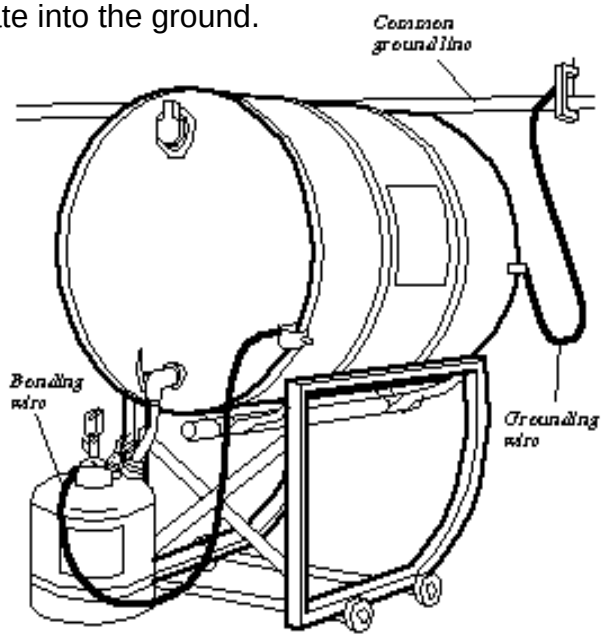
Introduction

The process of bonding and grounding can be defined as providing an electrically conductive pathway between a dispensing container, a receiving container, and an earth ground.

This pathway eliminates the buildup of static electricity and allows it to safely dissipate into the ground. The Code of Federal Regulations, 29 CFR 1910.106(e)(6)(ii) states, "Class I liquids shall not be run/dispensed into containers unless the nozzle and container are electrically interconnected. The National Fire Protection Association (NFPA), NFPA Code 30, 2008 edition, Chapter 18, Section 18.4.2.2 states that all liquids above their flash point must have static control that complies with Chapter 6 Section 6.5.4. Where the metallic floorplate on which the container stands while filling is electrically connected to the stem or where the fill stem is bonded to the container during filling operations by means of a bond wire, the provisions of this section shall be deemed to have been complied with." This means that all containers of Class I liquids (liquids with a flash point lower than 100 degrees Fahrenheit) need to be bonded and grounded during dispensing. This includes non-metallic containers, even though the construction material may not be recognized as conductive (for example, polyethylene). If the containers are not properly bonded and grounded, the resulting static spark could be capable of raising the vapor temperature above the flash point, causing an explosion.

Some common examples of Class I liquids include alcohol, toluene, acetone and benzene. The flash point can be found on the material safety data sheet (MSDS) that accompanies the chemical from the manufacturer or distributor.

The diagram below is an example of a complete bonding and grounding system. The bonding wire is shown connecting the lids of the receiving container and the dispensing container. The grounding wire is shown connecting the dispensing container to the common ground within the facility. The common ground is in turn connected to an earth ground. (Any ground source that is adequate for power circuits or lightning protection is sufficient for protection against static electricity.) This system provides an electrically conductive pathway for static electricity to follow and safely dissipate into the ground.



For bonding and grounding to be effective, a metal-to-metal connection must be maintained between the bonding and grounding cables and the containers. To accomplish this, all paint, dirt, rust, etc. must be removed from the area of connection. These connections can be of two basic types: permanent and temporary. **Permanent connections** can be made by using solid or braided wires, and must incorporate either screw-type clamps, welding, or other similar means. **Temporary connections** should use only braided wires in conjunction with spring clamps, magnetic clamps or other similar methods of maintaining metal-to-metal contact.

The difference between solid and braided wire is as follows: **Solid wire** is a single, complete strand of wire that is not known for its durability. For this reason, solid wires should only be used for permanent connections, or those that will not be handled often. **Braided wires** consist of several strands of wire wrapped together to provide greater strength and flexibility. With these characteristics, braided wires are recommended for use with temporary connections. Additionally, the National Fire Protection Association, in NFPA 77, states that either insulated or uninsulated cables can be used. **Insulated cables** are those with a protective rubber coating that completely encompasses the wire. **Uninsulated cables**, which have no coating, allow for quick, easy inspection. Insulated cables should frequently be checked for continuity. The minimum size (gauge) of the cables is determined by strength and durability rather than current-carrying capabilities.

Commonly Asked Questions

Q. ***Where do I bond and ground a polyethylene safety can?***

A. Most manufacturers of polyethylene safety cans will include a grounding lug for the connection of bonding and grounding cables.

Q. ***Do safety cabinets have to come with a grounding lug?***

A. Safety cabinets are not required by federal regulations to have a grounding point; however, in order for that cabinet to receive Factory Mutual (FM) approval, it needs to be equipped with one.

Q. ***Is it acceptable to hold the nozzle of the dispensing container in contact with the opening of the receiving container rather than attaching a bonding wire?***

A. No, this is not an acceptable practice because it is difficult to maintain an electrical bond between these two items. Bonding wires should be used.

Sources for More Information

29 CFR 1910.106

National Fire Protection Association, NFPA 77, Recommended Practice of Static Electricity

Uniform Fire Code, UFC Div. VIII Sec. 79.803

4. Confined Spaces, 29 CFR 1910.146

Introduction

On April 15, 1993, OSHA's Permit-Required Confined Spaces Final Rule (29 CFR 1910.146) went into effect. On December 1, 1998 OSHA published revisions to this rule to provide for:

- Enhanced employee participation in the employer's permit space program;
- Authorized representatives with the opportunity to observe any testing or monitoring of permit spaces;
- Strengthening and clarifying the criteria employers must satisfy when preparing for timely rescue of incapacitated permit space entrants.

The revisions became effective February 1, 1999.

OSHA defines a confined space as one that has limited or restricted means of entry or exit, is large enough for employees to enter and perform their work, and is not designed for continuous occupancy (29 CFR 1910.146(b)). A permit-required confined space is a space that has one or more of the following characteristics:

- Contains or could contain a hazardous atmosphere;
- Contains material that has the potential for engulfing the entrant;
- Inwardly converging walls;
- Any other recognized safety or health hazards.

OSHA also specifies the requirements of a non-permit required confined space. This is a space that does not contain, or with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

There are several steps an employer should follow when beginning a confined space program. The first is to evaluate the workplace and determine whether it contains permit-required confined spaces as defined by OSHA. If it is determined that there are permit-required confined spaces, the employer must inform all exposed employees of the dangers by posting signs or some other equally effective means. Signs should read:

"DANGER--PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" or other similar language.

The next decision the employer must make is whether or not the confined space should be entered.

If NO--The employer must take effective measures to prevent employees from entering the permit space.

If YES--The employer must develop and implement a written permit space entry program.

This program must do the following:

- Identify and evaluate permit space hazards before entry;
- Establish and implement means to prevent unauthorized entry;
- Establish and implement means to eliminate or control hazards necessary for safe entry by:
  - Specifying acceptable entry conditions;
  - Isolating the space;
  - Purging, inerting, flushing or continuously ventilating the permit space as
  - necessary to eliminate or control atmospheric hazards;
  - Provide, maintain, and require the use of personal protective equipment necessary for safe entry.

Require testing of atmospheric conditions inside the space before entry. Tests must be conducted for:

- O_2 (Oxygen, 19.5% to 23.5% acceptable)
- LEL (Lower Explosive Limit, <10% acceptable)
- Toxins that may be present.

Ensure that at least one attendant is stationed outside during entry;

- Coordinate with any contractors used;
- Implement rescue procedures;
- Establish-in writing-the permit system;
- Review the permit system annually.

OSHA also requires training to ensure that employees involved in confined space work can perform their job functions safely. This training covers specific items for the authorized entrant, the attendant and the entry supervisor. Training will cover the following:

Authorized Entrant Responsibilities

- Know the hazards involved in confined space entry;
- Select the appropriate personal protective equipment for confined space entry;
- Maintain communication with the attendant;
- Leave the space immediately when ordered by the attendant;
- Alert the attendant immediately if a problem develops;

Attendant Duties

- Remain outside unless relieved;
- Perform non-entry rescue when specified in procedure;
- Know existing and potential hazards of the confined space;
- Maintain communication at all times with entrants;
- Order evacuation of the space when conditions warrant;
- Summon rescue personnel when needed;
- Ensure unauthorized people stay clear of area;
- Perform no other duties that may interfere with attendant duties.

Entry Supervisor Responsibility

- Know the hazards involved with confined space entry;
- Know the company's permit system to remain consistent;
- Complete emergency planning.

When an employer has designated a rescue and emergency service to perform confined space rescue, the employer is responsible for:

- Evaluating a prospective rescuer's ability to respond to a rescue summons in a timely manner, considering the hazards identified (i.e. what is considered timely will vary according to the specific hazards involved in each entry);
- Evaluating a prospective rescue service's ability, in terms of proficiency with rescue-related tasks and equipment, to function appropriately while rescuing entrants from the particular permit space or types of permit spaces that have been identified;
- Selecting a rescue team or service from those evaluated that has the capability to reach the victims within a time frame that is appropriate for the hazard identified and is equipped for and proficient in performing the needed rescue services;
- Informing each rescue team of the hazards they may confront when called to perform rescue at the site; and
- Providing the rescue team or service selected with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.

NOTE: *Non-mandatory Appendix F -- Rescue Team or Rescue Service Evaluation Criteria* has been added to the 1910.146 to assist employers in their evaluation of rescue and emergency services.

Employers whose employees will perform rescue duties in confined spaces are responsible for:

- Providing affected employees with the personal protective equipment (PPE) needed to conduct permit space rescues safely and the training of affected employees so they are proficient in the use of that PPE (PPE must be provided to the employee at no cost to them);
- Training affected employees to perform assigned rescue duties. The employer must ensure that such employees successfully complete the training required to establish proficiency as an authorized entrant as required by 1910.146(g) and (h);
- Training of affected employees in basic first aid and cardiopulmonary resuscitation (CPR). the employer must ensure that at least one member of the rescue team or service holding a current certification in first aid and CPR is available; and
- Ensuring that affected employees practice making permit space rescues at least once every 12 months, by means of simulated rescue operations in which they remove dummies, manikins, or actual persons from the actual permit spaces or from representative permit spaces. Representative permit spaces must, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed.

To facilitate non-entry rescue, retrieval systems or methods shall be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant (29 CFR 1910.146(k)(3)).

Each authorized entrant shall use a chest or full body harness with a retrieval line attached at the center of the entrant's back near shoulder level, above the entrant's head, or at another point which the employer can establish presents a profile small enough for the successful removal of the entrant. Wristlets may be used in lieu of the chest or full body harness if the employer can demonstrate that the use of a chest or full body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest and most effective alternative.

The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the space so the rescue can begin as soon as the rescuer becomes aware that rescue is necessary. If the space is vertical and more than 5' deep, a mechanical device for removing the entrant must be available for use (29 CFR 1910.146(k)(3)(ii)).

The 1998 revision to the confined space standard gives employees and their authorized representatives the right to:

- Participate in the development and implementation of all aspects of the permit space program required by 1910.146;
- Review all supporting and determination data required under 1910.146;
- Observe pre-entry testing of the internal atmosphere and any periodic testing that is required;
- Review the certification that the space is safe to enter and that all pre-entry measures have been taken;
- Review the employer documentation that all hazards in a permit space have been eliminated;
- Request reevaluation of a permit space if the employee believes that the evaluation of that space may not have been adequate;
- Review immediately the results of any testing conducted in accordance with this standard; and
- Review the completed permit.

Employers should obtain a copy of 29 CFR 1910.146 to ensure that they are in full compliance with the standard. There are also several Appendices to the standard that provide information and non-mandatory guidelines to assist employers and employees in meeting the appropriate requirements.

Commonly Asked Questions

Q. ***What air monitoring needs to be performed prior to entering a confined space?***

A. Air monitoring should be performed prior to entry. At a minimum, oxygen and LEL levels need to be monitored. If other toxins are suspected, then those levels also need to be monitored. Air should be monitored in the following order:

Oxygen—Test for oxygen first in order to be sure you get an accurate LEL reading. Most combustible gas meters are oxygen-dependent and will not provide reliable readings in an oxygen-deficient atmosphere. Oxygen levels should be between 19.5 and 23.5%.

1. LEL—Test flammable gas and vapor levels due to the threat of fire or explosion, which can be immediate and life threatening.
2. Toxic air contaminants—Test for impurities such as carbon monoxide (CO), hydrogen sulfide (H_2S) and chlorine (Cl_2).

Q. ***What is the difference between a two-way and a three-way confined space retrieval winch?***

A. The two-way winch is used for hoisting people and/or equipment into or out of the confined space. A three-way winch, which has a breaking mechanism, is used for fall protection. The only time a three-way winch should be used to hoist someone is if a fall has occurred and a rescue needs to be performed. Otherwise, the two-way winch should be used so the teeth on the three-way winch do not become worn and nonfunctional should a rescue need to be performed.

Q. ***If I use my three-way winch for an emergency hoisting event, do I need to remove it from service and have it inspected?***

A. After an impact, the winch must be removed from service and inspected.

Q. ***What is an immediately dangerous to life and health (IDLH) atmosphere?***

A. It is an atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

Q. ***Can an ambient air pump be used for confined space respiratory protection?***

A. Confined spaces may be immediately dangerous to life and health (IDLH). An IDLH environment requires an SCBA or an airline respirator with an escape bottle. Escape bottles are used in a high-pressure, pressure-demand format. An AABA (ambient air breathing apparatus) is a low-pressure, constant-flow product. Therefore, the high-pressure escape bottle and the low-pressure AABA will not work together.

Q. ***If I monitor prior to entry and my readings are OK, do I need to continue monitoring while I'm in the confined space?***

A. Title 29 of the Code of Federal Regulations 1910.146 paragraph (c)(5)(ii)(F) requires periodic testing as necessary to ensure the space is maintained within the limits of the acceptable entry conditions. This is critical. OSHA states that all permit space atmospheres are dynamic due to variables such as temperature, pressure, physical characteristics of the material posing the atmospheric hazard, variable efficiency of ventilation equipment and air delivery system, etc. The employer must determine and document on an individual permit space basis what the frequency of testing is and under what conditions the verification testing is done.

Confined Space Entry Permit

Date & Time Issued: _____ **Date & Time Expires:** _____

Equipment to be worked on: _____

Work to be performed: _____

Entrant(s): _____ _____ _____ _____

Attendant(s): _____ _____

Entry Supervisor(s): _____

Atmospheric and physical hazards of the permit space to be entered:	**Measures used to isolate the permit space and to eliminate or control hazards before entry.**	
1. Lack of Oxygen	□ Lockout/Tagout	
2. Combustible Gases	□ Mechanical Ventilation	
3. Carbon Monoxide	□ Natural Ventilation	
4. Hydrogen Sulfide	□ Full Body Harness	
5. Chemical Contact	□ External Barricades	
6. Electrical Hazard	□ Protective Clothing	
7. Temperature	□ Lead Line	
8. Entrapment		

Atmospheric Testing Record

Acceptable Range:		**19.5 - 23.5**	**(LEL) Under 10%**	**0-35 (ppm)**	**0-10 (ppm)**
Tester's Initials	**Time**	**% of Oxygen**	**Combustible Gas**	**Hydrogen Sulfide**	**Carbon Monoxide**

Entry Supervisor Authorization- All Conditions Satisfied: _____ **Signature**

Is Gas Monitor calibration current? Yes □ No □

NOTE: Perform Periodic Monitoring

This checklist or form is only a sample. It is not meant to constitute a comprehensive list of potential exposures within your municipality. You may wish to revise, modify, or supplement this checklist or form to address specific exposures or safety requirements within your municipality.

5. Electrical Safety

Introduction

Electricity is a powerful source of energy that powers lights, tools, machinery and many other devices necessary for our day to day work; it can also be a hazard causing injury or death if taken for granted. Experts in the electrical industry look to the National Electric Code (NEC) for the standards on how to correctly assemble and maintain electrical circuits and the National Electric Safety Code (NESC) for the basic provisions for safeguarding persons from hazards when installing, operating or maintaining electric currents.

OSHA recognized the importance of the NEC and included the 1971 edition into Subpart K of the 29 Code of Federal Regulations (CFR) Part 1926 for the construction industry. They have since made updates, revised and clarified the standard to make it more flexible in order to eliminate the need for the constant revision to keep pace with the NEC which is updated every 3 years. For the general industry, OSHA has dedicated 29 CFR 1910 Subpart S to electrical safety.

Electricity and its Effects on the Body

In order for electricity to work, a complete circuit made of a conductor, a load or electricity consuming device, and a ground is needed. Electricity will flow through the conductor to the load and finally to the ground to complete the circuit. Electricity will follow the path of least resistance to ground; similar to water in a pipeline that flows out of a valve when it is opened. Electricity becomes dangerous when you become part of the circuit because the closest path to ground may be through you, causing an electrical shock.

When you are shocked by electricity, your muscles contract, if the lungs are involved in the path of the circuit, voluntary respiration can be halted. If the heart is involved, fibrillation can occur resulting in heart failure. As little as 50 milliamperes can cause death. It is important to realize that an electrical shock may not be strong enough to cause a fatality but it could cause you to fall or jolt to dangerous surroundings. For details on the effects electricity has on the body, see table 1.

Qualified Personnel vs. Unqualified Personnel

The 29 CFR 1910 Subpart S identifies two types of people that may come in contact with electrical equipment on a jobsite; qualified and unqualified. A qualified person is one who has been trained to avoid electrical hazards when working on or near exposed energized parts and is:

- Familiar with the safety related work practices required in 29 CFR 1910.331-1910.335;
- Able to distinguish exposed live parts of electrical equipment;
- Knowledgeable of the skills and techniques used to determine the nominal voltages of exposed parts.

An unqualified person - is someone who has little or no training regarding electrical hazards. Even though unqualified persons may not be exposed to energized parts, training should still be provided so they can be familiar with any electrical-related safety practice that is necessary for their safety.

Safe Work Practices

Safety-related work practices are used to prevent electrical shock or similar injuries by keeping workers away from energized equipment or circuits and by training qualified workers on the correct procedures when working on energized equipment or circuits. Prior to using or performing maintenance on electrical equipment, the employee should first determine if it is safe by checking the following:

- Make sure the electrical equipment is not located in a hazardous environment such as a damp/wet location or where it is exposed to high temperatures and flammable liquids and gases;
- Make sure current and safety devices such as fuses, breakers and ground fault circuit interrupters (GFCI) have not been tampered with and are working correctly;
- Make sure the power cord and plug do not have any defects such as cuts in the insulation exposing bare wiring;
- Know if the equipment has an emergency shutoff switch and where it is located prior to use;
- Make sure there is sufficient space around the electrical equipment or circuit in order to maintain or operate;
- Make sure all personal metal jewelry is removed prior to using or working on electrical equipment or circuits; and
- De-energize electrical equipment before testing or repairing in accordance with the Lockout Tagout standard 29 CFR 1910.147.

If de-energizing the electrical equipment or circuit will increase the potential for an electrical hazard or is necessary for testing and troubleshooting, the appropriate tools and personal protective equipment (PPE) must be used and worn for the specific parts of the body to be protected.

Insulated Tools

Insulated tools must be used when working on or near exposed energized live conductors. Only insulated tools that comply with the International Electrotechnical Commission standard 900 (IEC 900), and marked with the international 1000V rating symbol should be used. Not all tools with a plastic coating or plastic handles provide protection from electrical shock. That's why it is important to inspect your tools before performing electrical work not only to verify if the tools are rated for the job, but also if they are damaged or worn and no longer provide adequate protection from electrical shock. Damaged or worn tools should be removed from service immediately.

Electrical Protective Equipment

Electrical protective equipment, also known as insulating equipment, includes items such as insulated blankets, matting, covers, line hose, gloves, sleeves, face shields and arc flash clothing. Blankets, gloves, and sleeves are clearly marked with class and type while clothing is labeled with an ATPV rating (arc thermal performance value) measured in calories per square centimeter (i.e. 65 cal/cm^2). The class refers to the maximum use voltage. Insulating must not exceed maximum use voltages (see table 2). The type refers to its ozone resistance. Type I is not ozone resistant; Type II is ozone resistant. The ATPV rating cal/cm^2 identifies the amount of energy that can be delivered to a point at a particular distance from an arc flash, so the higher the number, the more protection the clothing offers.

Insulated equipment should be inspected prior to each days use and immediately following an incident that may have caused damage. Damage consists of holes, tears, cuts, punctures, ozone cutting, embedded foreign objects, swelling, softening, hardening or any other defect. Once an insulated piece of equipment is removed from service, it may not be reused until it has been retested and certified. All electrically-insulated equipment must also be retested and certified periodically. See table 3 for testing intervals.

For more information about PPE for electrical applications, please take a look at our Arc Flash Safety area.

Employee Training

Electrical safety is the responsibility of everyone on the jobsite. That's why it is important to establish a hazard assessment program that includes employee training on electrical safety. Training employees on the basics of electricity safety to include its effects on the body, first aid procedures when someone is shocked, how to fight an electrical fire and how to identify hazards, will ensure a safe working environment for them. Some do's and don'ts that can assist in electrical safety training are:

DO'S

- Read and follow electrical equipment instruction manuals prior to using;
- Use safety signs, barricades and tags to identify and protect electrical equipment;
- Only use extension cords as a last resort;
- Use waterproof cords in outdoor application;
- Contact a certified electrician when electrical repair is needed.

DON'TS

- Overload outlets by using splitters;
- Touch electrical equipment including power cords with wet or damp hands;
- Allow dirt, grease or dust to accumulate on electrical equipment;
- Use temporary wiring in place of permanent wiring;
- Use cords or equipment that aren't properly grounded.

Commonly Asked Questions

Q. ***Does insulated equipment need to be approved or certified?***

A. Insulated equipment must be certified by the manufacturer to be suitable for—given the proper usage—the specified conditions to which they are exposed. The certificate identifies the equipment and the date it was tested.

Q. ***Is there an expiration date for insulated equipment after which it must be destroyed?***

A. No. As long as the insulated equipment is in a safe, reliable condition and retested periodically as required by 29 CFR 1910.137, it may continued to be used. (See Table 3.)

Q. ***Where can I find out what level of personal protection I need to wear for my application?***

A. The NFPA 70E includes a table which identifies what level of personal protective equipment should be worn when working on energized equipment or circuits.

References

2008 NEC
29 CFR 1910 Subpart S
29 CFR 1910.137
29 CFR 1910.147
NFPA 70E
Winburn D.C. “Practical Electrical Safety”. Marcel Dekker, INC. 1988

Table 1: Effects of electricity on the body

Milliamperes (Thousands of an ampere)		
Body Effect	**DC Voltage**	**AC Voltage 60 hz**
No sensation on hand	0.6 - 1	0.3 - 0.4
Slight tingling	3.5 - 5.2	0.7 - 1.1
Non-painful shock, muscular control not lost	6 - 9	1.2 - 1.8
Painful shock, muscular control not lost	41 - 62	6 - 9
Severe shock, muscular control lost, difficult breathing	60 - 90	15 - 23
Fibrillation from shock, 3 second duration	500	100

Table 2: Class and Use Voltages

Class	***Maximum Use Voltage***	***Proof Test (AC)***	***Retest Voltage (AC)***	***Proof Test (DC)***	***Retest Voltage (DC)***
0	1,000	5,000	5,000	20,000	20,000
1	7,500	10,000	10,000	40,000	40,000
2	17,000	20,000	20,000	50,000	50,000
3	26,500	30,000	30,000	60,000	60,000
4	36,000	40,000	40,000	70,000	70,000

Table 3: Protective Equipment Test Schedules

Type of Equipment	***When to Test***
Line Hose	Upon indication that insulating value is suspect
Covers	Upon indication that insulating value is suspect
Blankets	Before first issue and every 12 months thereafter*
Gloves	Before first issue and every 6 months thereafter*
Sleeves	Before first issue and every 12 months thereafter*

*If insulating equipment has been tested but not issued for service, it may not be placed into service unless it has been tested within the previous 12 months.

6. Emergency Eyewashes & Showers—Proper Testing and Maintenance

Introduction

When a facility has corrosives onsite, it is required that drenching facilities be readily available. These drenching facilities could include an eyewash, eye/face wash, shower or combination eye/face wash shower depending on the amount of possible exposure to the chemical by the employee. For example, if there is a possibility the employee has a chance that more than their eyes or face could be exposed to the chemical the facility would have a drench shower available to drench the entire body. This requirement is found in the OSHA Code of Federal Regulations (CFR) 1910.151©.

OSHA defers to the American National Standards Institute (ANSI) Z358.1 standard for the requirements of all portable and plumbed emergency eye, eye/face wash and emergency shower equipment. This includes construction, testing, water pressure, flow requirements, location, operation and maintenance, among others. There will be an ANSI approval marked on the equipment to show that the manufacturer's product meets the ANSI specifications.

Emergency eyewashes and showers often go unused on a regular basis. So when an emergency occurs, these devices must function properly. Studies show that the seconds immediately following an eye injury or chemical splash are often critical to minimizing damage. That's why it's extremely important that eyewash stations and showers are kept in proper working order—if not, the consequences could be serious.

The American National Standards Institute (ANSI) developed a standard specifically for eyewashes and showers. Standard Z358.1-2009, states that "emergency eyewash and shower equipment shall be located on the same level as the hazard, have un-obstructed access (a door is considered an obstruction), and require not more than 10 seconds to reach." Z358.1-2009 also outlines specific locations and flow rates for these devices—a section of the standard that is often overlooked is the testing and maintenance of these devices and the training of employees in their proper use.

Common Problems

The Fendall Company (manufacturer of emergency eye-care products) conducted a survey study of approximately 200 U.S. manufacturing facilities to determine the quality of their eyewashes. Not surprisingly, many of the facilities lacked an adequate number of units. More troubling however, was the finding that many of the units already installed were in a serious state of disrepair. More than a third of the stations inspected were inoperable or would not function properly; nearly all were a direct result of insufficient maintenance operations. The following are some of the more common problems noted in the survey:

- Nozzles clogged, broken or missing
- Activating valve inoperable
- Improper water pressure—too high or low
- Low fluid levels in self-contained eyewashes
- Foreign particles in bowl or basin
- Nozzle dust covers not installed

In addition, the survey indicated that the flushing fluid of plumbed and gravity-fed eyewashes was of poor quality in more than 50% of the samples. Of these samples:

- 60% had visible debris or discoloration
- Nearly two-thirds had total plate counts exceeding 500 colony forming units per milliliter (cfu/ml)
- 58% of units tested for microbial contamination contained the seudomonas bacteria [1]
- 10% had a too high or too low pH level

[1] *The study tested only for this bacterium.*

Flushing Fluids

The quality of flushing fluid is often an overlooked item and is important for a number of reasons. Most important, the presence of foreign particles or unacceptable levels of microorganisms can result in further injury to the eye. Moreover, debris can either reduce or restrict the flow of the flushing fluid by obstructing nozzles, pressure-regulating devices and pipes that feed plumbed units and filters.

Flushing fluid should be clear and visibly free from foreign particles. The presence of off colors or contaminants is an indication of poor fluid quality in the supply line or in the water source. Contaminants can enter a self-contained eyewash via a biofilm on the inside of the station or through openings in the unit.

Total plate count is a measure of the biological activity of a fluid. Water with counts of less than 100 cfu/ml is considered potable, while values of 100 cfu/ml to 500 cfu/ml are considered questionable. Readings above 500 cfu/ml are considered poor quality. If a sample is above 500 cfu/ml, steps should be taken immediately to clean and disinfect gravity-fed eyewashes. For plumbed units, the fluid source must be cleaned. The presence of microorganisms such as bacteria, fungi and amoebae in flushing fluid can pose an added health risk to an injured eye. An eye that is injured is compromised by having less resistance to infection.

There are also requirements for the flow of fluids to eyewashes and showers in the ANSI standard. These are minimum flow rates that should be met to make the equipment work as it was designed, pass possible OSHA inspections and provide relief in case of an accidental splash. Each piece of equipment has a different flow requirement. **Plumbed** and **Self-Contained** eyewashes require a minimum flow of 0.4 gallons per minute (GPM) for 15 minutes of flush. Plumbed Eye/Face washes require a minimum flow of 3.0 GPM and combination showers and drench showers a minimum flow of 20 GPM for 15 minutes. All eye and eye/face wash units should be aligned so that the fluid provided flushes the eye and/or face simultaneously. If shut off valves are installed in the supply line, provisions should be made to prevent unauthorized shut off. According to the ANSI standard, these units should be inspected annually to make sure they continue to meet the flow requirements.

pH Levels

Tears generally have a pH of 7.4 and possess some buffer capacity. Ideally, the flushing fluid in an emergency eyewash device should have a pH close to 7.4 as well as a saline content similar to the fluid in the eye. If the pH is too low or too high the water may not be suitable for use as a flushing fluid.

ANSI Standards

To ensure that your eyewash stations and showers are always ready when you need them, it is important that the requirements for test procedures and maintenance set forth in Z358.1-2009 are followed. The American National Standard for eyewashes and showers provides minimum requirements for these units to function properly.

The requirements for testing and maintaining any of the eye, eye/face washes and showers is based on the manufacturer's instructions and ANSI requirements. Generally, the manufacturer's instructions state that the units "should be inspected, tested and recorded weekly". Individual owner manuals should be looked at for the specific manufacturer's guidelines. The ANSI standard Z358.1 5.5.2 states that plumbed eyewashes, eye/face washes and showers "….should be activated weekly for a period long enough to verify operation and ensure that the flushing fluid is available". While activating plumbed eyewashes, eye/face washes and showers, you should also verify that they are providing luke warm tepid water (between 60°-100°F). Self-contained eye washes obviously cannot be activated weekly without using up valuable solution, so ANSI recommends visually inspecting the unit to see if the fluid needs changing or supplementing.

Plumbed and self-contained units shall also be inspected and maintained in accordance with the manufacturer's instructions. For eyewashes, this includes protecting the nozzles and flushing fluid against airborne contaminants. Although not specifically stated, it's prudent to check the fluid levels and activation device of self-contained eyewash units every week. The flushing fluid of self-contained units must also be changed periodically. Table 1 provides replacement schedules for eyewash flushing fluids.

Table 1

Flushing Fluid Type	Recommended Replacement Schedule
Tap water only	Weekly.
Tap water mixed with a manufacturer's preservative	Test mixture to identify bacterial loads and determine a maintenance cycle. Manufacturer's recommend fluid changes of three to six months.
Tap water mixed with a factory-prepared liquid concentrate plus an additive	Same as above.
Factory-sealed cartridges	Expiration date of cartridge.

Other important things to look at during the weekly inspection are the lighting and signage around the eyewash, eye/face wash or shower station. The ANSI standard states that the eyewash station shall be well-lit and have a highly visible sign positioned so it is identifiable in the area it serves.

Preservatives

Most manufacturers provide suggested fluid replacement schedules, however, these are only guidelines. Preservatives are designed to control bacteria levels in flushing fluids but they are not effective against all bacteria. A preservative's performance also depends upon several factors including the initial bacterial load of the water and a potential biofilm in the station. Self-contained eyewash stations should be drained completely, disinfected and rinsed prior to refilling.

For the annual inspection, flow meters or other measuring devices can be used to make sure the facilities units are in proper working order with the correct amount of flow.

An Eye/facewash tester will help determine whether the alignment is correct and also that the flow is sufficient. The Shower tester will help with annual testing as well as weekly testing by keeping the fluid contained in a bucket while determining water flow.

Summary

Always inspect and test the unit if you have any doubt about its dependability. Identify problems or concerns and establish a regular maintenance program. Consult the manufacturer's operating manual and ANSI Z358.1-2009 for assistance in performing test procedures, maintenance operations and training.

Commonly Asked Questions

Q. ***Who should be trained on the proper use of emergency eyewashes and showers?***

A. ANSI states that all employees who may be exposed to hazardous materials should be trained on the use of eyewash and shower devices. Specific areas that should be addressed include the location of the units, how to properly activate the systems and how to correctly maintain the devices.

Q. ***Are there any recommended procedures on how to effectively flush eyes that have been contaminated?***

A. Individuals should be instructed to hold the eyelids open and roll the eyeballs so fluid will flow on all surfaces of the eye and under the eyelid.

Q. ***Are there any alternatives to the frequent changing of gravity-fed eyewash solutions?***

A. Yes. Factory-sealed cartridges containing eyewash solutions are available. These products have shelf lives well in excess of preservative solutions and are significantly easier to maintain.

Sources for More Information

29 CFR 1910.151©
ANSI/ISEA Z358.1-2009
American National Standards Institute
11 W. 42nd Street , New York, NY 10036
212.642.4900
www.ansi.org

7. Emergency Shower and Eye Wash Station Requirements

OSHA/ANSI Eye Wash Station Requirements

1) The Occupational Safety and Health Administration (OSHA) has two different types of regulations, general and specific, which apply to emergency shower and eye wash station equipment designed to promote eye safety under certain work conditions. The first is a general requirement for emergency showers and eye wash stations. The second is specific to certain industries.

2) OSHA's general regulation is applicable to all facilities that require the installation of an emergency shower or eye wash station equipment as a form of first aid. [29 CFR 1910.151 (c)]. It states that:

3) "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 shall be provided within the work area for immediate emergency use."

4) The second OSHA regulation in this area specifies certain industries that must include emergency eye wash equipment in every facility. These industries include: Activities Utilizing an Open Surface Tank, Storage and Handling of Anhydrous Ammonia, Powered Industrial Trucks, Pulp, Paper and Paperboard Manufacturing, Telecommunications, and Hazardous Materials.

5) Both OSHA regulations specify where and when emergency eye wash and shower equipment must be available. However, they do not specify minimum operating requirements or installation set-up requirements.

6) The American National Standards Institute (ANSI) developed the ANSI standard Z358.1-1990 to do just that. While it doesn't have the full force of an OSHA regulation, the ANSI standard covers situations when employees are exposed to hazardous materials. ANSI's definition of "hazardous material" would include caustics, as well as additional substances and compounds that have the capability of producing adverse effects on the health and safety of humans.

Note: The standard was revised in 2004 and 2009. Changes made for 2009 that affect this document are noted with an *. The 2009 standard was prepared by the International Safety Equipment Association (ISEA) and approved by ANSI. It is now known as ANSI/ISEA Z358.1-2009.

7) This "Emergency Eye Wash and Shower Equipment" standard helps the user select and install emergency equipment to meet OSHA requirements. The following eye wash station requirements are taken directly from the ANSI/ISEA Z358.1-2009 standard.

1) There are two types of Emergency Showers:

- **Plumbed Shower:** An emergency shower permanently connected to a source of potable water.
- **Self-Contained Shower:** A shower that contains its own flushing fluid, and must be refilled or replaced after use

The specifications below are for plumbed showers only.

Heads

Positioned 82"—96" from floor
Spray pattern will have a minimum diameter of 20" at 60" above the floor
Flow Rate=20 gallons per minute (GPM) at 30 pounds per square inch (PSI)
The center of the spray pattern shall be located at least 16 inches from any obstruction

Valves

Activate in 1 second or less
Stay-open valve (no use of hands)
Valve remains on until the user shuts it off

Installation

Emergency Shower shall be located in an area that requires no more than 10 seconds to reach. **Consult a medical professional to determine the appropriate distance for harsh acids and caustics (high hazard=closer distance)*
Shower location shall be in a well-lit area and identified with a sign
Shower shall be located on the same level as the hazard

Maintenance and Training

Plumbed emergency showers will be activated weekly to verify correct operation
All employees who might be exposed to a chemical splash shall be trained in the use of the equipment
All showers shall be inspected annually to make sure they meet with ANSI Z358.1 requirements

2) There are two types of Eye Wash Stations:

Plumbed Eye Wash Station: An eye wash unit permanently connected to a source of potable water.

Gravity-Feed Eye Wash Station: An eye wash device that contains its own flushing fluid and must be refilled or replaced after use.

Heads

Positioned 33"—45" from floor
Positioned 6" from wall or nearest obstruction
0.4 gallons per minute (GPM) for 15 minutes for plumbed units shall provide flushing fluid at 30 PSI
0.4 gallons per minute (GPM) for 15 minutes for gravity-feed units

Valves

Activate in 1 second or less
Stay-open valve (leaving hands free)

Installation

Eye wash station shall be located in an area that requires no more than 10 seconds to reach. **Consult a medical professional to determine the appropriate distance for harsh acids and caustics (high hazard=closer distance)*

The location of the eye wash station shall be in a well-lit area and identified with a sign

Eye wash stations shall be on the same level as the hazard

Maintenance and Training

A plumbed eye wash station shall be activated weekly to verify proper operation

Gravity-feed units shall be maintained according to the manufacturer's instructions

All employees who might be exposed to a chemical splash shall be trained in the use of the equipment

All eye/face wash stations shall be inspected annually to make sure they meet ANSI Z358.1 requirements

An Eye/Face Wash Station is a device used to irrigate and flush both the face and the eyes. ANSI requirements for its installation include:

Heads

Positioned 33"—45" from floor

6" from wall or nearest obstruction

Large heads to cover both eyes and face or regular size eye wash heads plus a face spray ring

3 gallons per minute (GPM) for 15 minutes

Valves

Activate in 1 second or less

Stay-open valve (leaving hands free)

Installation

Eye/face wash shall be located in an area that requires no more than 10 seconds to reach. **Consult a medical professional to determine the appropriate distance for harsh acids and caustics (high hazard=closer distance)*

The location of the eye/face wash station shall be in a well-lit area and identified with a sign

Eye/face wash stations shall be on the same level as the hazard

Maintenance and Training

A plumbed eye/face wash station shall be activated weekly to verify proper operation

Gravity-feed units shall be maintained according to the manufacturer's instructions

All employees who might be exposed to a chemical splash shall be trained in the use of the equipment

All eye/face wash stations shall be inspected annually to make sure they meet ANSI Z358.1 requirements

Personal Eye Wash and Eyesaline Requirements

1) A Personal Eye Wash is a supplementary eye wash that supports plumbed units, gravity-feed units, or both by delivering immediate flushing fluid.

NOTE: Personal eye wash units can provide immediate flushing when they are located near the workstations. Personal eye wash equipment does not meet the requirements of plumbed or gravity-feed eye wash equipment. Personal eye wash units can support plumbed or gravity-feed eye wash units, but cannot be a substitute.

2) Personal eye wash can be delivered through bottles of saline solution designed to simulate human tears. Individual bottles can be carried by workers and provide relief until in the crucial seconds until an approved eye wash station installation can be reached.

Drench Hose Requirements

1) A drench hose is a flexible hose connected to a water supply and used to irrigate and flush eyes, face and body areas. Hand-held drench hoses support shower and eyewash units but shall not replace them according to the ANSI standards. Requirements for their installation include:

Heads

3 gallons per minute (GPM)

Valve

Activate in 1 second or less

Installation

Assemble per the manufacturer's instructions

The location of the drench hose shall be in a well-lit area and identified with a sign

Maintenance and Training

Activate each drench hose weekly to verify proper operation

All employees who might be exposed to a chemical splash shall be trained in the use of the equipment

All drench hose equipment shall be inspected annually to make sure they meet ANSI Z358.1 requirements

Commonly Asked Questions

Q. What water temperature is required?

A. The ANSI/ISEA Z358.1-2009 Standard states the use of tepid water.* Appendix B6 defines tepid water as 60°F for the lower limit and 100°F as the upper limit.

Q. Are there advantages to using eyesaline flushing solution instead of water in a gravity fed or personal eyewash station?

A. Eyesaline is a buffered, isotonic saline solution. Buffered to the same pH balance of the human eye. It also contains a preservative to help reduce the bacterial growth. Tap water can contain chlorine and other chemicals. This can cause further irritation to the eyes. It also has the potential for bacteria growth. When tap water is used, weekly solution replacement is strongly recommended as bacteria can grow rapidly in standing water. Eyesaline only needs to be replaced every six months.

Q. What other significant changes to the standard were there for 2009?

A. Other changes made to the Z358.1-2009 standard were to the certification procedures. The procedures were clarified to allow freedom in designing compliant equipment and expanded the criteria for personal washes. Illustrations were also updated.

* ANSI/ISEA Z358.1-2009 Revision

Emergency Eye Wash Requirements Sources

29 CFR 1910.151(c)

ANSI/ISEA Z358.1-2009

American National Standards Institute
11 W. 42nd St.
New York, NY 10036
(212) 642-4900
www.ansi.org

International Safety Equipment Association 1901 North Moore St.
Arlington, VA 22209-1762
(703) 525-1695
www.safetyequipment.org

Works Consulted

1. Code of Federal Regulations, 29 CFR 1910.1000 to end, 1997.
2. American National Standards Institute, Z358.1-1998.
3. Emergency Eye Wash Handbook, Fendall Company, Arlington Heights, IL, 1991.
4. Emergency Shower and Eye Wash Equipment, Encon Safety Products, Houston, TX.
5. ISEA News Release, 9/22/2009

Emergency Eyewash Inspection Record

The eyewash must be flushed weekly for three minutes to verify proper operation. The following items must be inspected: Water Pressure, Cleanliness, Condition of Caps, Overall Equipment Condition, Clearance of 30" in front of eyewash station. Caps or covers must be replaced following the test. If the eyewash fails to operate, tag or label it as being out of service and contact Facilities Services for repair. The person conducting the test must enter the date, location and signature in the space below.

Date	Location	Signature

Comments: _____

This checklist or form is only a sample. It is not meant to constitute a comprehensive list of potential exposures within your municipality. You may wish to revise, modify, or supplement this checklist or form to address specific exposures or safety requirements within your municipality

8. FIRE SELF INSPECTION CHECKLIST

Fire Department Access Roads

- Address clearly displayed.
- Fire lanes access is unobstructed.
- Fire lane signs are posted and curbs painted with 6" striping.
- The installation of controlled access gates across a fire lane require a permit and must be approved by the Fire Marshal.
- Fire apparatus access gates shall be maintained at all times.

Fire Hydrants

- Hydrant is unobstructed by vehicles for at least 15' in front of, and in both directions, parallel to the curb.
- Maintain a 3' clear space around hydrant.
- Centerline of lowest outlet not less than 18" above grade. Highest outlet does not exceed 30" above grade.

Fire Department Connection

- Fire Department Connection shall be fully visible and unobstructed.
- Mount a 12" x 12" sign, per attached specifications, at least 12 feet above FDC.

Fire Sprinkler System

- Sprinkler control valve secured in the open position.
- Sprinkler heads free of obstructions and an 18" clearance.
- Replace painted sprinkler heads.
- Sprinklers in all areas.
- System shall be maintained, inspected and tested annually.

Fire Alarm System

- Pull stations are visible and unobstructed.
- System is operational and no trouble conditions exist.
- System shall be maintained, inspected and tested annually.

Exit Doors, Corridors & Stairways

- Free of obstructions.
- Opens without special use or knowledge.
- Bolt locks are prohibited.
- Fire Doors are kept closed and latched (no wedges).
- Doors swing in direction of exit travel if occupancy load exceeds 50 or new "H" occupancy.
- Egress/aisle width is appropriate.

Fire Extinguishers

- If occupancy has mostly Class A fire hazards, maximum travel distance is less than 75'.
- Fire extinguishers shall be located in conspicuous locations, readily accessible, and immediately available.
- Fire extinguishers are unobstructed and unobscured.
- Have annual inspections.
- Top must be below 42" in height if fire extinguisher weighs over 40 lbs. Top must be below 48" in height if fire extinguisher weighs less that 40 lbs. In either case, fire extinguisher bottom must be at least 4" above the floor.

Electrical

- Wiring and connection are in good condition throughout.
- Frayed cords or unauthorized extension cords have been removed.
- Multi-plug adapter which are not listed are prohibited.
- Open electrical junction boxes and open wiring splices shall be prohibited.
- Extension cords cannot be used in lieu of permanent wiring.

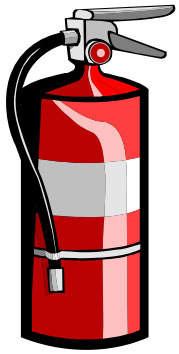
Kitchen Hood Fire Extinguishing Systems

- Ventilating hoods, filter, fans, and ducts free of grease. Nozzles are positioned correctly.
- Extinguishing system is listed and installed in accordance with Fire Code, NFPA and manufacturer's installation instructions.
- Maintained and serviced every 6 months.
- Emergency actuation device between 10 & 20 feet from exhaust system.
- Class K fire extinguisher in place within 30 feet.
- Fusible links should be replaced annually.

Miscellaneous

- Ceiling tiles in place throughout.
- Air handling/ Mechanical/ Electrical rooms free of combustible materials.
- Oily rags stored in listed covered metal containers.
- Remove excess vegetation.
- Emergency power equipment should be maintained and operational. Tested annually

Fire Extinguisher Inspection Checklist



Instructions:

1. Check and verify that the extinguisher is in its designated location.
2. See that it is properly marked with a sign.
3. Ensure that nothing is blocking the extinguisher or immediate access to it.
4. Ensure that the pull-pin in the handle is in place.
5. Check that the plastic tie that secures the pull-pin in the handle is in good condition.
6. Check the gauge by tapping on the gauge and ensure that it reads in the green.
7. Verify that the extinguisher has an annual certification tag and that the date has not expired.
8. Closely examine the overall extinguisher for any obvious defects. (Broken handle, damaged hose, etc.)
9. Turn the extinguisher upside down for a few seconds until you feel the powder inside it fall to the bottom. (You may need to tap on the bottle with a rubber mallet to break up the powder inside the bottle).
10. Look inside the end of the hose to ensure that nothing is lodged in it.
11. Each month following your *inspection, sign off and date the back of the annual certification tag that is attached to the extinguisher.

***Note: This inspection must be conducted monthly on all portable extinguishers, both at the facility and in the vehicles.**

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9. Forklift Battery Changing Station Safety

Introduction

Powered industrial trucks are used in many industries for a variety of applications. Due to increasing technological advancements, battery powered industrial trucks are becoming more and more prevalent. With longer run times, shorter recharging times and reduced emissions, this type of truck is going to become even more popular. Currently, there are numerous styles of battery operated trucks that range from small, motorized pallet trucks to much larger high lift trucks. No matter what kind of truck you have, there are similar hazards associated with their batteries and their maintenance.

Forklift Batteries

There are two styles of batteries in industrial trucks today: Lead acid or nickel-iron. Both of these batteries can pose health and safety hazards.

- Sheer weight--some batteries weigh as much as 2000 lbs. or more
- Gases emitted during charging can be highly volatile
- Corrosive chemicals exist within the battery

For these reasons, battery charging stations and the employees that work around them must be properly equipped with personal protective equipment in addition to having certain safety procedures implemented.

To protect workers from danger associated with the battery's weight, the batteries should only be removed and replaced from the forklifts using a special equipped forklift or battery cart specifically designed for transporting batteries, or even and automatic battery charger.

Batteries that are being removed or replaced should be securely placed and restrained in the cart or the forklift. Use the correct tools and follow proper procedures when moving batteries. This will ensure that the battery remains stable and does not fall.

Batteries release oxygen and hydrogen gases when they are charging. This effect, called "out gassing" is more noticeable if the battery is being overcharged. In the right concentrations, these gases can be highly explosive. Due to this "out gassing" effect, charging stations should be located in well-ventilated areas, to prevent concentrations of hydrogen and oxygen from reaching volatile levels. General or local ventilation can be provided by a fume hood or an exhaust fan. If an on-board charging system is used, the industrial truck itself should be parked in a location where there is adequate ventilation.

Sulfuric acid is a common and hazardous component in a battery. In the event of a battery acid spill, neutralizing agents should be spread on the spill. These cleanup materials should be on hand at all times. After the spill is neutralized, it can be safely cleaned up and disposed of in accordance with local ordinances. Only properly trained and authorized employees should perform an acid cleanup.

Personal Protective Equipment (PPE)

Whenever changing or servicing a battery, personal protective equipment (PPE) should be worn to prevent harm if an accident should occur. The first area of concern is the weight of the battery. To protect workers against drops, proper footwear, such as steel-toe boots should be worn.

Maintaining batteries by adding water or acid also requires appropriate protection. Chemical-resistant gloves, acid apron, eyewear and face protection are a must. They will reduce the risk of injury should an acid splash occur. As stated by OSHA 29 CFR 1910.133(a)(1),

"The employer shall ensure that each affected employee uses appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation."

Face protection must meet the ANSI Z87.1-1989 specifications or be proven equally effective. Faceshields are considered as secondary eye protection only. Indirect or non-vented safety goggles should also be worn to protect the eyes.

An eye/face wash and shower are other required pieces of equipment that must be in or near a battery changing area. According to OSHA 29 CFR 1910.151,

"...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 shall be provided within the work area for immediate emergency use."

According to ANSI Z358.1-2004, the eye/face wash and shower must be within 10 seconds in distance of the hazard and on the same level as that hazard. This unit needs to be clearly identified with proper signs and adequate lighting.

Basic Battery Charging Guidelines

In order to insure that battery changes are performed safely, certain steps should be taken. In 29 CFR 1910.178, OSHA has called out a basic battery charging and changing guidelines:

(g) Changing and charging storage batteries.

1. Battery charging installations shall be located in areas designated for that purpose.
2. Facilities shall be provided for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage by trucks, and for adequate ventilation for dispersal of fumes from gassing batteries.
3. A conveyor, overhead hoist, or equivalent material handling equipment shall be provided for handling batteries.
4. Reinstalled batteries shall be properly positioned and secured in the truck.
5. A carboy tilter or siphon shall be provided for handling electrolyte.

6. When charging batteries, acid shall be poured into water; water shall not be poured into acid.
7. Trucks shall be properly positioned and brake applied before attempting to change or charge batteries.
8. Care shall be taken to assure that vent caps are functioning. The battery (or compartment) cover(s) shall be open to dissipate heat.
9. Smoking shall be prohibited in the charging area.
10. Precautions shall be taken to prevent open flames, sparks, or electric arcs in battery charging areas.
11. Tools and other metallic objects shall be kept away from the top of uncovered batteries.

Sources for more information:

- 29 CFR 1910.178, Powered Industrial Trucks
- 29 CFR 1910.151, Medical Services and First Aid
- ANSI/ASME B56.1-1993, Safety Standards for Low Lift and High Lift Trucks
- ANSI/NFPA 505, Powered Industrial Trucks Including Type, Area of Use, Maintenance and Operation
- Powered Industrial Truck Owner's Manual
- ANSI Z358.1-2004

Commonly Asked Questions

Q. ***What type of gloves should be worn?***

A. Workers should wear chemical-resistant gloves. The common corrosive material encountered is Sulfuric acid. If this is the case, neoprene gloves are normally sufficient. Check with the manufacturer's recommendations.

Q. ***Is wetness on the top of a battery a problem?***

A. Wetness around the terminals on a battery can be a sign of three things:

1. overfilling
2. excessive gassing during charging or
3. leaky seals

Not only can this be a hazard for workers but to the lift truck as well. Once wetness is detected, the problem should be corrected to prevent corrosion of the cell posts and other components. If this problem is left unattended, the top of the battery can become electrically conductive. Stray current flowing over the top of the batter drastically reduces the battery's performance.

Forklift Inspection Checklist	**Forklift No.**		***Month***				
If repair is needed, explain under **Comments** and submit a copy of the inspection to the Supervisor.			FOR THE WEEK OF:		-	2010	
VISUALS	**MON.**	**TUE.**	**WED.**	**THU.**	**FRI.**	**SAT.**	**SUN.**
Components							
Gauges							
Battery Fluid (Check after charging)							
Brake Fluid							
Hydraulic Fluid							
Hydraulic Lines							
Tires, Wheels, Rims							
Forks							
Mast Chains							
Body							
Lights, Head							
Lights, Tail							
Lights, Signal							
Lights, Warning							
Seat Belt							
Overhead Cage							
Operational							
Horn							
Back-Up Warning Device							
Steering							
Parking Brake							
Service Brake							
Mast Lift Up/Down							
Mast Tilt							
Mast Side/Squeeze							
OK = √	Not OK = X						
INITIALS OF INSPECTORS FOR EACH DAY:							
MONDAY	TUESDAY		WEDNESDAY		THURSDAY		
FRIDAY	SATURDAY		SUNDAY				

Comments: _____

_____

_____

This checklist or form is only a sample. It is not meant to constitute a comprehensive list of potential exposures within your municipality. You may wish to revise, modify, or supplement this checklist or form to address specific exposures or safety requirements within your municipality.

10. Gas Cylinder Storage and Handling

Introduction

Hundreds of different materials are packaged in compressed gas cylinders - atmospheric gases, fuel gases, refrigerant gases, poison gases, etc. The hazards associated with these gases include oxygen displacement, explosion hazards, toxic effects and the physical hazards of a ruptured cylinder. The Occupational Safety and Health Administration (OSHA) references general requirements for compressed gases in 29 Code of Federal Regulations (CFR) 1910.101.

Inspection

- Per 29 CFR1910.101(a) employers must inspect the cylinders to ensure that they are in a "safe condition".
- Visual and other inspections must be conducted as described in the Department of Transportation (DOT) Hazardous Materials Regulations (49 CFR 171 - 179).
- Where the DOT regulations are not applicable, visual and other inspections must be conducted as prescribed in the Compressed Gas Association's C-6 Standards for Visual Inspection of Steel Compressed Gas Cylinders and C-8 Standard for Requalification of DOT-3HT, CTC-3HT, and TC-3HTM Seamless Steel Cylinders pamphlets.

Storage and Handling

- Per 29 CFR 1910.101(b), the in-plant handling, storage and utilization of all compressed gas cylinders must be in accordance with CGA Pamphlet P-1 Safe Handling of Compressed Gas Cylinders.
- Gas cylinders should be properly secured at all times to prevent tipping, falling or rolling. They can be secured with straps or chains connected to a wall bracket or other fixed surface, or by use of a cylinder stand.
- The cylinders should be stored in a cool, dry, well-ventilated, fire-resistant area that meets all applicable federal, state and local regulations.
- When a cylinder is empty or not being used, ensure that the valve is closed, the regulator removed and that the valve protector cap is secured in place.
- Cylinders should be transported using hand trucks designed for that purpose and the cylinders should be secured so that they do not tip, fall or roll.
- Appropriate lifting devices, such as cradles or nets, must be used when using a crane, hoist or derrick to transport gas cylinders. Do not use magnets or slings to lift gas cylinders. Do not use the valve protection cap for lifting a gas cylinder.
- It is necessary to take precautions so that gas cylinders are not dropped or allowed to strike each other or other objects. Dropping or striking may damage the cylinder valve, which could turn the cylinder into a dangerous torpedo with the potential to destroy property and/or injure personnel.

- Consult the appropriate Material Safety Data Sheet (MSDS) for detailed information on the chemical contained in the gas cylinder. Specific chemical handling and storage precautions will be outlined in the MSDS. The MSDS will also have specifications for appropriate personal protective equipment for worker protection.

Sources for More Information

Compressed Gas Association
4221 Walney Road, 5th Floor
Chantilly,VA 20151-2923
703-788-2700
www.cganet.com

11. Ground Fault Circuit Interrupters (GFCI)

Introduction

According to OSHA 1910.399, a ground fault circuit interrupter, or GFCI, is defined as ". . . a device whose function is to interrupt the electric circuit to load when a fault current to ground exceeds some predetermined value, that is less than that required to operate the over current protective device of the supply circuit."

GFCIs are designed to shut off electric power within as little as 1/40 of a second. It works by comparing the amount of current going into the electric equipment to the amount of current returning from the equipment along the circuit conductors. If the current exceeds six milliamperes, the GFCI interrupts the current enough to prevent electrocution.

GFCI's can be incorporated into a special outlet, part of a power cord or put in-line and continually monitor the current passing through the receptacle. When a difference is sensed, indicating a leakage of current that could cause an injury, the GFCI quickly breaks the circuit.

GFCIs are intended to protect people similar to the way breakers and fuses protect wiring in a home or business. For example: electricity follows the path/route of least resistance. So if someone were to touch an electrical system with a leak, the person touching the system may be a better route of ground for the electricity to pass through since the individual offers very little resistance.

Where are they used?

GFCIs are used in wet or humid environments, high-risk areas and places where people could come into contact with ground or ground equipment. Typically in home use, GFCIs can be found in kitchens and bathrooms. Other applications include outdoor outlets, spas and pools. Occupations that use GFCI's include dairy farms, breweries, steam plants and construction sites.

The following are GFCI regulations according to the OSHA Construction Standard 1926.404 ~ Wiring Design and Protection for Construction Sub part K of the 29 Code of Federal Regulations (CFR):

1926.404 (b)(l)(ii)

Ground fault circuit interrupters– All 120V, single-phase 15A and 20A receptacle outlets on construction sites, which are not a part of the permanent wiring of the building or structure and which are in use by employees, shall have approved ground fault circuit interrupters for personal protection. Receptacles on a two-wire, single-phase portable or vehicle mounted generator, rated not more than 5KW, where the circuit conductors of the generator are insulated from the generator frame and all other ground surfaces need not be protected with ground fault circuit interrupters.

1926.404 (b)(l)(iii)

Assured equipment grounding conductor program–The employer shall establish and implement an assured equipment grounding conductor pro-gram on construction sites covering all cord sets, receptacles which are not a part of the building or structure and equipment connected by cord and plug which are available for use or used by employees. The program shall comply with the following minimum requirements:

1926.404 (b)(l)(iii)(A) A written description of the program, including the specific procedures adopted by the employer, shall be available at the job site for inspection and copying by the Assistant Secretary and any affected employee.

1926.404 (b)(l)(iii)(B) The employer shall designate one or more competent persons (as designed in 1926.32(f)) to implement the program.

1926.404 (b)(l)(iii)(C) Each cord set, attachment cap, plug and receptacle of cord sets, and any equipment connected by cord and plug, except cord sets and receptacles which are fixed and not exposed to damage, shall be visually inspected before each day's use for external defects such as: deformed or missing pins, insulation damage, or indications of possible internal damage. Equipment found damaged or defective shall not be used until repaired.

GFCI Program Requirements

Employer must provide:

- Written description of program
- Competent person to implement the program
- Inspection and testing
- Records of test results

Inspections/Tests

Visual inspection of the following equipment is required:

- Cord sets
- Cap, plug and receptacle of cord sets
- Equipment connected by cord and plug

Exceptions:

- Receptacles and cord sets that are fixed and not exposed to damage.

Frequency of tests:

- Before first use
- After repair and before placing back in service
- Before use after suspected damage
- Every 3 months—however, cord sets and receptacles exposed to damage must be tested at regular intervals not to exceed 6 months

Conduct tests for:

- Continuity of equipment of grounding conductor
- Proper terminal connection of equipment grounding conductor

Note: For additional information please see 29 CFR 1926.404

Other Sources

29 CFR 1926.404
29 CFR 1910.399
N.E.C. National Electric Code
OSHA booklet: *Controlling Electrical Hazards* at:
www.osha-slc.gov/OshDoc/Additional.html

Commonly Asked Questions

Q. ***Do I need to test GFCIs?***

A. A.Yes, GFCIs should be tested periodically to ensure they are working properly. It is recommended to follow manufacturer's instructions regarding the testing of the GFCI.

12. Hazard Assessment Report

Instructions

Print this two-page form and use it as a guide for your walk-through survey. It will help you identify the hazards in each work area. Once you've completed the first page, review the *Guidelines for Selecting Personal Protective Equipment* on the second page.

Area:_____ Job Classification: _____

Assessor: _____Date: _____

Head Hazards

Tasks that can cause head hazards include: Working below other workers who are using tools and materials which could fall, working on energized electrical equipment, working with chemicals and working under machinery or processes which might cause materials or objects to fall.

Check the appropriate box for each hazard:

Burn	Yes	☐	No	☐	Description of Hazards:	
Chemical Splash	Yes	☐	No	☐		
Electrical Shock	Yes	☐	No	☐		
Impact	Yes	☐	No	☐		

Eye Hazards

Tasks that can cause eye hazards include: Working with acids and chemicals, chipping, grinding, furnace operations, sanding, welding and woodworking.

Check the appropriate box for each hazard:

Chemicals	Yes	☐	No	☐	Description of Hazards:	
Dust	Yes	☐	No	☐		
Heat	Yes	☐	No	☐		
Impact	Yes	☐	No	☐		
Light/Radiation	Yes	☐	No	☐		

Hand Hazards

Tasks that can cause hand hazards include: Cutting material, working with chemicals and working with hot objects.

Check the appropriate box for each hazard:

Burns	Yes	☐	No	☐	Description of Hazards:	
Chemical Exposure	Yes	☐	No	☐		
Cuts/Abrasion	Yes	☐	No	☐		
Puncture	Yes	☐	No	☐		

Foot Hazards

Tasks that can cause foot hazards include: Carrying or handling materials that could be dropped, performing manual material handling and working with chemicals.

Check the appropriate box for each hazard:

Chemical Exposure	Yes	☐	No	☐	Description of Hazards:	
Compression	Yes	☐	No	☐		
Impact	Yes	☐	No	☐		
Puncture	Yes	☐	No	☐		

Guidelines for Selecting Personal Protective Equipment (PPE)

Note: *Personal Protective Equipment alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls and sound manufacturing practices.* Familiarize yourself with the potential hazards in the area and the types of PPE that are available. Consider the hazards associated with the environment (impact velocities, masses, projectable shape, radiation intensities, etc.). Select PPE that ensures a greater level of protection than the minimum required to protect workers from the hazards. Fit the worker with the PPE and give instructions on its use and care. It is very important that workers be made aware of all warning labels for and limitations of their PPE.

Based on the hazard assessment for_____, the following PPE is required:
Task/Function/Job

EYE HAZARDS PPE

_____ _____

_____ _____

HEAD HAZARDS PPE

_____ _____

_____ _____

FOOT HAZARDS PPE

_____ _____

_____ _____

HAND HAZARDS PPE

_____ _____

_____ _____

OTHER HAZARDS PPE

_____ _____

_____ _____

13. Hazardous Locations: Classes, Divisions, and Groups

Introduction

General-purpose electrical equipment can cause explosions in certain atmospheres. Equipment used in areas where explosive concentrations of dusts or vapors may exist must be equipped with special wiring and other electrical equipment for safety purposes. Hazardous (classified) locations such as these might exist in areas such as aircraft hangars, gasoline stations, paint-finishing locations, or agricultural areas such as grain bins. In order to make sure the correct equipment is used, these environments have been broken down into classes, divisions, and groups to more specifically identify the hazards.

SUMMARY OF CLASS I, II, II HAZARDOUS LOCATIONS			
CLASSES	**GROUP**	**DIVISIONS**	
		1	**2**
I Gasses, Vapors and Liquids (Art. 501)	A. Acetylene B. Hydrogen, etc. C. Ether, etc. D. Hydrocarbons, Fuels, Solvents, etc.	Normally explosive and hazardous.	Not normally present in an explosive concentration (but may accidentally exist).
II Dusts (Art. 502)	E. Metal Dusts (conductive* and explosive) F. Carbon Dusts (Some are conductive* and all are explosive) G. Flour, Starch, Grain, Combustible Plastic or Chemical Dust (explosive)	Ignitable quantities of dust that is normally or may be, in suspension or conductive dust may be present.	Dust not normally suspended in an ignitable concentration (but may accidentally exist). Dust layers are present.
III Fibers and Flyings (Art. 503)	Textiles, Woodworking, etc. (easily ignitable, but not likely to be explosive)	Handled or used in manufacturing.	Stored or handled in storage (exclusive of manufacturing).
*NOTE: Electrically conductive dusts are dusts with a resistivity less than 10^5 OHM-centimeter.			

Class I

Locations or areas where flammable gases or vapors are/could become present in concentrations suitable to produce explosive and/or ignitable mixtures. Class I locations are further divided into 2 divisions:

Class I, Division 1: There are three different situations that could exist to classify an area as a Class I, Division 1 location.

1. When the atmosphere of an area or location is expected to contain explosive mixtures of gases, vapors, or liquids during normal working operations. (This is the most common Class I, Div. 1)
2. An area where ignitable concentrations frequently exist because of repair or maintenance operations.
3. The release of ignitable concentrations of gases or vapors due to equipment breakdown, while at the same time causing electrical equipment failure.

Class I, Division 2: One of the following three situations must exist in order for an area to be considered a Class I, Division 2 location.

1. An area where flammable liquids and gases are handled, but not expected to be in explosive concentrations. However, the possibility for these concentrations to exist might occur if there was an accidental rupture or other unexpected incident.
2. An area where ignitable gases or vapors are normally prevented from accumulating by positive mechanical ventilation, yet could exist in ignitable quantities if there was a failure in the ventilation systems.
3. Areas adjacent to Class I, Division 1 locations where it is possible for ignitable concentrations of gas/vapors to come into this area because there isn't proper ventilation.

Class II

Class II locations are areas where combustible dust, rather than gases or liquids, may be present in varying hazardous concentrations.

Class II, Division 1: The following situations could exist, making an area become a Class II, Division 1 locations:

1. Where combustible dust is present in the air under normal operating conditions in such a quantity as to produce explosive or ignitable mixtures. This could be on a continuous, intermittent, or periodic basis.
2. Where an ignitable and or explosive mixture could be produced if a mechanical failure or abnormal machinery operation occurs.
3. Where electrically conductive dusts in hazardous concentrations are present.

Class II, Division 2: Class II, Division 2 locations exist in response to one of the following conditions:

1. Where combustible dust is present but not normally in the air in concentrations high enough to be explosive or ignitable.
2. If dust becomes suspended in the air due to equipment malfunctions and if dust accumulation may become ignitable by abnormal operation or failure of electronic equipment.

Class III

Class III locations contain easily ignitable fibers or flyings, but the concentration of these fibers or flyings are not suspended in the air in such quantities that would produce ignitable mixtures.

Class III, Division 1: These locations are areas where easily ignitable fibers or items that produce ignitable flyings are handled, manufactured, or used in some kind of a process.

Class III, Division 2: These locations are areas where easily ignitable fibers are stored or handled.

Groups

Class I and Class II locations are further divided into groups: Groups A-G for gases, vapors, and liquids. Groups A-D relate to Class I environments. Groups E-G describe different dusts that may be encountered in a Class II environment. The actual determination of what group a chemical or dust would fall into is determined by the specific properties of that chemical or dust.

Requirements for Equipment used in Hazardous Locations:

The specific hazardous atmosphere must be considered when deciding what type of equipment to use in those areas. The equipment must be designed and tested to ensure it will perform properly and not cause additional hazards in that environment. According to 29 CFR 1910.307(b)(2)(ii), "Equipment shall be marked to show the class, group and operating temperature or temperature range, based on operating in a 40°C ambient temperature for which it is approved." The National Electric Code (NEC), NFPA 70, has set guidelines for the design of equipment installed in hazardous locations.

Equipment for Class I Locations

The equipment used in Class I locations are housed in enclosures designed to contain any explosion that might occur if hazardous vapors were to enter the enclosure and ignite. These closures are also designed to cool and vent the products of this explosion as to prevent the surrounding environment from exploding. The lighting fixtures used in Class I locations must be able to contain an explosion as well as maintain a sur-face temperature lower than the ignition temperature of the surrounding hazardous atmosphere.

There are some exceptions to the marking requirement set up by OSHA under 29 CFR 1910.307(b)(2)(ii)(B). According to OSHA, "Fixed lighting fixtures marked for use in Class I, Div. 2 locations only, need not be marked to indicate the group." Also, fixed general-purpose equipment in Class I locations, other than lighting fixtures, do not need to be marked with the class, group, division, or operating temperature, but must still be acceptable for the specific class, division, and group for which it is in.

Equipment for Class II Locations

Class II locations make use of equipment designed to seal out dust. The enclosures are not intended to contain an internal explosion, but rather to eliminate the source of ignition so no explosion can occur within the enclosure. These enclosures are also tested to make sure they do not overheat when totally covered with dust, lint, or flyings.

Again, OSHA has an exception for the marking requirements for equipment used in Class II locations. According to 29 CFR 1910.307 (b)(2)(ii)(D) permanently fixed dust-tight equipment, other than lighting fixtures, which is acceptable for use in Class II, Division 2 locations does not need to be marked with the class, group, division, or operating temperature.

Equipment for Class III Locations

Equipment used in Class III locations needs to be designed to prevent fibers and flyings from entering the housing. It also needs to be constructed in such a way as to prevent the escape of sparks or burning materials. It must also operate below the point of combustion. The same exception for the Class II locations holds true for the Class III locations-fixed, dust-tight equipment, other than lighting fixtures, does not need to be marked with the class, group, division, or operating temperature, as long as it is acceptable for Class III locations.

International Comparison

The International Electrotechnical Commission (IEC) is an international organization that strives to create standards to help promote international trade. They use a series of zones rather than classes and divisions to classify hazardous areas. The table below compares the NEC classifications to the equivalent IEC classifications:

Definitions:

Explosion Proof: a term frequently encountered when looking at products and wiring for hazardous areas. This term is usually seen when describing Class I Division 1 equipment. There are basically two requirements for components to be considered explosion proof for Class I Division 1 atmospheres. First, the device must be able to withstand an internal explosion if it should occur and secondly, it must work to prevent the spread of the internal explosion to the surrounding saturated atmosphere. This is typically accomplished by joints and closures built into the actual device. The devices themselves may be damaged, but they are designed so as not to allow the explosion or other possible sources of ignition to reach the hazardous atmosphere.

Intrinsically Safe: another term that is often seen when looking for products to use in hazardous locations. According to the Fire Protection Handbook, intrinsically safe is defined as "...equipment and wiring incapable of releasing sufficient electrical energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture." Or simply stated, equipment that is intrinsically safe is incapable of igniting the atmosphere surrounding it.

Commonly Asked Questions

Q. ***Can I use a piece of equipment approved for use in a Division 1 location in a Division 2 location?***

A. Yes. If equipment has been approved for use in a Division 1 location, it can be used in a Division 2 location, providing it is in the same class and group.

Q. ***Can equipment approved for a Class I location be used in a Class II location?***

A. No. Equipment used in Class I and Class II locations are made for different purposes. Equipment approved for Class I locations must contain an internal explosion, while Class II approved equipment must seal out dust. They are not interchangeable.

HAZARDOUS MATERIALS	NEC U.S. STANDARDS	IEC STANDARDS
Gas or Vapor	Class I Division 1	Zone 0
	Class I Division 2	Zone 1
Dust	Class II Division 2	
	Class II Division 2	
Fibers or Flyings	Class III Division 1	
	Class III Division 2	

Sources for More Information:

29 CFR 1910.307 -- Hazardous (classified) Locations.
UL 1203 -- Explosion-Proof and Dust-Ignition-Proof Electrical Equipment.
Fire Protection Handbook 18th edition -- National Fire Protection Association.
29 CFR 1910.399 -- Definitions Applicable to this subpart.
NFPA 70

14. HAZARDOUS MATERIALS SELF INSPECTION CHECKLIST

Above Ground Storage Tanks of Flammable/Combustible liquids

- Tank is constructed to API or UL standards. This will be indicated on the tank nameplate.
- "No Smoking within 25 feet" sign present for outdoor use/dispensing or open/use. "No Smoking" for rooms storing flammable/combustible liquids.
- Tanks greater than 100 gallons storing Class I, II or IIIA liquids have appropriate placarding/labeling.
- Emergency vent is properly sized and functions correctly.
- Normal vent is 12' above ground (excludes CL IIIB liquids), and at least 5' from building opening or property lot lines.
- An approved overfill protection device shall be provided to prevent overfill of all Class I, II and IIIA liquids in aboveground storage tanks with a volume of 1320 gallons or more when located outside and in ALL tanks inside of buildings.
- Secondary containment meet requirement and is adequate.
- Hoses and nozzles are listed for petroleum service.
- Vehicle impact protection (i.e. bollards) is adequate.
- Electrical sources have adequate separation or appropriate classified electrical listing.
- There is a minimum 20 foot separation between tank storing flammable or combustible liquids and LP gas tanks.
- If fuel dispensing:
- Adequate separation from buildings and property lines.
- Fill instructions posted.
- Emergency instructions posted (if unattended).
- Shut-off valve within 20 to 100 feet and labeled.
- Nozzle is listed.
- Fire extinguisher with a minimum 2A:20 BC rating is located within a 75 foot travel distance.

Compressed Gases

- Portable cylinders/tanks secured.
- Caps or other valve protection in place.
- Stationary tanks, cylinders & containers have clearly visible labeling.
- Vehicle impact protection (i.e. bollards) adequate.
- Piping labeled with contents/direction of flow.
- Incompatibles separated by a 20 foot line of sight or other approved barrier.
- Flammable gases shall have an emergency shut-off at each point of use and at each source.
- "No Smoking" signs in place.

Flammable/Combustible/Corrosive Liquids

- Grounding and bonding provided where Class I flammable liquids are being dispensed.
- Horizontal drums have listed self-closing valves.
- Drums have appropriate placards/labeling.
- When required, secondary containment is liquid tight.
- When required, spill control in-place around storage/use area.
- Containers greater than 30 gallons are stored no higher than 1 container high. Containers 30 gallons or less are stored no higher than 2 containers or 3 feet high.
- Appropriate separation of incompatibles (20' line of sight or barrier protection).

LP Gas-Above ground Tanks And Fill/Dispensing

- "No Smoking" sign present on all four sides of the LPG storage area.
- Emergency shut-off present and not painted.
- When required, emergency shut-off is within 25 to 100 feet of dispenser.
- Temperature-sensitive elements of emergency shutoff valve are not painted.
- There are no "double-block" conditions present on liquid service piping.
- Fill/withdrawal piping has appropriate excess flow valve protection.
- Liquid piping has thermal shut-off (fusible link) or positive shut-off valve if required by NFPA 58 – 5.7.7. Vehicle impact protection (i.e. bollards) adequate.
- No ignition sources within 25 feet.
- Containers do not show serious denting, bulging, gouging, or excessive corrosion.
- A minimum 2A:20B:C
- Fire extinguisher is located within 30 feet.

LP Gas-Portable Containers

- All portable LPG cylinders have valid expiration dates.
- Cylinders do not show serious denting, bulging, gouging, or excessive corrosion.
- Personnel who transfer liquid LPG are trained in proper handling procedures with refresher training held at least once every 3 years.
- Containers are NOT stored up-side-down. Ensure that the pressure relief device is in direct communications with the vapor space.

Flammable Spray Operations

- Construction permit is required for the installation of spray booth, spray room, spray area and powder coating booth.
- Operational permit required to spray flammable finishes.
- Interlock functions correctly.
- Filters are in place and clean.
- No excessive paint residue in spray booth.
- Sprinkler heads clean/protected.
- Electrical wiring/equipment listed according to IEC.
- Fire extinguisher mounted nearby.
- Approved lighting and glass panels.
- Waste cans are listed and equipped with self-closing lids.
- Solvent recycling or distillation unit meets 3405.4.

Welding and Cutting Operations

- Tanks secured. Caps in place.
- Acetylene & oxygen cylinders not in use separated by a 20 foot line of sight or other approved barrier.
- Operational permit for Hot Work
- Set pressure on acetylene gauge below 15 PSI.
- No combustibles store within 25 feet.
- “No Smoking” signs posted in use/storage areas.
- A minimum 2A:20B:C fire extinguisher located within 30 feet.

Non-Routine Task - *Protective Measures Determination*

Job Title:	**Name of Task:**	
Date Conducted:	**Related Operating Procedures** **Reviewed: ☐ Yes ☐ No**	**All Affected Employees** **Notified: ☐ Yes ☐ No**

HAZARDS AND PERSONAL PROTECTIVE EQUIPMENT: (Indicate Specific Hazards with Initials)

Initials	Hazard	Remarks/Recommendations	PPE/Safety Equipment Needed
	Oxygen deficiency:	(less than 19.5%)	
	Flammable gases or vapors:	(more than 10% of LEL)	
	Airborne combustible dust:	(meets or exceeds LFL)	
	Toxic gases or vapors:	(more than PEL)	
	Mechanical hazards:		
	Chemical hazards:		
	Respiratory hazards:		
	Fall hazards:		
	Skin hazards:		
	Noise hazards:		
	Electrical hazards:		
	Lock-Out Tag-Out:		
	Welding/Hot/Burning:		

EMPLOYEE NOTIFICATION

I certify that I understand the hazards involved with the job and will comply with established safe work practices.

Employee Signature:	**Title:**	**Date:**
Supervisor Signature:		**Date:**

☐ **Approved** **AUTHORIZATION**

I certify that I have conducted a Protective Measures Determination of the above named Non-Routine Task and have detailed the findings on this form.* Further detailed on reverse or attachment: ☐ Yes ☐ No

Name:	**Signature:**	
Title:	**Date:**	**Time:**

FORM RETENTION INFORMATION		**ATTACHMENTS**
Retention File:	Date Filed:	***Yes ☐ No ☐**
	Filed By:	***See Following Pages**

This checklist or form is only a sample. It is not meant to constitute a comprehensive list of potential exposures within your municipality. You may wish to revise, modify, or supplement this checklist or form to address specific exposures or safety requirements within your municipality.

15. Hearing Protector Selection Guide

Introduction

It is estimated that approximately 30 million people in the U.S. are occupationally exposed to hazardous noise levels. One of the most common methods for minimizing worker exposure to these hazardous noise levels is the use of hearing protectors. Before selecting a hearing protector for use in your facility, several questions should be considered, including:

- Are we required to provide hearing protection?
- Does the hearing protector provide adequate noise reduction?
- What types of hearing protectors are available?
- Is the hearing protector compatible with any other Personal Protective Equipment (PPE) we are using?

This document will address these issues and provide some guidelines for selecting the most appropriate hearing protectors for your application.

Regulations

The use of hearing protectors is detailed in the Occupational Noise Exposure Standard - 29 CFR 1910.95 **Section (i)** of this standard states:

"Employers shall make hearing protectors available to all employees exposed to an 8-hour time-weighted average of 85 decibels or greater at no cost to the employees…."

This section further requires that employers must provide their employees a variety of hearing protectors to choose from, training on use and maintenance of hearing protectors and ensure that hearing protectors are worn by all employees who meet the requirements of this standard.

Noise Reduction Rating

The **Noise Reduction Rating (NRR)** is defined as the maximum number of decibels (dB) that the hearing protector will reduce the sound level when worn. **Section (j)** of 1910.95 states that the hearing protector should have a NRR sufficient to reduce the employee's exposure to a Time Weighted Average (TWA) of 90 dB (decibels) (or 85 dB for employees who have had a standard threshold shift). Appendix B of the same standard also provides some correction factors when using the NRR to asses the adequacy of the hearing protector.

1. If using a C-weighted TWA, subtract the NRR from the TWA to determine the attenuated noise level. (i.e. TWA[C] – NRR = Attenuated Noise Level).*
2. 2) If using an A-weighted TWA, first subtract 7dB from the NRR, then subtract the remainder from the TWA to determine the attenuated noise level. (i.e. A weighted TWA[A] – (NRR-7db) = Attenuated Noise Level).*

OSHA also *recommends* reducing the NRR by an additional safety factor of 50%, however this is only a suggestion and citations cannot be issued for not using this 50% reduction factor.

Types of Hearing Protectors

A wide variety of hearing protectors are available, each with their own unique set of advantages and disadvantages. The most common types are:

Disposable Earplugs: These are the most common type of protector. They are usually made of a PVC (polyvinyl chloride) or PU (polyurethane) foam. Disposable earplugs are compressed or rolled-down prior to insertion and then slowly re-expand to fill the ear canal. These earplugs are usually available with or without a pre-attached cord and are usually one-size-fit-all (some sized plugs may also be available). This type of earplugs is intended for a single use; disposable earplugs are not intended to be cleaned or reused.

Figure 1.

Reusable Earplugs: This type of earplugs is made of flexible material such as silicone and is tapered to fit the ear canal. They are intended to be reused and can be cleaned using soap and water. They are available either corded or uncorded. While these are more durable than disposable earplugs, they typically have a lower NRR. Both reusable and disposable earplugs are small enough to be used with any other head/face/eye protective equipment such as hard hats, face shields or safety glasses.

Figure 2.

Hearing Bands: Hearing Bands consist of a pair of earplugs connected to a flexible band, which can be worn in a number of positions (over-the-head, under-the chin or behind the neck). The NRR of these bands is similar to most earplugs. The band allows this item to be stored around the neck while not in use. Depending on which position the band is worn in, these can be used with most any hardhat, face shield or glasses.

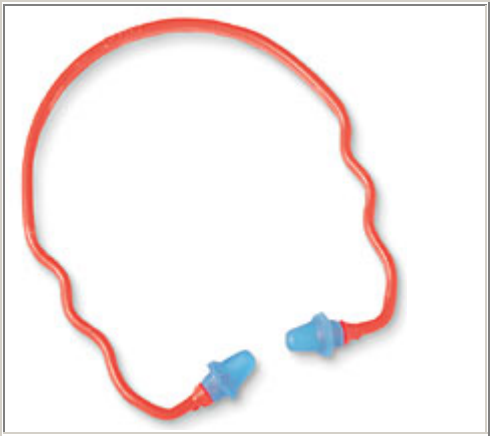

Figure 3.

Earmuffs: Earmuffs have rigid cups with soft cushions that seal around the ears to block noise. Typically an earmuff with a higher NRR tends to be bulkier (larger cups with more sound reducing insulation) than an earmuff with a lower NRR. Earmuffs are usually constructed of all plastic materials (these are called **dielectric** and are ideal for work around electrical hazards) or a combination of metal and plastic for added durability. The three common designs of earmuffs are **over-the-head** (see Figure 4a.), **cap-mounted** (Figure 4b.) and **behind-the-neck** (Figure 4c.). The cap-mounted earmuffs are design to mount directly to most hard hats that have side-accessory slots and the behind-the-neck style can also be used be used while wearing a hard hat or face shields.

Figure 4a.

Figure 4b.

Figure 4c.

Electronic Earmuffs: These provide the same protection as standard earmuffs but also offer other features such as AM/FM radio reception, two-way radio reception or amplification of low sound levels.

Commonly Asked Questions

Q. ***Can earmuffs and earplugs be used together to provide more noise reduction?***

A. Yes. OSHA allows for earplugs to be worn underneath earmuffs. The NRR this will produce is calculated by adding 5 dB to the NRR of whichever protector (the earplug or the earmuff) has the higher NRR. Keep in mind that this is after the necessary reduction factor of 7dB (if using the A weighted scale) has been calculated. For example, if you were using an earplug with a NRR of 32dB with an earmuff with 27dB NRR, your noise reduction calculations would be:

- 32dB[A] (earplug) – 7db (OSHA Safety Factor) = 25 dB
- 25 dB + 5 dB (for using earmuff and earplug together) = 30 dB
- Total corrected NRR = **30 dB**

Sources for More Information

Hazard Assessment Report
29 CFR 1910.95, Occupational Noise Exposure

16. Introduction to First Aid

Levels of Training

In the workplace it is often the job of a Certified First Aid Provider to assist in stabilizing an injured or ill person until professional medical help arrives. Certified First Aid Providers are persons who are certified and trained to certain levels in first aid and CPR (Cardiopulmonary Resuscitation). 29 CFR 1910.151(b) states, "In the absence of an infirmary, clinic or hospital in the near proximity of the workplace which is used for the treatment of all injured employees, a person or persons shall be adequately trained to render first aid. Adequate first aid supplies shall be readily available."

First Responder is a trade name for a 40-hour certification course in advanced first aid and CPR. This course is taught by hospitals, technical colleges or fire departments, and certification must be updated biannually. Basic First Aid and CPR courses are approximately eight hours long, and are certified through a number of nationally recognized organizations such as The American Red Cross, The American Heart Association and The National Safety Council, to name a few. These certifications also should be updated biannually.

Informed, trained citizens are indispensable in helping people in emergencies. To help citizens be more prepared for emergency situations, the American Red Cross trains people in first aid and CPR. Due to the increased need for first aid services, the development of the EMS (Emergency Medical Services) has been established in most communities. It remains, however, equally important that citizens are trained in first aid and know what to do until the EMS or other emergency medical professional arrives.

First Aid and Infectious Diseases

Infectious diseases are diseases that pass from one person to another. Most commonly these are referred to as bloodborne or airborne pathogens. In first aid, bloodborne and airborne pathogens are most commonly transmitted through touching, breathing and biting. People can become infected if touched by an infected person, or if the germs in that person's blood or other bodily fluids pass into the body through breaks in the skin, or through the lining of the mouth, nose or eyes. Therefore, the greatest risk is in touching another person's blood or bodily fluids directly (without protective gloves or some other protective barrier). Learn more about complying with OSHA's Bloodborne Pathogens Standard see (29 CFR 1910.1030). Below are some basic guidelines to follow that will help reduce body fluid transmission when rendering first aid care.

- Avoid direct contact with bodily fluids and blood whenever possible.
- Place barriers, such as gloves or a clean, dry cloth, between the victim's bodily fluids and yourself.
- Wear protective clothing, such as disposable gloves, to cover any cuts, scrapes or skin conditions you have.
- Wash your hands with soap and water immediately after giving care.
- Do not eat, drink or touch your mouth, nose or eyes when giving first aid.
- Do not touch objects that may be soiled with blood or other bodily fluids.
- Be prepared by having a first aid kit stocked and easily accessible.

By following these simple guidelines, the risk of getting or transmitting infectious diseases is reduced.

Good Samaritan Laws

Most states have enacted Good Samaritan Laws to encourage people to help others in emergency situations. These laws give legal protection to people who provide emergency care to ill or injured persons. They require that the "good samaritan" use common sense and a reasonable level of skill not to exceed the scope of the individual's training in emergency situations.

If you're interested in learning more about the Good Samaritan Laws in your state, contact a local legal professional, or check your local library.

Basic First Aid Procedures

Following are some basic first aid techniques for treating shock, bleeding and wounds, burns, choking, electric shock, eye injury, fainting, heat stroke, hypothermia, and unconsciousness. These techniques can be used in the workplace or at home and being prepared will help make the most of a serious situation.

Shock

Shock can be life threatening. Symptoms include cold sweat, weakness, irregular breathing, chills, pale or bluish lips and fingernails, rapid weak pulse and nausea.

1. Call 9-1-1 or seek medical help immediately.
2. Do Not give the victim anything to eat or drink.
3. Lay the victim on their back, but do not move them if they have back or neck injuries. If the victim is unconscious, vomiting or has severe injury to the lower face or jaw, lay them on their side and be sure they are getting adequate air.
4. Keep the victim warm (not hot) by use of blankets or clothes.
5. Raise the victim's feet and legs with a pillow. (Only do this if it does not cause the victim any pain.)

Bleeding and Wounds

1. Place a clean cloth or gauze and gloved hand over the wound; apply firm steady pressure for at least 5 minutes.
2. Call 9-1-1 or other emergency personnel if bleeding is severe.
3. Elevate an injured arm or leg above the level of the victim's heart if practical.
4. When bleeding stops, secure the cloth with a bandage. **Do Not** lift the cloth from the wound to check if bleeding has stopped. Be sure the bandage is not too tight--it may cut off circulation.
5. Check the victim for shock.

Never use a tourniquet unless you cannot control the bleeding. Tourniquets may result in subsequent medical amputation.

Burns

1. Chemical or Compressed Gas Burns

1. Use a hose, shower or faucet for at least 15 minutes to rinse away all traces of chemicals while removing any contaminated clothing from the victim. (See illustration 1.)
2. Cover the burn loosely with a clean, dry cloth, or special burn dressing.
3. Check the victim for shock.
4. Call 9-1-1 or seek medical attention as soon as possible.

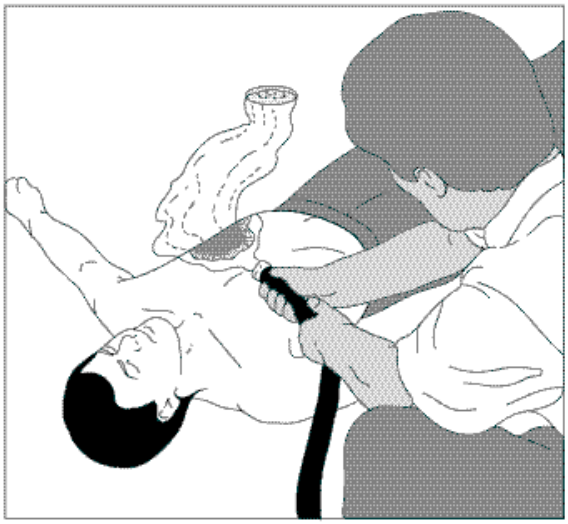

Illustration 1

2. Heat or Electrical Burns

1. Use water to stop actual burning of skin if necessary.
2. If the skin is not broken, immerse the burned area in cool (not ice) water, or gently apply a cool compress until pain is relieved. Bandage with a clean dry cloth.
3. Do not break a blister if one forms. Do not apply ointments or creams.
4. If skin is broken, or if burns are severe:

   Call 9-1-1 or other emergency personnel.
   Do not clean the wound or remove embedded clothing.
   Cover the burn loosely with a clean, dry cloth.
   Expect shock and treat accordingly.

Choking

Note: These instructions are for choking victims over one year of age. There are specific guidelines for treatment of infant choking that are not outlined in this document.

If the victim can speak or cough forcibly and is getting sufficient air, do not interfere with his attempts to cough the obstruction from his throat. If victim cannot speak or is not getting sufficient air, have someone call 9-1-1 while you perform abdominal thrusts.

1. Stand directly behind the victim and wrap your arms around his stomach. (See illustration 2)

Illustration 2

2. Make a fist with one hand and place that fist just above the navel and well below the ribs, with the thumb and forefinger side toward you. (See illustration 3.)

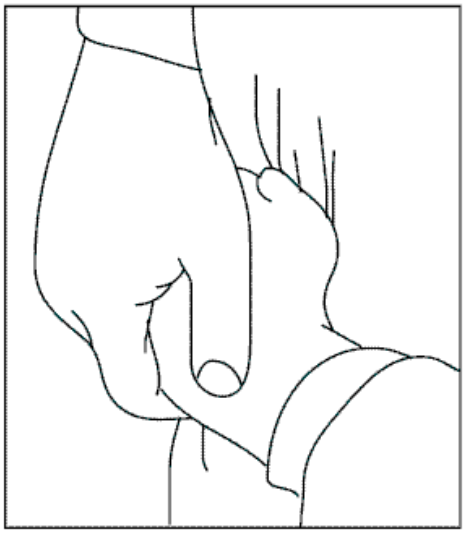

Illustration 3

3. Grasp this fist with the other hand and pull it quickly toward you with an inward and slightly upward thrust. Repeat if necessary. (See illustration 4.)

Illustration 4

If the victim becomes unconscious:

1. Lay the victim on their back.
2. If the object is visible, use your forefinger to reach deeply into the victim's mouth (along the inside of the cheek) and try to sweep the obstruction out of the victim's throat.
3. Even if this is not successful, attempt rescue breathing.
4. If the victim is still not breathing or moving, then begin chest compression - CPR.

Electric Shock

1. **Do Not** touch the victim until electrical contact is broken.
2. Unplug or switch off the source of electricity if possible.
3. If victim is not breathing and has no pulse, call 9-1-1 or seek medical attention immediately.

Eye Injury

1. Chemical

1. Hold the eyelids apart and flush the eyeball with lukewarm water for at least 15-30 minutes. Be careful not to let runoff water flow into the other eye.
2. Place a gauze pad or cloth over both eyes and secure it with a bandage.
3. Get to an eye specialist or emergency room immediately.

2. Cut, Scratch or Embedded Object

1. Place a gauze pad or cloth over both eyes and secure it with a bandage.
2. Do not try to remove an embedded object.
3. Get to an eye specialist or emergency room immediately.

Fainting

Note: Fainting victims regain consciousness almost immediately. If this does not happen, the victim could be in serious danger and you should call 9-1-1 as soon as possible.

1. Lay the victim down on their back and make sure they have plenty of fresh air.
2. Reassure the victim and apply a cold compress to their forehead.
3. If the victim vomits, roll them on their side and keep their windpipe clear.
4. Report the fainting incident to the victim's doctor.

Heat Stroke

Heat stroke can be life threatening. Symptoms can include a body temperature of 105°F or higher; dry, hot, flushed skin; rapid pulse; unconsciousness; and lack of perspiration.

1. Get the victim out of the heat and into a cooler place.
2. Place the victim in the shock position, lying on their back, with their feet up.
3. Remove or loosen the victim's clothing.
4. Cool the victim by fanning and applying cloth-wrapped cold packs or wet towels.
5. Treat for shock.

Hypothermia (Prolonged exposure to the cold)

Hypothermia can be life threatening. Symptoms include lower than normal body temperature, shivering, apathy, disorientation, drowsiness, and eventually unconsciousness.

1. Immediately move the victim into the best available nearby shelter.
2. Get the victim out of wet clothes and replace with dry clothes, sleeping bag or blankets.
3. Have the victim drink a warm, non-alcoholic beverage if possible.
4. Seek medical help.

Unconsciousness

1. Determine responsiveness by gently tapping the victim's shoulder and asking, "Are you O.K.?"
2. If there is no response, shout "Help!" and look for a medical alert tag on the victims neck or wrist.
3. If victim is not breathing and has no pulse, begin CPR.
4. Call 9-1-1 or seek medical aid as soon as possible.

Commonly Asked Questions

Q. ***How can I best prepare my workplace for an emergency?***

A. 1. Always have a stocked first aid kit and emergency equipment handy.
2. Establish an emergency responder program in the workplace.
3. Always consider safety first. By adopting a safety program, you can keep work-related accidents to a minimum.

Q. ***Can I be sued for providing first aid care in an emergency?***

A. People rarely sue someone for helping in an emergency, but it does happen on occasion. However, if you act as a reasonable and prudent person would under these conditions, good Samaritan immunity will generally protect you.

Q. ***When should I call for assistance?***

A. If the victim is unconscious, call 9-1-1 or your local emergency number. If the victim is conscious, call an ambulance unless they ask that an ambulance not be called; call 9-1-1 or an ambulance anyway IF the victim:

- Is or becomes unconscious.
- Has trouble breathing or is breathing in a strange way.
- Has chest pain or pressure.
- Is bleeding severely.
- Has pressure or pain in the abdomen that does not go away.
- Is vomiting or passing blood.
- Has seizures, a severe headache or slurred speech.
- Appears to have been poisoned.
- Has injuries to the head, back or neck.
- Has possible broken bones.

References and Sources for More Information

American Heart Association

American Red Cross

National Safety Council

BLOOD EXPOSURE INCIDENT EVALUATION

Employee Name: _____ Date of Incident: _____

Every reported exposure incident shall be evaluated per paragraph (f) (3) (i) of 29 CFR 1910.1030 or the Bloodborne Pathogen Standard. The evaluations shall consists of the following:

1. Describe the route(s) of exposure, and the circumstances under which the exposure incident occurred. _____

2. What personal protective equipment was employee wearing? _____

3. Were the engineering controls and work practices in place at the time of the incident?
   If not, did the engineering controls' failure contributed to the incident?
   If yes, explain: _____

4. Could the incident have been avoided? If so, how? _____

5. Are there any changes recommended to avoid future incidents? _____

6. Name of source individual, unless employer can establish that identification is not feasible or is prohibited by state or local law. _____

7. The source individual's blood shall be tested as soon as possible after consent has been obtained to determine HBV and HIV status. The results of the source individual's testing shall be made available to the exposed employee. Source individual agreed to blood draw:

   For HIV Yes No Date Drawn: _____
   Results: _____

   For HBV Yes No Date Drawn: _____
   Results: _____

8. The exposed employee's blood shall be collected and tested as soon as feasible after consent is obtained to determine HBV and HIV status.

9. The exposed employee shall be offered medical evaluation and follow-up relative to the incident at no cost to the employee.

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HEPATITIS B VACCINATION DECLINATION STATEMENT

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring Hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with Hepatitis B vaccine, at no charge to myself. However, I decline Hepatitis vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring Hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with Hepatitis B vaccine, I can receive the vaccination series at no charge to me.

Employee's Printed Name	Employee's Signature	Date

Witness's Printed Name	Witness's Signature	Date

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17. Labeling for Hazardous Communication

Introduction

OSHA's 29 CFR 1910.1200 Hazard Communication Standard (Haz-Com), which is also known as the "Right-to-Know" law, was enacted in 1983 for general industry and includes nearly one-fourth of the nation's workforce. It is routinely one of OSHA's most frequently cited standard with 6,704 citations in 2006.

The purpose of the standard is to protect workers from the chemicals they encounter in the workplace. It is about communicating and training workers to do their jobs safely every day. Labeling is one of the main focuses of the Haz-Com Standard, but by itself it is inadequate to protect workers from the hazards of chemicals. Training workers to understand and read both the Material Safety Data Sheet (MSDS) and the label is necessary for safe chemical awareness. For more information on Hazardous Communication please refer to "Hazard Communication (Right-to-Know) *29 CFR 1910.1200."]*

What Needs To Be On a Label

Chemical manufacturers or distributors must provide the following information on chemicals that leave their facility: Identity of the hazardous chemical(s), appropriate hazard warnings, and name and address of the chemical manufacturer, importer or other responsible party. *[29 CFR 1910.1200(f)(i)]*

The employer shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with the following information: Identity of the hazardous chemical(s) contained therein and appropriate hazard warnings. *[29 CFR 1910.1200(f)(5)]*

Which Label Should I Use?

The Haz-Com Standard sets only general guidelines. All labels must be in English, but it is a matter of personal preference as to which system or combination of systems are adopted. There are three different types of label systems: Right-to-Know (RTK), National Fire Rating (NFR), and Hazardous Material Identification Guide (HMIG).

RTK labels - offer an easy-to-understand, complete labeling system. These labels list the chemical name, common name or synonym, signal word, hazard information, precautionary measures, first aid procedures and the CAS number. No chart for interpretation of hazards is necessary. Personal protection pictorials can be added to the RTK system for additional worker awareness.

NFR system - uses a hazard rating colored diamond code for ranking the health, flammability and reactivity of hazardous chemicals in the presence of fire. Substances are assigned a rating of 0–4, with 4 being the most hazardous. Several pictorials alert workers to hazards such as water reactive and radioactivity. Books, charts and wallet cards are available for an explanation of the rating system.

HMIG system - is similar to the NFR system except the label is in a color bar format and rectangular, rather than diamond, shape. The definition of the health ratings is not based on fire exposure, but on acute and chronic hazards present in normal day-to-day operations. It includes twelve icons for personal protective equipment. Charts and wallet cards are available in English and Spanish for interpretation of colors, numbers and symbols. The Spanish version may help promote safety in a bilingual workplace. *[29 CFR 1910.1200(f)(9)]*

Hazard Rating Numbers

Sources and hazard determinations can be found in 29 CFR 1910.1200(d), Hazard Determinations; Appendix A, Health Hazard Definitions; Appendix B, Hazard Determinations and Appendix C, Information Resources. Hazard determinations are best left to product toxicologists or other comparable trained health professionals. Hazard rating numbers can be obtained from several books including the *Fire Protection Guide to Hazardous Materials* and the *National Fire Rating Guide* for over a thousand common chemicals. Information may also be taken off the MSDS, or you can contact the chemical manufacturer.

Labeling Exemptions

Labels do not always have to adhere to a container. Labels, placards, batch tickets or signs can be placed on shelving or posted where similar stationary containers are stored. No labels are required on portable transfer containers of ten gallons or less, as long as the chemical is used, discarded, or returned to the labeled mother container by the end of the work shift. [29 CFR 1910.1200(f)(7)] Although it is not required, labeling of transfer containers for safety and liability reasons is suggested.

Target Organ Labels

A new court case has ruled that it is reasonable for manufacturers to include the proper target organ warning on hazardous chemicals. A September 15, 1993 ruling by the U.S. Court of Appeals involving a major chemical manufacturer concluded that, "labels should have been more explicit as to what organs could be affected." The interpretation of 29 CFR 1910.1200(f)(1)(ii) and Appendix A was that "appropriate hazard warnings" include target organ labels. The Court rejected the OSHA review commission's ruling that the standard did not require such warnings on labels.

Training

Each labeling system requires training so employees can interpret the icons, numerical indexes and color meanings on labels. Designate someone to conduct training of employees and to be responsible for labeling. Train workers to take the time to read both the MSDS and the label before working with a chemical. Make sure the labels and the MSDS use the same chemical or common name so they can be easily cross-referenced. Keep a signed sheet of all employees who attend training programs.

A survey of the U. S. workforce done at the University of California Berkely revealed that nearly half of the workforce cannot understand training materials or warning signs. After the initial training, there is no requirement for annual training unless a new chemical is added. However, refresher trainings are essential if workers are expected to understand and remember the details of the chemical labeling system.

Commonly Asked Questions

Q. ***How do I label a 10% bleach solution using the NFPA ratings?***

A. The NFPA standard does not allow reduction of the hazard rating if chemicals are stored in small quantities or diluted concentrations without testing. Label this as a full-strength solution.

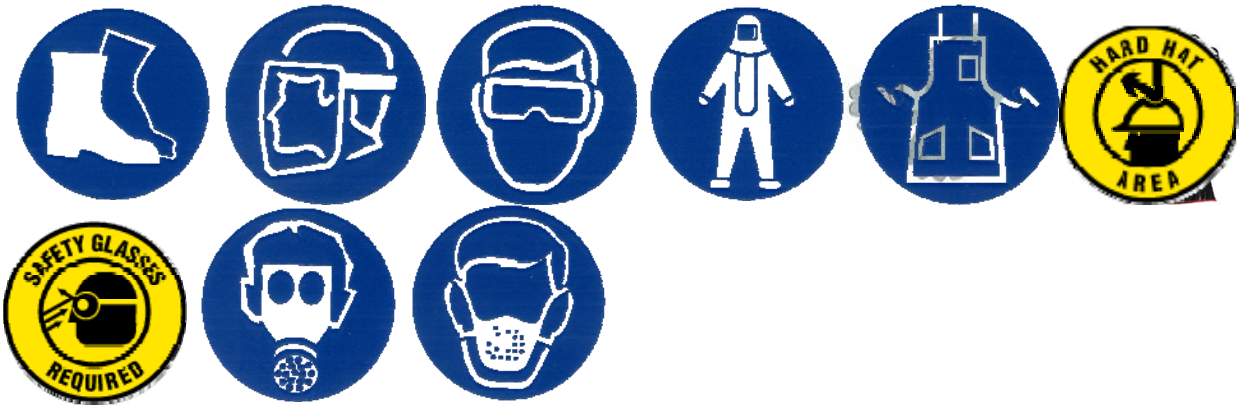
Q. ***Is there any way I can protect my paper labels from being defaced?***

A. Use overlays to extend the wear life of paper labels. Just peel off the backing and place over your paper labels. The clear polyester self-adhesive material protects paper labels from moisture, UV fading, scratches, and wear and tear.

Sources for More Information

29 CFR 1910.1200 Hazard Communication Standard

PPE SYMBOLS


HARD HAT AREA
SAFETY GLASSES REQUIRED


HEARING PROTECTION REQUIRED
GLOVES REQUIRED IN THIS AREA
USE ALL PROTECTIVE EQUIPMENT ISSUED
NOTIFY SUPERVISOR IF YOU ARE MISSING ANY ITEM
RESPIRATORS REQUIRED IN THIS AREA
STEEL TOE SHOES REQUIRED


EMERGENCY EYEWASH
EMERGENCY EYE WASH
FIRST AID STATION
EMERGENCY EYEWASH
KEEP AREA CLEAR
DANGER
HIGH VOLTAGE
DANGER
ELECTRICAL HAZARD
CAUTION
HOT
DANGER
HOT METAL
DANGER
MOVING MACHINERY
DANGER
KEEP HANDS AWAY
NOTICE
CLEAN MACHINES AFTER USE
DOWN TIME IS CLEAN UP TIME
EMERGENCY SHUT-OFF
OUT OF SERVICE FOR REPAIRS
KEEP HANDS CLEAR OF MOVING MACHINERY
CAUTION
DO NOT REACH INTO RUNNING EQUIPMENT
HAND HAZARD
WATCH YOUR FINGERS
DANGER
PINCH POINT
DANGER
KEEP HANDS CLEAR
CAUTION
FALL PROTECTION REQUIRED
OUT OF ORDER
CAUTION
AUTOMATIC EQUIPMENT
WILL START WITHOUT WARNING
SAFETY FIRST
WEAR YOUR GOGGLES WHEN GRINDING
DANGER
ARC FLASH HAZARD
CAUTION
NO SMOKING
BATTERY CHARGING AREA
EMERGENCY SHOWER & EYEWASH

PPE HAZARD ASSESSMENT

In compliance with the OSHA Personal Protective Equipment Standard 29 CFR 1910.

132, this company has conducted a hazard assessment of the workplace.

Hazard assessment performed by: _____ **Date:** _____

Dept: _____ **Equipment:** _____ **Task:** _____

The following personnel certifies that the evaluation has been performed:

Name: _____ **Title:** _____

The following Personal Protective Equipment is to be worn for the above-mentioned location/machine/equipment.

Safety Glasses with side shields, Apron, Steel Toe Shoes, Welding Gloves, Welding Helmet, Firestop Bib Apron and Sleeves

The list below summarizes the PPE used at _____. An individual Job Safety Analysis is generated for each task or function.

1. **Organic Vapors Cartridges**
2. **Nuisance Respirator**
3. **Steel-Toe Shoes**
4. **Ear Plugs**
5. **Heat Resistant Arm Protector**
6. **Heat Resistant Gloves**
7. **Neoprene Gloves**
8. **Latex Gloves**
9. **Vinyl Anti-Static Gloves**
10. **Brown Cotton Gloves**
11. **Safety Goggles**
12. **Safety Glasses with Sideshields**
13. **Splash Guard (face shield)**
14. **Urethane Boots**
15. **Steel Toe Boots**
16. **Tyvek Suit**
17. **Welding Gloves**
18. **Welding Helmet**
19. **Welding Glasses**
20. **Welding Flip**
21. **Firestop Bib Apron & Sleeves**
22. **Smock**
23. **Apron**

NOTE: Where Personal Protective Equipment is not feasible and may interfere with the operation, administrative and/or engineering controls can be installed to provide adequate employee protection.

Safety Approval:		**Date:**	

This checklist or form is only a sample. It is not meant to constitute a comprehensive list of potential exposures within your municipality. You may wish to revise, modify, or supplement this checklist or form to address specific exposures or safety requirements within your municipality.

Hazardous Material Inventory Statement

Business Name: _____ Address: _____

Location at Facility: _____ Date: _____

					AMOUNTS			NFPA 704 RATING		
Chemical or Trade Name	**Conc. (%)**	**CAS Number**	**PFC Hazard Classification**	**Physical State**	**Storage**	**Use Closed**	**Use Open**	**H**	**F**	**R**
Acetone (Example)	100	67-64-1	Class IB Flammable Liquid	Liquid	55 gl	NA	1 gl	1	3	0

Completed By: _____ Title: _____

This checklist or form is only a sample. It is not meant to constitute a comprehensive list of potential exposures within your municipality. You may wish to revise, modify, or supplement this checklist or form to address specific exposures or safety requirements within your municipality.

18. Means of Egress and Emergency Lighting

Introduction

The Occupational Safety and Health Administration (OSHA) is responsible for promulgating legally enforceable standards which require the use of practices, means or processes that are reasonably necessary and appropriate to protect employees on the job. OSHA incorporates other standards adopted by standard-producing organizations into their own. OSHA promulgated Subpart E of 29 CFR 1910, Means of Egress, from the National Fire Protection Association NFPA 101-1970, Life Safety Code.

OSHA and the National Fire Protection Association (NFPA) give the general requirements for means of egress. 29 CFR 1910.35 defines a means of egress in this way: "A means of egress is a continuous and unobstructed way of exit travel from any point in a building or structure to a public way and consists of three separate and distinct parts." They are:

1. **Exit access**—that portion which leads to the entrance of an exit;
2. **Exit**—that portion which is separated from all other spaces of a building or structure by construction or equipment to provide a protected way of travel to the exit discharge; and
3. **Exit discharge**—that portion between the termination of an exit and a public way.

OSHA requires that "each exit route be adequately lighted so that an employee with normal vision can see along the exit route". 1910.37(b)(1).

OSHA also requires that "each exit must be clearly visible and marked by a sign reading "EXIT"". 1910.37(b)(2). "Each exit route door must be free of decorations or signs that obscure the visibility of the exit route door." 1910.37(b)(3). "Each doorway or passage along an exit access that could be mistaken for an exit must be marked "NOT AN EXIT" or similar designation, or be identified by a sign indicating its actual use (e.g., closet)." 1910.37(b)(5).

Exit Sign Specifications

Every sign must have the word "Exit" in plainly legible letters not less than six inches high, with the principal stroke of the letter .75 inches wide (29 CFR 1910.37(b)(7)). (See NFPA 101 7.10 for further specifications.) Where the direction of travel to the nearest exit is not immediately apparent, a sign reading "Exit" or similar designation with an arrow indicating the direction to the exit is required (29 CFR 1910.37(b)(4)).

Requirements for Exit Sign Illumination

NFPA 101 defines the methods of illumination for exit signs:

1. **Externally illuminated**—the light source is contained outside of the device or legend that is to be illuminated. The light source is typically a dedicated incandescent or fluorescent source;
2. **Internally illuminated**—the light source is contained inside the device or legend that is illuminated. The light source is typically incandescent, fluorescent, electro luminescent, light-emitting diodes, or photoluminescent;

3. **Photoluminescent**—the sign is illuminated by self-contained power sources and operates independently of external power sources. (Batteries do not qualify as a self-contained power source.)

   Photoluminescent- The face of the sign must be continually illuminated while the building is occupied. The face of the sign shall be illuminated according to its listing from the face of the sign. The illumination has to be a reliable source as determined by the Authority Having Jurisdiction, AHJ. The AHJ is the ultimate arbiter concerning safety practices and safety equipment for a particular locality. The charging light must be of the same type that is specified on the sign.

   Photoluminescent Signs need a specific type of light and a minimum level of light on the face to assure that the sign will be able to provide adequate illumination in an emergency situation. During illumination the sign shall not be connected to an automatic timer.

   In 2000 the NFPA Life Safety Code was updated and now recognizes certain Photoluminescent Exit signs as an alternative to internally lighted electric powered signs. A photoluminescent sign absorbs light from an activation light source in order to emit light (that is, luminescence). The sign continues to emit light for a time after the activation light source has been removed.

   Photoluminescent Exit signs are in the category of an Internally Illuminated Sign. The signs are permitted, provided they are listed in accordance with UL 924, "Standard for Safety Emergency Lighting and Power Equipment" and meet all the requirements outlined in the criteria from the Life Safety Code 101, 2006 edition parts 7.10.7.2.

Every required exit sign must be suitably illuminated by a reliable light source and be visible in both normal and emergency lighting modes (NFPA 101 2006 7.10.5.1). The illuminated surface value of the exit sign should have a value of not less than five foot-candles (29 CFR 1910.37(b)(6)). NFPA 101 2006 7.10.5 has the same requirement (5 foot-candles) for internally and externally illuminated signs, with exceptions made for approved self-luminous or electro luminescent signs that provide evenly illuminated letters; they must have a minimum luminescence of 0.06 foot lambert as measured by a color-corrected photometer.

Requirements for Emergency Lighting

NFPA 101, Life Safety Code 2006, section 7.9, describes the requirements for emergency lighting. (Emergency lighting is not specifically required for all occupancies. Refer to NFPA 101 2006, UL 924 and local municipal building codes for specific requirements of your occupancy.) Emergency illumination (when required) must be provided for a minimum of 1.5 hours in the event of failure of normal lighting. The emergency lighting must be arranged to provide initial illumination of not less than an average of one foot-candle and a minimum at any point of 0.1 foot-candle measured along the path of egress at floor level. These levels can decline to a minimum of 0.6 foot-candle average and 0.06 foot-candle at any one point at the end of emergency lighting time (1.5 hours). The maximum illumination at any one point can be no more than 40 times the minimum illumination at any one point to prevent excessively bright and dark spots (NFPA 101 2006 7.9.2.1).

The emergency lighting system must be arranged to provide illumination automatically in the event of any interruption of normal lighting (NFPA 101 2006 7.9.2.3).

Definitions and Formulas

The intensity of visible light is measured in units of candles. The rate of flow of light (luminous flux) is measured in lumens. One lumen is the flux on one square foot of a sphere, one foot in radius with a light source of one candle at the center, and radiating uniformly in all directions. One lux is a unit of illumination equal to one lumen per square meter. Foot-candle is the direct measurement of visible radiation falling on a surface. Foot lambert is the unit measure of physical brightness on any surface emitting or reflecting visible light.

Foot-candles	X 10.764	= lumens/sq. meter
Foot-candles	X 10.764	= lux
Lumens/sq. ft.	X 1	= foot-candles
Lumens/sq. ft.	X 10.764	= lumens/sq. meter
Lumens	X 0.07958	= spherical candle power
Lux	X 0.0929	= foot-candles
Lambert	X 0.3183	= candles/sq. cm
Lambert	X 295.720	= candles sq. ft.
Lambert	X 1	= lumens/sq. cm

Sources for More Information

29 CFR 1910.106

29 CFR 1910 Subpart E

National Fire Protection Association, NFPA 77,
Recommended Practice of Static Electricity

NFPA 101 2006 Uniform Fire Code, UFC Div. VIII, Sec. 79.803

19. OSHA Checklist for General Industry

Introduction

A 1999 survey by OSHA revealed that more than 85% of employers conduct voluntary self-audits of safety and health conditions; a 60% increase from a similar survey performed in 1981. The survey found that self-audits are performed for a number of reasons, with three of them being the most common. Careful inspections can reduce injury and illness rates within the workplace by identifying present hazards. Staying on top of potential hazards is considered the “right thing to do” by many employers. Finally, performing self-audits and acting upon any findings helps sustain compliance with OSHA regulations.

Routine self-audits are a cost-effective method of ensuring compliance with OSHA regulations. Performing self-audits can quickly identify safety hazards that need to be corrected prior to formal inspections. Costs associated with occupational safety and health hazards, beyond potential fines, can be reduced if hazards are corrected. Man-hours lost through workers’ compensation and sick leave can be reduced and productivity can remain high. Some insurance carriers in partnership with OSHA even offer reduced premiums to employers who perform self-audits.

The most thorough means for performing a self-audit is to use regulatory checklists for each work area and OSHA-required record keeping. The size and diversity of the business dictates how many checklists are required and how much information should be in each checklist. While there is not a standard format for checklists, several key features should be included:

- Name of auditor and date inspected
- Description and CFR cite for all pertinent regulations with a space to note deficiencies
- A feasible completion date for material deficiencies
- Initials and/or date when all corrections have been completed

The following list highlights major general industry regulations within work areas and record keeping but should not be considered all-inclusive.

Work Areas

All work areas should be identified. Within these locations, consider the applicability of each subpart of the OSHA standards from CFR Title 29. For:

Aisles, stairways, and ladders
see Walking/Working Surfaces; 1910.21 to 1910.30
Number of and ease of access to exits within each area and emergency plans
see Means of Egress; 1910.35 to 1910.38
Lifting platforms
see Powered Platforms, Manlifts, and Vehicle-Mounted Work Platforms; 1910.66 to 1910.68
Ventilation, noise, and radiation
see Occupational Health and Environmental Control; 1910.94 to 1910.98
Storing and handling of hazardous materials
see Hazardous Materials; 1910.101 to 1910.126

Eye protection, protective clothing, respiratory protection, head protection, foot protection, electrical protective equipment and hand protection
see Personal Protective Equipment; 1910.132 to 1910.139
Spill cleanup, safe disposal requirements, permit-required confined spaces, lockout/tagout
see General Environmental Controls; 1910.141 to 1910.147 Appendix A
First aid availability and training
see Medical and First Aid; 1910.151 to 1910.152
Fire extinguishers, fixed fire-suppression equipment and other systems
see Fire Protection; 1910.155 to 1910.165
Air receiver installation and safety
see Compressed Gas and Compressed Air Equipment; 1910.166 to 1910.169
Use and care of forklifts, cranes, derricks, helicopters and slings
see Materials Handling and Storage; 1910.176 to 1910.184
Guard requirements for moving machinery
see Machinery and Machine Guarding; 1910.211 to 1910.219
Guarding and maintenance of hand-powered equipment
see Hand and Portable Powered Tools and Other Hand-Held Equipment; 1910.241 to 1910.244
Oxygen-fuel, arc and resistance welding requirements
see Welding, Cutting, and Brazing; 1910.251 to 1910.255
Special Industries
see 1910.261 to 1910.272 Appendix C
Design safety standards, safe work practices, maintenance requirements
see Electrical; 1910.301 to 1910.399
Toxic and Hazardous Substances
see 1910.1000 to 1910.1450 Appendix B

Record Keeping

In addition to work area checklists, written records are often required by OSHA. The following standards cite a required written plan or program in place where applicable:

Emergency Action Plan	1910.38
Process Safety Management of Highly Hazardous Chemicals	1910.119
HAZWOPER Record Keeping	1910.120
Respirator Program	1910.134
Permit-Required Confined Space Program	1910.146
Lockout/Tagout	1910.147
Employee Alarm System	1910.165
Forklift Inspection Log and Training Distribution	1910.178
Electric Power Generation, Transmission, and Distribution	1910.269
Electrical Safety-Related Work Practices	1910.333
Bloodborne Pathogens: Exposure Control Plan	1910.1030
Hazard Communication Program	1910.1200
Lab Standard: Chemical Hygiene Plan	1910.1450

Subpart Z--Specific Chemical Substances	1910.1000 to 1910.1450 Appendix B
Posting and Citations	Job Safety and Health Poster Form 2203
Accidents, Injuries, and Deaths	300 Log

Creating and Maintaining Checklists

The following is an example of what a portion of a workplace checklist could look like for a flammable storage area. Appropriate components depend on individual situations.

INSPECTION REPORT FOR FLAMMABLE STORAGE AREA

Location:
Inspected By:
Date of Inspection:

(Circle all numbers with deficiencies)

Containers

1. Are approved containers and portable tanks used for the handling and storage of flammable and combustible liquids? 29 CFR 1910.106(d)(2)
2. Are all connections on drums and combustible liquid piping vapor and liquid tight? 29 CFR 1910.106(c)(3)
3. Are all flammable liquids kept in closed containers when not in use? 29 CFR 1910.106(e)(2)(iv)(a)
4. Are bulk drums of flammable liquids grounded and bonded to containers during dispensing? 29 CFR 1910.106(e)(6)(ii)
5. Are safety cans used for dispensing flammable or combustible liquids? 29 CFR 1910.106(d)(5)(iii)
6. Are storage tanks adequately vented to prevent the development of excessive vacuum or pressure as a result of filling, emptying, or atmosphere temperature changes? 29 CFR 1910.106(b)(4)(ii)
7. Are portable tanks equipped with emergency venting to relieve internal pressure from exposure to fire? 29 CFR 1910.106(d)(2)(ii)
8. Are storage cabinets that store flammable liquids labeled, “Flammable – Keep Fire Away”? 29 CFR 1910.106(d)(3)(ii)
9. Are flammable liquids stored in approved safety cans? 29 CFR 1910.106(d)(2); 29 CFR 1910.144(a)(1)
10. Are “No Smoking” rules enforced in areas for storage and use of hazardous materials? 29 CFR 1910.106(e)(9)

Fire Extinguishers

1. Are appropriate fire extinguishers mounted, located and identified so that they are readily accessible to employees? 29 CFR 1910.157(c)(1)
2. Are all fire extinguishers inspected and recharged regularly, and marked on inspection tags? 29 CFR 1910.157(e)(2)
3. Is there and adequate number or portable fire extinguishers of the proper type? 29 CFR 1910.157(d)
4. For a fixed extinguishing system, is a sign posted warning of the hazards presented by the extinguishing medium? 29 CFR 1910.160(b)(5)

Exits

1. Are exits properly marked? 29 CFR 1910.37(q)
2. Do exit signs have an illumination of at least 5 foot-candles? 29 CFR 1910.37(q)(6)
3. Are exits maintained free of obstructions? 29 CFR 1910.36(d)(1)

Correction completion date:
Corrections have been completed (initials and date):
Supervisor:
Date:

Creating and maintaining checklists is by no means the final step. When beginning a safety audit program, several ideas should be kept in mind. A team approach to safety is most effective; rotating people on and off the team will keep ideas fresh and enhance perspective. Inspect thoroughly and frequently; any area, regardless of size, can pose hazards that can crop up seemingly overnight. Once hazards are identified, have a system in place for correction.

Commonly Asked Questions

Q. ***Would using checklists reduce fines levied from a formal OSHA inspection?***

A. Recently, OSHA sought public comments on a policy whereby an employer's self-audit may be considered evidence of good faith.

Sources for more Information

29 CFR 1910

20. OSHA Reporting Requirements

Introduction

OSHA's existing recordkeeping requirements have been in place since 1971, and have long been criticized as being complicated and confusing. In January 2002, OSHA's revised recordingkeeping rule became effective. The revised rule will generate more accurate information about occupational injuries and illnesses, while simplifying the overall recordkeeping system for employers. The rule will also better protect employees' privacy.

Additionally, recent legislation required OSHA to address the recording of needlestick/sharps injuries and Musculoskeletal Disorders (MSDs). The revised recordkeeping standard now provides a provision for recording both needlestick injuries and MSDs.

Like the 1971 rule, employers with 10 or fewer employees are exempt from most requirements of the new rule. However, one fatality or the hospitalization of three or more employees must still be reported to OSHA within eight hours, regardless of the number of workers a business employs.

Old vs. New

The revised recordkeeping standard still requires employers to track, record and report workplace injuries and illnesses. The revision ultimately makes it easier for employers to successfully meet the requirements of this standard. Some notable requirement changes were made to the revised rule:

- Maintain three recordkeeping forms.

1. OSHA 300 form: log of work-related injuries and illnesses; simplified and printed on smaller legal sized paper.
2. OSHA 300A form: summary of work-related injuries and illnesses; a separate form updated to make it easier to calculate incidence rates.
3. OSHA 301 form: injury and illness incident report.

- Complete OSHA 301 incident report form, or an equivalent form, for each entry on the OSHA 300 log.
- Use one set of criteria to record both work-related injuries and illnesses.
- Record all needlestick and sharps injuries.
- Record all standard threshold shift (STS) hearing loss cases in a separate column of the OSHA 300 log.
- Record all MSDs in a separate column of the OSHA 300 log.
- Record all cases of tuberculosis transmission.
- Eliminate the term "lost workdays" and replace with "days away" or "days restricted". Days count-ed are based on calendar days, (including week-ends, vacations and holidays) not just workdays.
- Establish a procedure for employees to report injuries and illnesses and instruct them on how to report.

- Protect employee privacy by not entering an individual's name on Form 300 for certain types of injuries/illnesses (e.g. do not describe the nature of sensitive injuries that may reveal the identity of the individual; only give access to the OSHA 301 form, which contains no personal identifiers; remove employees' names before providing the data to persons not given access rights under this rule).
- Post an annual summary (OSHA form 300A) and certification by a company executive, for three months from February 1st to April 30th of each year.
- Recording of a light-duty or restricted case is clarified.
- Medical treatment, first aid and restricted work definitions are modified to simplify recording decisions.
- A significant degree of aggravation must exist before a preexisting injury or illness becomes recordable.

Scope

As an employer, you are classified by OSHA's injury and illness recordkeeping requirements into one of three groups: Employers regularly exempt from OSHA recordkeeping, employers exempted from preparing and maintaining injury and illness records and employers that are not classified under groups one or two.

Employers regularly exempt from OSHA recordkeeping includes small businesses with fewer than 11 full- or part-time employees during the previous calendar year and employers classified in low-hazard industries. However, these employers are required to report multiple hospitalizations and fatalities as required by 29 CFR 1904.8. In addition, if the employer is notified in writing by OSHA to participate in a statistical survey, the employer must maintain injury and illness records in accordance with 29 CFR 1904.

Employers exempted from preparing and maintaining injury and illness records includes industries listed in Appendix A of Subpart B of the revised recordkeeping standard.

Employers that are not classified under groups one or two are required to comply with the guidelines of 29 CFR 1904.

OSHA Log 300

The new OSHA 300 log is used by each employer's establishment to record and maintain information about employee injuries and illnesses and is now printed on 8 1 /2" x 11" paper. An establishment, as defined by OSHA, is, "A single physical location where business is conducted, or where services or industrial operations are performed; the place where employees report for work, operate from or from which they are paid."

The form itself is divided into three general sections: Identity (e.g. name, case number, job title, etc.), Descriptive (e.g. date, injury location, description of incident, etc.) and Classification (e.g. type of injury, days away from work, days on restriction, etc.). The following is a list of guidelines to use for maintaining an OSHA 300 log:

- Maintain OSHA 300 log on a calendar year cycle (not fiscal).
- Record cases within seven calendar days of receiving information that a recordable case has occurred.
- Retain OSHA 300 log for five years following the calendar year to which it relates.
- Maintain OSHA 300 log during those five years and add or delete cases as necessary.

OSHA Form 301

If an injury or illness is recordable, a supplementary form (e.g. OSHA 301) must be completed. This new form provides more information about the case and is printed on 8 1 /2" x 11" paper. Such information as the events leading up to the injury or illness, body parts affected, object(s) or substance(s) involved, etc., must be included on this form.

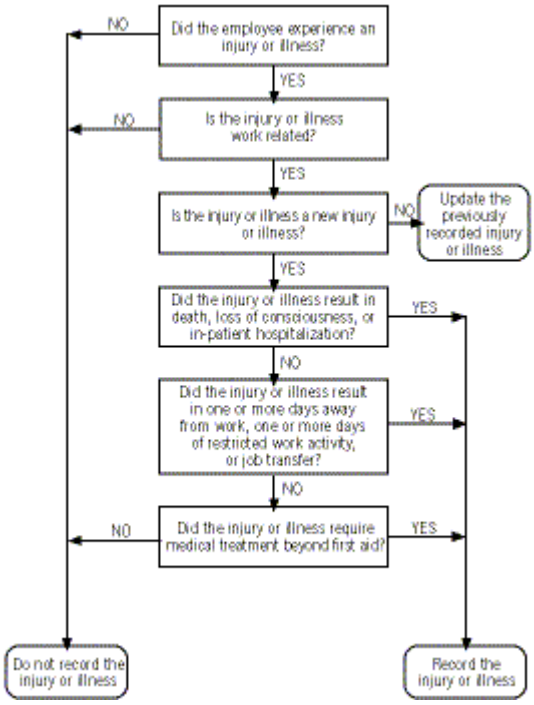
The OSHA 301 form is only suggested. A different form may be used if it contains the same information as the OSHA 301 form. Other suitable forms are: state workers' compensation reports, insurance claim reports or the employer's accident report form.

The following is a list of guidelines to use for maintaining supplementary records:

- Record cases within seven calendar days of receiving information that a recordable case has occurred.
- Keep the OSHA 301 form current within 45 days at any given time.
- Each establishment must maintain an OSHA 301 form or similar form.
- Retain records for five years following the calendar year to which they relate.

Process to Determine if a Case is Recordable

As an employer, you are responsible for reporting all recordable injuries and illnesses. To help determine if an injury or illness is recordable, refer to the flow chart below. If you are unable to determine if an injury or illness is recordable, call the OSHA area office nearest you.



Medical vs. First Aid Treatment

One of the most confusing aspects of recordkeeping is determining if an injury or illness is recordable, based upon first aid or medical treatment. The revised standard sets new definitions of medical treatment and first aid to simplify recording decisions.

Medical Treatment is defined as:

- Administering immunizations, such as Hepatitis B or rabies (does not include tetanus)
- Using wound closing devices, such as sutures, staples, etc.
- Using rigid means of support to immobilize parts of the body
- Physical therapy or chiropractic treatment

Medical Treatment does not include:

- Visits to a physician or other licensed health care professional solely for observation or counseling
- The conduct of diagnostic procedures, such as X-rays and blood tests, including the administration of prescription medications used solely for diagnostic purposes

First Aid is defined as:

- Using a nonprescription medication at nonprescription strength
- Administration of tetanus immunizations
- Cleaning, flushing or soaking wounds on the surface of the skin
- Use of wound coverings, such as bandages, Band-Aids ® , gauze pads, etc.
- Application of hot or cold therapy
- Use of any nonrigid means of support, such as elastic bandages, wraps, nonrigid back belts, etc.
- Use of temporary immobilization devices while transporting an accident victim (e.g. splints, slings, neck collars, back boards, etc.)
- Drilling of a fingernail or toenail to relieve pressure, or draining fluid from a blister
- Use of eye patches
- Removal of foreign bodies from the eye using only irrigation or a cotton swab
- Removal of splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs or other simple means
- Use of finger guards
- Administration of massage
- Drinking fluids to relieve heat stress

This is a complete list of all treatments defined as first aid under the revised standard.

OSHA Form 300A (Annual Summary)

The employer is responsible for preparing an annual summary of injuries and illnesses that occurred during the calendar year. The annual summary, OSHA form 300A, displays the totals from columns G through M of OSHA log 300. The summary also displays the calendar year covered, company name and address,

annual average number of employees and total hours worked by all employees covered by the OSHA 300 log. Form 300A is a separate form and does not display any personal information, as shown on OSHA log 300. Form 300A also makes it easier to calculate incident rates. The annual summary must be:

- Posted by February 1 and remain posted until April 30th
- Posted in areas where other notices are normally placed
- Certified (signed) by a company executive, stating that the information is correct and complete to the best of the employer's ability
- Retained for five years following the calendar year to which they relate

If no cases are recorded during a reporting period, a summary must still be posted. Zeros should be entered into all spaces provided on form 300A.

Commonly Asked Questions

Q. ***Where can I get a copy of the 300, 301 and 300A forms?***

A. Contact the area OSHA office nearest you, or download the information off of the OSHA Web site at www.osha.gov.

Q. ***What is restricted work activity?***

A. When the employee is kept from performing one or more routine (regularly performed at least once per week) functions of his or her job or when employee is kept from working a full workday. Production of fewer goods or services is not considered restricted work activity.

Q. ***Our company is closed on Saturday and Sunday. Do these still need to be counted as days away?***

A. Yes, all calendar days the employee was unable to work—including weekend days, holidays, vacation days, etc.—must be counted. Cap day count at 180 days. The day the illness or injury occurred is not counted as a day away.

Q. ***If an employee is injured and misses the remainder of the work shift, is this a day away?***

A. No, injuries and illnesses are not considered lost-time cases until they affect the employee beyond the day of injury or onset of illness.

Q. ***How are days away calculated if an employee works a normal shift that is longer than 8 hours?***

A. A single workday for recordkeeping purposes is 12 hours.

Q. ***How should a partial lost workday be recorded?***

A. If an employee is unable to work a full workday or shift (beyond the initial day of injury or onset of an illness), the day should be recorded as a job transfer of restriction.

Sources for More Information

Recordkeeping Guidelines for Occupational Injuries and Illnesses
U.S. Department of Labor
O.M.B. No. 1220-029
September 1986

A Brief Guide to Recordkeeping Requirements for Occupational Injuries and Illnesses
U.S. Department of Labor
O.M.B. No. 1220-029
April 1986

Draft OSHA Proposed Rule For Recordkeeping, Reporting Occupational Injuries and Illnesses
U.S. Department of Labor
Docket No. R-02
February 22, 1995

www.osha-slc.gov/recordkeeping/index.html

21. Playground Safety

Here are some easy steps you can take to make sure the child in your care is safe when playing at a park or home playground:

1. **Make sure adult supervision is present at the playground.**
   More than 40 percent of playground injuries may be in some way related to inadequate supervision. Adults need to watch for potential hazards, observe children playing, intercede and facilitate play when necessary and be available in case an injury occurs.

2. **Guide children to play on age-appropriate equipment.**
   Children are developmentally different. Therefore, equipment designed for children ages 5 to 12 is too big for children ages 2 to 5. Different playing areas for each of the age groups should be available and children should only play on their age-appropriate equipment.

3. **Survey the play area and make sure it is free of apparent hazards.**
   Visually survey the area and check to see that there are no apparent immediate hazards. Hazards range from broken glass or metal pieces lying around to playground design that creates congestion among the play equipment where children could collide or fall on each other. If the area is near a street or parking lot, make sure there is fencing to prevent the children from running in front of cars. Look for signs designating the separate play areas for 2 to 5 and 5 to 12 year olds. Be sure that metal equipment is in shaded areas or has a protective surface to prevent burns.

4. **Check the playground surface for cushioned surfacing beneath equipment and its fall areas.**
   Falls to surfaces are responsible for more than 70 percent of the injuries sustained on playgrounds. Improper surfacing is the leading cause of many of those injuries. Hard surfaces such as asphalt, blacktop, concrete, grass, packed dirt or rocks should not be used. A fall to those surfaces could be life threatening. Acceptable surfaces include hardwood fiber/mulch, pea gravel and sand. Other options include synthetic surfaces such as rubber tiles, mats or poured surfaces.

   Surfaces should be maintained to a depth proportionate to the height of equipment. A good guideline would be to use 12-inches of loose fill, such as mulch, pea gravel or sand, for equipment up to eight feet in height. Manufacturers of synthetic surfaces should make recommendations of the depth of their products depending on equipment height.

5. **Examine equipment such as ladders, platforms and steps.**
   Climbers and monkey bars are popular equipment that promote strength and coordination skills. However, they also have the highest incidence of injury on public playgrounds and need to be closely supervised. Check to see if steps on climbers are in good condition and that handrails have appropriate grip sizes for children.

If the climber has a platform, it should be surrounded with a guardrail or protective barrier. The choice of protection depends on the age level of children using the equipment and the height of the platform. For platforms for younger children, the guardrails and protective barriers should be at least 29" high; for school-aged children, the barriers should be at least 38" high.

6. **Survey types and quality of swings.**
   Swings also are favorite equipment that need close observation. They are the pieces of moving equipment that are most likely to cause injuries. For preventative measures, the following changes are suggested: remove animal swings; remove metal or wooden seats and replace with soft seats; make sure swings are on a separate framework rather than attached to other equipment.

   Only two swings should be placed in each bay (or framework) that supports the swings. Swings should be positioned at least 24" apart at the base of the seats and 30" from any supports.

   Swings should have a fall zone that is twice the height of the pivot or swing hanger in front and in back of the swing seats. For example, if the hanger pivot height is 10 feet, the fall zone must be 20 feet in front and 20 feet in back of the swing seat. The fall zone also should extend six feet to each side of the support structure.

7. **Check out the slides.** Slides should be well anchored, have firm handrails for gripping and steps with good traction. Steps should have drainage holes to make them less slippery. There should be no spaces between the slide platform and the slide bed where strings from clothing could catch and cause strangulation. Make sure metal slides are shaded or covered to prevent burns in hot sun.

8. **Review the seesaw area.**
   Make sure the handles of the seesaw are secure and of a size and design that children can grip easily. Check to see if there is a soft bumper under the bottom of the seat to cushion the hit to the surface and that all pivot points are covered to prevent pinched fingers.

9. **Inspect the action of merry-go-rounds.**
   Merry-go-rounds should be firmly anchored into the ground and have handles for children to grasp easily. The surface under the bed of the merry-go-round should be positioned so that children cannot slide underneath. The gear box should be covered so fingers cannot get caught. Finally, a governor should be attached to control the ultimate speed of the unit.

10. **Be a good neighbor.**
    Be sure to leave the area in as good a condition as you found it (or better, if you have spotted problems). Have the children help you redistribute any loose surfacing that may have been pushed aside by play back under swings and the bottom of slides. Close any gates that may be open.

22. Recognizing and Preventing Heat Related Illnesses

Introduction

During the summer months, employers should be especially aware of the dangers associated with working in high-temperature environments. Heat and humidity combined with physical exertion can do more than just make employees uncomfortable—it can lead to a variety of heat-related illnesses that can debilitate employees.

Heat Cramps

Heat cramps are painful muscle spasms. They can occur after vigorous exercise or intense physical activity in extreme temperatures. Abdominals, calf and thigh muscles and the biceps/triceps are most frequently affected. If cramping occurs it is suggested to rest and cool down, drinking water with a teaspoon of salt per quart. Affected individuals may also feel faint and should be taken to a cool place and manual pressure applied to the cramped muscle.

Heat Rash

Heat rash, or prickly heat, appears as fine red spots or small bumps. It's usually found where clothing is somewhat restrictive (i.e., on the neck and upper back, chest or arms). This harmless rash is triggered by hot, humid weather when one is dressed too warmly for conditions. The rash develops when skin is persistently wetted by perspiration. The small inflamed spots on the skin can become infected. The condition usually disappears when the skin is cooled and dried.

Heat Exhaustion

Heat exhaustion is a result of excessive heat and dehydration. It is generally caused by insufficient water intake, insufficient salt intake and a deficiency of the production of sweat which evaporates on the skin to cool the body." Symptoms of heat exhaustion can have a sudden onset and include pale, clammy skin, fatigue, dizziness, nausea, vomiting, shallow breathing, rapid pulse and intense thirst. Syncope (fainting) is a milder form of heat exhaustion and is brought on by having to stand for long periods of time in a hot environment; it is caused by the pooling of blood in the heat-dilated vessels of the legs.

A victim of heat exhaustion should be cooled as rapidly as possible by placing the individual flat or with feet slightly elevated in front of a fan or in a cool room. Administer cool liquids (not icy), and seek medical attention. More severely exhausted patients may need I.V. fluids—especially if vomiting prevents them from keeping liquids down. Heat exhaustion is more difficult to diagnose than heatstroke, but its prognosis is far better unless circulatory failure is prolonged.

Heatstroke

Heatstroke is caused by overexposure to extreme heat and a breakdown of the body's heat-regulating mechanisms. In the initial and most crucial stage of diagnosing heat stroke, a victim will exhibit an altered mental status such as disorientation or confusion. This altered consciousness is the key to diagnosing heat stroke. All heat stroke victims will exhibit an altered mental state; this is not true for those suffering from heat exhaustion or extreme sunburn.

Victims of heat stroke often have hot, dry, flushed skin; a rapid heartbeat; and abnormally high body temperature (i.e., a rectal temperature of 105.8°F). They may appear confused or lose consciousness entirely. If their body temperature is too high, death can occur.

Heat stroke is an extreme medical emergency requiring immediate medical attention. Until medical assistance is available, the victim should be cooled rapidly by placing him/her in a shady area, submersing them in a cool bath or wrapping them in wet sheets. Air movement around the individual should be increased to improve evaporative cooling.

Another cooling method is to spray the victim with lukewarm water and fan the individual with a towel. The water evaporating from the skin will help cool the victim quickly. During the cooling process, the victim must be continuously monitored to prevent shivering. Once a victim's rectal temperature is reduced to 102.2°F, cooling methods should be stopped.

Even though it is important to replace fluids as soon as possible, **liquids should NOT be administered to a victim in an altered mental state of heat stroke**—there is a risk of these liquids being aspirated into the lungs. Medical professionals will give I.V. fluids to an individual suffering from heat stroke when they arrive at the scene.

Prevention

Basic methods to prevent heat-related illnesses on the job include the following:

- Wear loose fitting clothing
- Drink water often (don't wait until you're thirsty)
- Schedule "hot" jobs for the cooler part of the day (early morning or late afternoon)
- Schedule routine maintenance and repair work in hot areas during the cooler seasons of the year
- Provide additional breaks and comfortable break areas
- Add additional personnel to reduce exposure time for each member of a crew
- Permit workers the freedom to interrupt work when they feel extreme heat discomfort.

OSHA's Technical Manual discusses specific engineering and administrative control measures in great detail. It also outlines a variety of personal protective equipment that can be implemented to reduce the possibility of heat related illnesses. This reference material is available at OSHA's Web site: http://www.osha.gov (see "Heat Stress" in the Subject Index.)

An awareness of the symptoms of heat-related illnesses and the control measures to prevent them will help keep your employees safe and your workplace running more smooth during the summer months.

Commonly Asked Questions

Q. ***There seems to be conflicting opinions on the use of salt tablets. When, if ever, are they appropriate for employee use?***

A. If the temperatures are extreme and the activity is intense, the use of a sport drink with sodium would be better than tablets. You need to have sodium because it helps the small intestine absorb water, getting it into the blood-stream faster. However, salt tablets are highly-concentrated doses of sodium that can interact with other medicines and health conditions and pose a health threat to employees if not administered by a health professional. Another reason to avoid tablets is that if the water lost through sweating is not replaced, salt can build up in your body and cause cramps. Too much sodium in your system can also cause fluid retention—this can cause your blood pressure to rise, predisposing you to such problems as swollen legs or arteriosclerosis. Generally, a fluid/electrolyte replacement sport drink is safer than tablets.

Q. ***Are sport drinks any better than water for employees working in high temperature environments?***

A. The real key is to keep yourself fully hydrated. According to a 1999 release from the Mayo Health Foundation, unless you are engaging in extreme exercise, water is your best bet. Sport drinks are generally not necessary unless you are exerting yourself for 90 minutes or more (60 minutes if the activity is particularly intense or temperatures are extreme). During physical work or exercise it is recommended to replenish your fluids every 20 minutes—your body has limits in its ability to adjust to fluid loss, so don't wait to be thirsty! Humans lose about 10 cups of fluid a day in sweat, urine, exhaled air and bowel movements. What is lost must be replaced to maintain balance. On the other hand, sport drinks really can't hurt. There is some research that shows individuals will drink more of a sport drink than water, and that in itself will help you stay adequately hydrated. Sport drinks quickly replace fluids and electrolytes that are lost in sweat; they also provide energy to working muscles. During extreme physical exertion or in very hot conditions, sport drinks are superior to water. While water is a good "thirst quencher," it is not an efficient "rehydrator" like a sport drink. This is because water can quench your thirst before you're completely rehydrated. Water also turns on the kidneys prematurely so you can lose fluid in the form of urine much more quickly than when drinking a sports drink. The small amount of sodium in most sports drinks aids your body to hold on to the fluid you consume rather than losing it through urine and the carbohydrates they contain make it more easily absorbed than water. One caution is to avoid the high-carbohydrate drinks like soda pop— especially those in the 20% concentration range. fluid carbohydrate levels exceed 6-8% they are actually more difficult for the body to absorb.

23. Safe Handling of Acids and Bases

Introduction

Due to the dangers of some acids and bases, it is very important to follow certain guidelines when working with these hazards. There are several steps that can be taken to ensure that you are promoting a safe work environment for you and your employees. Following specific lab procedures, wearing the correct personal protective equipment (PPE) and using proper storage and disposal methods are all essential to accomplishing this goal.

Good Lab Practice

Here are several key tips to practicing safety in the laboratory:

1. Never work in a lab alone.
2. Do not eat, drink or smoke in the lab.
3. Never mouth pipette. Use the actual mechanical devices.
4. Make sure that all Bunsen burners are off before you leave the lab.
5. Wear the correct personal protective equipment (PPE) for the hazard.
6. Always use secondary containment if transporting the acids or bases.
7. Keep the lab clean at all times.
8. Make sure bottles are tightly capped unless they are being heated.
9. If you are using hazardous chemicals, make sure your work is always done inside a laboratory hood.
10. Be aware of the location of spill response equipment.

Personal Protective Equipment

It is very important to wear the correct personal protective equipment (PPE) for your application. Correct eyewear, face shields, gloves, respiratory protection and chemical-resistant clothing are all things that should be taken into consideration when working with acids and bases. If you are dealing with the potential for splash, safety glasses are not sufficient. You need to wear an indirectly vented goggle for splash protection. There are three different types of protective goggles: direct vent, indirect vent and non-vented.

Direct Vent

This type of goggle offers protection from impact only. It allows air to flow in so that fogging does not occur as easily. This is **NOT** a good option for splash protection for that reason. It is possible when handling that the acid or base splash could come in contact with the eye through the vents. It is better to go with an indirect or non-vented goggle when handling acids and bases.

Indirect Vent

This goggle is used for protection against chemical splash. They are “capped” so that air can move freely in and out of the goggle but chemical splash and particles cannot. Because there is not as much space for the air to move, you may want to select a goggle that has an “anti-fog” coating. Indirect vented goggles do not offer protection from fumes or vapors. If you are dealing with fumes or vapors, you must use a non-vented goggle.

Non-Vented

Non-vented goggles are goggles that have no holes for air to flow through. They are used in situations where splash and/or fumes and vapors are present. They often have an “anti-fog” coating so that the goggles will not fog up while you are working.

Face Shields

Eyewear alone will not provide adequate protection from splashes to the face. Face shields protect not only the eye area from chemical splash, but also the rest of the face. Face shields are considered secondary protection and must be worn with safety glasses or goggles, as stated in ANSI Z87.1-1989.

Hand Protection

When working with acids and bases it is very important to wear hand protection (gloves) that are compatible with the chemicals you are using. If the material is not appropriate for the acid or base, you may have problems with breakthrough or degradation of the glove material. Sometimes your MSDS will tell you exactly which type of glove material is compatible with the chemical. If it does not, it is very important to do the necessary research to determine which material will be compatible. This may require contacting the business which you purchased the gloves from or visiting the Web site of the manufacturer of the glove (most of them have chemical compatibility guides available on their Web sites).

Respiratory Protection

The four most common types of respirators used in applications where acids and bases are present are air-purifying, powered air-purifying, supplied air, and SCBA (Self Contained Breathing Apparatus). The respirator that you choose should be acceptable for the acid or base that you are using and have a NIOSH approval.

Air-purifying respirators can be either full-face or half masks with mechanical or chemical cartridges to filter dusts, mists, fumes, vapors or gases. They are available in three types: disposable, reusable and disposable/reusable.

Disposable air-purifying respirators are intended to be used once or until the cartridge expires. The cartridges are permanently attached and have no replacement parts.

Reusable air-purifying respirators use both replaceable cartridges and parts. *NOTE: The replaceable cartridges and parts must be from the same manufacturer to retain a NIOSH approval.*

Disposable/reusable air-purifying respirators have few or no replacement parts except cartridges. When using air-purifying respirators, it is necessary to use cartridges that are going to be compatible with the acid or base you are working with. These cartridge types include:

Organic Vapors: Organic vapor cartridges are black in color and protect against organic vapors (compounds with carbon in them).******

Acid Gas: Acid gas cartridges are white in color and protect against chlorine, chlorine dioxide, hydrogen chloride and sulfur dioxide.**

P100: P100 cartridges are purple in color and it filters out particulates and aerosols (.3 microns in size or larger) at a 99.97% efficiency rate.

**** A chemical cartridge respirator may only be used for exposure levels not exceeding (10X) the OEL (Occupational Exposure limit) as established in 29 CFR 191.134 (d)(3)(iii)(B)(2). If the exposure level exceeds the OEL, then a supplied air respirator must be used.**

Powered air-purifying respirators use a blower to pass the contaminated air through a filter. The purified air is then delivered into a mask or hood. They filter dusts, mists, fumes, vapors and gases, just like ordinary air-purifying respirators. Powered air-purifying respirators would need to be used if the person has facial hair. Having facial hair can affect the fit of an air-purifying negative air respirator and that is why a powered air-purifying respirator would be selected.

Air-purifying respirators cannot be used in oxygen-deficient atmospheres or others deemed IDLH (Immediately Dangerous to Life and Health), which can result when another gas displaces the oxygen or consumption of oxygen by a chemical reaction. Oxygen levels below 19.5% are considered to be oxygen deficient and require a source of supplied air such as an airline respirator with escape bottle or SCBA (CFR 1910.134(d)(2)(i)(a) and 1910.134(d)(2)(i)(b).

Supplied-air respirators provide the highest level of protection against highly toxic and unknown materials. Supplied air refers to ***self-contained breathing apparatuses*** (SCBAs) and ***air-line respirators***. SCBAs have a limited air supply that is carried by the user, allowing for good mobility and fewer restrictions than air-line respirators.

Air-line respirators have an air hose that is connected to a fresh air supply from a central source. The source can be from a compressed air cylinder or air compressor that provides at least Grade D breathing air.

Emergency Escape Breathing Apparatuses (EEBAs) provide oxygen for 5, 10 or 15 minutes depending on the unit. These are for emergency situations in which a worker must escape from environments immediately dangerous to life or health (IDLH).

Chemical-Resistant Clothing

Depending on the concentration of the acid and base that you are using, chemical-resistant clothing may be required. A standard lab coat may not provide enough protection for you. If concentration levels are high enough, you may even need to wear a suit that is fully encapsulated. Check your MSDS to see if there is a specific type of protective clothing required for your acid or base. If that information is not on the MSDS, try contacting the manufacturer of the chemical or the place where you purchased the acid or base.

Storage of Acids and Bases

There are several factors that should be taken into consideration when storing acids and bases. First and most important, is to make sure that acids and bases are not stored together. If there were to be a spill, chemical reactions could occur if they are stored in the same storage area. Second, make sure you check the MSDS of the acid or base to determine you are not storing incompatible chemicals together.

Also, be aware that all containers are properly labeled so that identification can be achieved as easy as possible. You should be paying close attention to expiration dates, making sure that the acid or base is disposed of on or before the expiration date. Acids and bases should be stored in an acid/base cabinet. The following is a list of some of the most common acids and bases and their specific incompatibilities. As a rule you should not be storing these acids or bases with each other.

Examples of Incompatible Acids and Bases	
Acid or Base	**Is Incompatible and Should Not Be Mixed or Stored With**
Acetic Acid	Chromic acid, nitric acid, hydroxyl compounds, ethylene glycol, perchloric acid, peroxides, permanganates
Ammonia (anhydrous)	Mercury, chlorine, calcium hypochlorite, iodine, bromine, hydrofluoric acid (anhydrous)
Ammonium nitrate	Acids, powdered metals, flammable liquids, chlorates, nitrates, sulfur, finely divided organic or combustible materials
Bleach	Acids, ammonia, drain cleaners
Chromic acid	Acetic acid, naphthalene, camphor, glycerol, alcohol, flammable liquids in general
Hydrocyanic acid	Nitric acid, alkali
Hydrofluoric acid (anhydrous)	Ammonia (aqueous or anhydrous)
Nitric acid (concentrated)	Acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulfide, flammable liquids, flammable gases, copper, brass, any heavy metals
Potassium chlorate	Sulfuric and other acids
Potassium hydroxide	Acids, organic materials, metals and moisture
Sodium Carbonate	Acids, strong bases, strong oxidizers, fluorine, aluminum, zinc, phosphorous pentoxide
Sodium Hydroxide	Acids, aluminum, organ halogen compounds, nitro and chloro organic compounds, flammable liquids, nitro methane, whey solids and nitrous compounds
Sulfides	Acids
Sulfuric acid	Potassium chlorate, potassium perchlorate, potassium permanganate (similar compounds of light metals, such as sodium, lithium)

Disposal of Acids and Bases

When disposing of acids and bases it is best to contact your local solid waste official for information on proper disposal procedures.

Sources for More Information

29 CFR 1910.1450, **Occupational Exposure to Hazardous Chemicals in Laboratories**

Prudent Practices for Handling Hazardous Chemicals in Laboratories,
National Academy Press, Washington D.C.
1981 ISBN 0-309-03128-1

29 CFR 1910.134, **Respiratory Protection**

29 CFR 1910.1000, **Air Contaminants Standard**

24. Smoke Alarm Safety

Smoke alarms are your “nose at night”. They can smell gases and smoke which can be deadly. If they are properly installed and maintained, they can protect everyone living in the home.

Recommend places to install smoke alarms:

- One on every level of the home.
- One in all sleeping areas including bedrooms and guest rooms
- In hallways near sleeping areas and storage areas
- Follow the instructions on how to use, maintain, and replace smoke alarms.

Do NOT place smoke alarms in the following places:

- Kitchens, garages, or laundry rooms
- Bathrooms and showers
- Dusty or greasy areas
- Close to ceiling fans or air vents

How to keep smoke alarms working properly:

- Test smoke alarms once a month
- Batteries should be changed yearly
- A “chirping” sound means a new battery is needed
- Keep your smoke alarm clean. They should be vacuumed monthly.
- Never paint a smoke alarm.
- Smoke alarms need to be replaced every 7 - 10 years

Make sure everyone knows what your smoke alarm sounds like.

25. Storage of LP Gas Cylinders - NFPA 58

Introduction

What is LP gas? The LP stands for "liquefied petroleum." A widely used fuel, LP gas is a mixture of light hydrocarbons, primarily propane and butane, which are gaseous at atmospheric pressure and temperature. Because of its absence of sulfur and its very low production of nitrogen oxides (NOx), this fuel produces low levels of toxic substances and particulates during combustion. NOx emissions are nitric oxides and nitrogen dioxides. LP gas can be easily liquefied by modestly decreasing the temperature or increasing the pressure. This makes it extremely easy to store and transport, even to remote areas. In 2001, world consumption of LP gas was estimated to be approximately 200 million tons.

The National Fire Protection Association (NFPA) addresses common questions regarding how to store LP gas containers in their Standard title 58. The following excerpt from the NFPA national fire code outlines proper storage procedures for LP gas containers awaiting use or resale. Several frequently asked questions are answered following the excerpt;

8.1 Scope

8.1.1 The provisions of this chapter are applicable to the storage of portable containers, cylinders, of 1,000 lb (454 kg) water capacity, or less, whether filled, partially filled or empty as follows:

(a) At consumer sites or distributing points, but not connected for use.

(b) In storage for resale by dealer or reseller.

8.1.3 The provisions of this chapter do not apply to: (a) Cylinders stored at bulk plants.

8.2 General Provisions.

8.2.1 General Locations of Containers

8.2.1.1 Cylinders in storage shall be so located as to minimize exposure to excessive temperature rise, physical damage or tampering.

8.2.1 Cylinders in storage having individual water capacity greater than 2.7 lb (1.1 kg) [nominal 1 lb (0.45 kg) LP-Gas capacity] shall be positioned such that the pressure relief valve is in direct communication with the vapor space of the container.

8.2.1.3 Cylinders stored in buildings in accordance with Section 8.3 shall not be located near exits, stairways, or in areas normally used, or intended to be use, for the safe egress of people.

8.2.1.4 If empty containers which have been in LP-Gas service are stored indoors, they shall be considered as full containers for the purposes of determining the maximum quantities of LP-Gas permitted in 8.3.1, 8.3.2.1 and 8.3.3.1

8.2.1.5 Cylinders shall not be stored on roofs.

8.2.2 Protection of Valves on Cylinders in Storage.

8.2.2.1 Cylinder valves shall be protected as required by 5.2.6.1 and 7.2.2.5.

8.2.2.2 Screw-on type caps or collars shall be securely in place on all cylinders stored regardless of whether they are full, partially full or empty, and container outlet valves shall be closed.

8.3 Storage Within Buildings.

8.3.2 Storage within Buildings Frequented by the Public and in Residential Occupancies.

8.3.2.1 The quantity of LP-Gas in cylinders stored or displayed shall not exceed 200 lb (91 kg) in one location, with additional storage separated by 50 ft (15 m). The maximum quantity to be stored in one building shall not exceed 1000 lb (454 kg).

8.3.3 Storage within Buildings Not Frequented by the Public (Such as Industrial Buildings).

8.3.3.1 The maximum quantity of LP-Gas allowed in one storage location shall not exceed 735 lb (334 kg) water capacity [nominal 300 lb (136 kg) LP-Gas].

8.3.3.2 Where additional storage locations are required on the same floor within the same building, they shall be separated by a minimum of 300 ft (91 m).

8.3.3.3 Storage beyond the limitations described in 8.3.3.2 shall comply with 8.3.4.

8.3.3.4 Cylinders carried as a part of the service equipment on highway mobile vehicles shall not be part of the total storage capacity in 8.3.3.1, where such vehicles are stored in private garages and carry no more than three cylinders with a total aggregate capacity per vehicle not exceeding 100 lb. (45.4 kg) of propane.

8.3.4 Storage within Special Buildings or Rooms.

8.3.4.1 The maximum quantity of LP-Gas which may be stored in special buildings or rooms shall be 10,000 lb (4540 kg).

8.3.4.2 Special buildings or rooms for storing LP-Gas cylinders shall not be located where the buildings or rooms adjoin the line of property occupied by schools, churches, hospitals, athletic fields or other points of public gathering.

8.3.4.3 The construction of all such special buildings, and rooms within, or attached to, other buildings, shall comply with Chapter 10 and following:

(1) Vents to the outside only shall be provided at both the top and bottom of the building and shall be located at least 5 ft (1.5 m) from any building opening.

(2) The entire area shall be classified for purposes of ignition source control in accordance with Section 6.22.

8.4 Storage Outside of Buildings.

8.4.1 Location of Storage Outside of Buildings.

8.4.1.2 Distances from cylinders in storage outside of building shall be in accordance with table 8.4.1.2 with respect to the following:

(1) Nearest important building or group of buildings.

(2) Line of adjoining property that can be built upon.

(3) Busy thoroughfares or sidewalks on other than private property.

(4) Line of adjoining property occupied by schools, churches, hospitals, athletic fields or other points of public gathering.

(5) Dispensing station.

Table 8.4.1.2 Distances from Cylinders in Storage and Exposures

Quantity of LP-Gas Stored	Horizontal Distance to (1) and (2)	Horizontal Distance to (3) and (4)	Horizontal Distance to (5)
720 lb (227 kg) or less	0 ft (0 m)	0 ft (0 m)	5 ft (1.5 m)
721 to 2500 lb (227+ to 1134 kg)	0 ft (0 m)	10 ft (3 m)	10 ft (3 m)
2501 to 6000 lb (1134+ to 2721 kg)	10 ft (3 m)	10 ft (3 m)	10 ft (3 m)
6001 to 10,000 lb (2721+ to 4540 kg)	20 ft (6.1 m)	20 ft (6.1 m)	20 ft (6.1 m)
>10,000 lb (>4540 kg)	25 ft (7.6 m)	25 ft (7.6 m)	25 ft (7.6 m)

8.4.3 Alternate Location and Protection of Storage.

8.4.3.1 When the provisions of 8.4.1 and 8.4.1.2 are impractical at construction sites or at buildings or structures undergoing major renovation or repairs, the storage of containers shall be acceptable to the authority having jurisdiction.

8.5 Fire Protection.

8.5.1 Storage locations, where the aggregate quantitiy of propane stored is in excess of 720 lb (327 kg), shall be provided with at least one approved portable fire extinguisher having a minimum capacity of 18 lb (9.2 kg) dry chemical with a B:C rating.

8.5.2 The required fire extinguisher shall be located no more than 50 ft (15 m) from the storage location. Where fire extinguishers have more than one letter classification, they can be considered to satisfy the requirements of each letter class.

(Also see NFPA 10.)

Other sources of information regarding storage of LP gas containers can be obtained from the Occupational Health and Safety Administration's Standard 29 CFR1910.101 which covers general requirements regarding compressed gases. This standard refers to the Compressed Gas Association's (CGA) Pamphlet. It is always important to check state and local codes. Your local Fire Marshall is recommended as a source of information to assure you are in compliance.

Commonly Asked Questions

Q. ***Is there a source that outlines distance requirements for proper outside storage of LP containers?***

A. Yes, NFPA Title 58 table 8.4.1 outlines distance requirements from buildings, property lines, busy thoroughfares, sidewalks and other points of adjoining public gathering points.

Q. ***Are there specific storage requirements for indoor storage?***

A. Yes, NFPA Title 58 8.3.2 and 8.3.3 addresses indoor storage and break it down based on buildings frequented and not frequented by the public.

Q. ***Does OSHA have a specific regulation addressing this topic?***

A. OSHA Standard 29 CFR 1910.101 which also refers to the CGA pamphlet.

Terminology:

Cylinder: Generally a compressed gas cylinder having a maximum water capacity of 1000 lbs. This is approximately equivalent to 120 gallons of water.

Sources for More Information:

OSHA 29 CFR 1910.101
NFPA 58 Liquified Petroleum Gas Code-2004
NFPA 1-617-770-3000

26. SWIMMING POOL SAFETY

- Diving boards need to be coated with a non-slip tread surface and be situated not more than 30 inches above the water.
- Depth markers, no-diving markers and No Lifeguard signs must all be visible.
- Floating safety ropes of alternating contrasting colors must mark severe depth changes.
- The slope of the pool bottom must conform to the specific state code to prevent diving injuries.
- Suction grates must be located in multiple places and be at least one foot square, while smaller drains must contain anti-vortex devices to prevent entrapment.

Water Quality

- Each pool must conform to guidelines for disinfectant residual, pH level and clarity.
- Automatic chlorine and bromine feeders must be within code and the maintenance of the pool walls and floor must be adhered to as well.
- Water temperature is checked and water quality records kept along with a working and well stocked test kit.

Personal Safety Rules

- No running, no horseplay, no pushing people into the pool should be common sense items, but often times are not.
- No diving into the shallow end of a pool or having any glass items in the pool area of any kind apply also.
- Ladders or stairs must be able to be locked or restrict pool access to small children that could drown in an unsupervised setting.

Safety Around the Pool

- Decking material should be skid resistant and wide enough to provide a suitable walkway all around the pool area.
- Lifesaving equipment such as Coast Guard Life Preservers or Official Floatation Devices should be on hand as well as a long pole for a swimmer in trouble to grab from someone.
- Lighting needs to be sufficient to avoid accidents and wiring should never be stretched across an open walkway.

27. Tips for Avoiding Eyestrain

If computer workstations are set up incorrectly, it could lead to eyestrain. Here are 10 tips for avoiding computer-caused eyestrain.

1. Look away from the monitor for 30 seconds, every 15 or 20 minutes. Look at or scan things at least 20 feet away to allow the eyes to focus in rest position.
2. Position the monitor 20" to 26" from your eyes (roughly the distance from your eyes to the end of your index finger with arm outstretched). Otherwise, you'll be forced to sit or lean too close to the screen, or sit too far away. If your eyeglass prescription does not allow clear vision at 20" to 26" range, get it adjusted.
3. Set the monitor height so that the top edge is even with your view when looking straight ahead. Then tilt the screen upward so you are not looking at the image at an angle. The optimal screen position is 10 to 20 degrees below eye level.
4. Set the monitor screen resolution, Internet browser text size, and the zoom and font default on other applications so that text is easy to read (600x800 for the screen resolution is standard).
5. Set the monitor refresh rate to 75 hz or above. 60 hz is too slow and will cause eye strain.
6. Remember to blink often (put a sticky note on your monitor!). The average blink rate is 22 times per minute. The rate goes down to 7 per minute when looking at a monitor--this causes the eye lens to dry out. Use an eye moistener if you can't get into the habit of blinking more often.
7. Put the palm of your hands over your eyes for a minute or so, once every half hour. This warms the muscles around the eyes, relaxing them.
8. Minimize glare. Make sure the background light level around the monitor is about the same as the screen light level. Minimize direct sunlight or bright lights in front of the monitor or directly behind it. Attach a glare shield if a bright background or reflection can't be minimized.
9. A bright screen causes eyestrain. Adjust the contrast and brightness to levels you use when reading a book comfortably.
10. Place a paper holder at the same level as the monitor, or attach it to the monitor, to hold documents. This prevents repetitive upper body and eye movement from paper to screen.

28. Understanding ANSI, ASTM International, FM Global, NFPA, SEI and UL

Introduction

Many non-governmental agencies affect the products and services offered to the safety industry. Those that will be discussed here are: American National Standards Institute, ASTM International, FM Global, National Fire Protection Association, Safety Equipment Institute and Underwriters' Laboratories Inc.

American National Standards Institute (ANSI)

The American National Standards Institute (ANSI) is a diversified and unique nonprofit organization that includes industry, standards developing organizations, trade associations, professional and technical societies, government, labor and consumer groups.

ANSI was formed originally as the American Engineering Standards Committee in 1918.

ANSI's mission is to enhance both the global competitiveness of U.S. business and the U.S. quality of life by promoting and facilitating voluntary consensus standards and conformity assessment systems.

ASTM International

ASTM International, originally known as the American Society for Testing and Materials (ASTM), was formed in 1898, when a group of engineers and scientists got together to address frequent rail breaks. Their work led to standardization on the steel used in railroad construction.

ASTM International is a not-for-profit organization that provides a forum for the development and publication of voluntary consensus standards for materials, products, systems, and services. It is one of the largest voluntary standards developing organizations in the world.

Standards developed at ASTM International are the work of over 30,000 members. These technical experts represent producers, users, consumers, government and academia from over 120 countries.

Members belong to one or more committees, each of which covers a subject area. These committees develop the more than 12,000 ASTM standards that can be found in the 77-volume Annual Book of ASTM Standards.

FM Global

FM (Factory Mutual) Global is one of the world's largest commercial and industrial property insurance and risk management organizations specializing in property protection. It was formed in 1835 by Zachariah Allen, who felt the need for an industrial insurance group to focus on loss control.

FM Global has six business units and each unit helps its clients manage their property risks through a variety of products and services.

The FM Approvals business unit certifies industrial and commercial products and services.

When a product or service meets FM Approvals' standards, it is issued the FM Approved mark to signify it will perform as expected and support property loss prevention.

The FM Approvals business unit backs its evaluations with scientific research and testing and lists more than 45,000 certified products in its Approval Guide.

National Fire Protection Association (NFPA)

The National Fire Protection Association (NFPA) is an international nonprofit organization founded in 1896 and headquartered in Quincy, Massachusetts. NFPA membership totals more than 81,000 individuals and more than 80 national trade and professional organizations.

NFPAs' mission is to reduce the worldwide burden of fire and other life quality altering hazards by providing and advocating consensus codes and standards, research, training and education.

NFPA's 300 codes and standards influence every building, process, service, design and installation in the U.S. and many of those used in other countries. The National Electric Code (NFPA 70), Life Safety Code (NFPA 101) and Flammable and Combustible Liquids Code (NFPA 30) are widely used.

Safety Equipment Institute (SEI)

The Safety Equipment Institute (SEI) was organized in 1981 and is headquartered in Arlington, Virginia. It is a private, nonprofit organization with third-party certification programs to test and certify a wide array of safety equipment. SEI's certification programs are accredited by the American National Standards Institute (ANSI) in accordance with the standard, ISO Guide 65, General Requirements for Bodies Operating Product Certification Systems.

SEI certification programs include on-going product testing and quality assurance audits of product models voluntarily submitted by manufacturers.

All product testing is done in accordance with the selected voluntary, government or other standards available for the given product.

SEI will certify the manufacturer's product model and grant the right to use the SEI certification label when (1) the testing lab has determined that the product model has been tested and successfully meets the appropriate product standard, and (2) the quality assurance auditor has determined that the manufacturer complies with SEI quality assurance requirements.

SEI publishes a certified product list and it is continuously updated to reflect the latest information.

SEI DOES NOT offer a warranty for the performance of the product, but having a product certified by SEI shows that the manufacturer is taking responsibility for producing a quality product.

Underwriters' Laboratories Inc. (UL)

Underwriters' Laboratories Inc. (UL) is an independent, not-for-profit product safety certification organization that has been testing products and writing safety standards since 1894.

Annually, UL evaluates more than 19,000 types of products, components, materials and systems with 21 billion UL Marks appearing on 71,000 manufacturers' products each year.

ULs' mission is to promote safe living and working environments by the application of safety science and hazard-based safety engineering. This is supported by 127 inspection centers, 66 laboratory, testing and certification facilities and a staff of 6,200.

Reference

These six agencies affect many of these products. Here are some examples of sections in which they appear:

American National Standards Institute

•Eyewear
•Hard Hats
•Fall Protection
•Eye Wash/Showers

American Society for Testing and Materials

•Clothing
•Footwear

Factory Mutual

•Lighting
•Safety Cans

National Fire Protection Association

•Cabinets
•Lighting
•Respriators

Safety Equipment Institute

•Air Monitors
•Eyewear
•Hard Hats

Underwriters' Laboratories

•Lighting
•Lockout/Tagout
•Safety Cans

Addresses and Phone Numbers

ANSI Operations
25 W 43rd St., 4th Floor
New York, NY 10036
(212) 642-4900
www.ansi.org

ASTM International
100 Barr Harbor Dr.
West Conshohocken, PA 19428
(610) 832-9585
www.astm.org

FM Global Corporate Offices
1301 Atwood Ave.
Johnston, RI 02919
(401) 275-3000
www.fmglobal.com

FM Approvals
1151 Boston-Providence Turnpike
Norwood, MA 02062
(781) 762-4300
www.fmglobal.com/approvals/

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471
(617) 770-3000
www.nfpa.org

Safety Equipment Institute
1307 Dolly Madison Blvd. Suite 3A
McLean, VA 22101
(703) 442-5732
www.seinet.org

Underwriters' Laboratories Inc.
333 Pfingsten Rd.
Northbrook, IL 60062
(847) 272-8800
www.ul.com

29. Venting of Storage Cabinets

Introduction

Chemical storage cabinets, whether used for flammables, corrosives or pesticides/poisons, often come with capped bung openings that allow ventilation. While cabinet manufacturers may provide the bungs for venting, ventilation for chemical storage cabinets is NOT required or even recommended by any Federal regulatory agency. Cabinet manufacturers include venting bungs for users who are required to vent by state or local codes, or by individual company or insurance carrier policies.

Don't Vent Unless You Have To

According to NFPA (National Fire Protection Association) Code 30, *Flammable and Combustible Liquids Code Handbook*, venting a chemical storage cabinet is not necessary for fire protection purposes. Flammable and combustible liquid storage cabinets are designed to protect the internal contents from a fire outside the cabinet. A vented cabinet could compromise the ability of the cabinet to protect its contents from a fire.

According to NFPA Code 30, 9.5.4*, "The cabinet is not required to be vented for fire protection purposes."

9.5.4.2, states; "If vented for whatever reason, the storage cabinet vent openings shall be ducted directly to outdoors in such a manner that will not compromise the specific performance of the cabinet and in a manner that is acceptable to the authority having jurisdiction."

9.5.4.1, states; "If the cabinet is not ventilated, storage cabinet vent openings shall be sealed with the bungs supplied with the cabinet or with bungs specified by the manufacturer."

NFPA Code 30 clearly dismisses the need to vent storage cabinets in its appendix. Under A.9.5.4 it states, "Venting storage cabinets has not been demonstrated to be necessary for fire protection purposes. Additionally, venting a cabinet could compromise the ability of the cabinet to adequately protect its contents from involvement in a fire since cabinets are not generally tested with venting. **Therefore, venting of a storage cabinet is not recommended.**"

Federal OSHA recognizes the NFPA guidelines when it comes to chemical storage cabinets, so there's no requirement to vent cabinets for OSHA compliance. However, this does not mean it is not required in some circumstances. State and local authorities having jurisdiction (AHJ) may require venting. NFPA 30 acknowledges this later in A.9.5.4., "However, it is recognized that some jurisdictions may require storage cabinets to be vented and that venting may also be desirable for other reasons, such as health and safety. In such cases, the venting system should be installed so as to not affect substantially the desired performance of the cabinet during a fire. Means of accomplishing this may include thermally actuated dampers on the vent openings or sufficiently insulating the vent piping system to prevent the internal temperature of the cabinet from rising above that specified. Any make-up air to the cabinet should also be arranged in a similar manner. If vented, the cabinet should be vented from the bottom with make-up air supplied to the top. Also, mechanical exhaust ventilation is preferred and should comply with NFPA, *Standard for Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying*. Manifolding the vents of multiple storage cabinets should be avoided."

How Do I Know If I Need To Vent My Cabinet

In addition to acknowledging that the local AHJ requirements supersedes that of the NFPA, the above appendix passage identifies that venting is occasionally necessary and how it can be achieved.

The following five steps help to determine whether or not to vent a chemical storage cabinet:

1. Determine Classification (Flammable, Corrosive and Oxidizer), health hazards, storage requirements (i.e. temperature, incompatibilities) and total amounts of the chemicals that will be stored in the cabinet. Refer to the Material Safety Data Sheets (MSDS) for this information or contact the manufacturer/supplier for assistance. This information may be needed for the following steps.
2. Contact your local Fire Marshal/Fire Inspector to determine if venting is required by your local or state regulations. If so, obtain their instructions and any other special requirements.
3. Contact your Environmental Health and Safety (EHS) Officer, if applicable. Many companies, universities, school districts and other large facilities have internal requirements for venting and storage. Again, request instructions and special requirements since they may vary.
4. Consult with your insurance company for their recommendations and requirements.
5. Have air quality evaluated to determine actual explosive limit value in and around the storage area. Consult an Industrial Hygienist for assistance. Your State OSHA Consultation Office will either provide you with an accredited hygienist that is on-staff, or will help you contact one in your area.

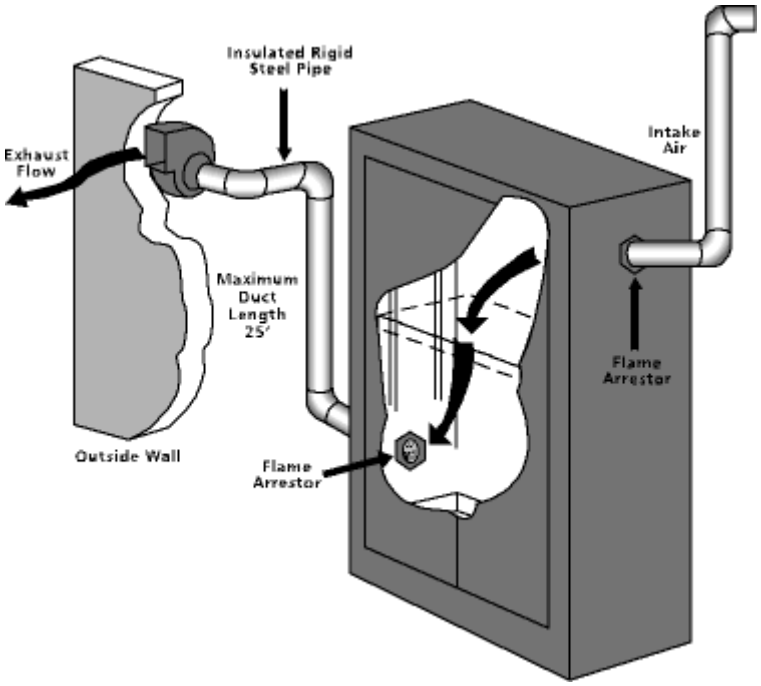
If the cabinet's contents are creating excessive levels of chemical vapors, it doesn't necessarily mean the cabinet must be vented. Before venting a cabinet to lower vapor emissions, consider the following options:

1. Place cabinets in a cool, dry location out of direct sunlight and away from any possible heat or ignition source. Temperature fluctuation in many chemicals will increase harmful vapors emitted.
2. Always maintain continuous and adequate room ventilation. Many accidents occur when ventilation is turned off for the weekend or an extended period of time.
3. Maintain an accurate inventory of chemicals and their properties to prevent dangerous reactions resulting from incompatible chemical storage. **Never** store chemicals solely based on alphabetization, as this can result in dangerous chemical reactions. Store chemicals only in containers that are made of materials determined to be chemically compatible so that leakage/damage will not occur. Consult the MSDS or manufacturer for their recommendations. Frequently inspect containers for signs of damage and aging.
4. Always make sure that caps are replaced on containers tightly, and that the outside of containers is clean and free from residual liquids.
5. Regularly inspect inside the cabinet for spills, and clean immediately if found.
6. Regularly inspect cabinets and any metal items in surrounding area for signs of rust, corrosion or other visual indications that the vapor levels are excessive and mechanical ventilation would be needed.
7. Dispose of any aging chemicals that could become unstable.
8. Use of vapor absorbent inside the cabinet can also reduce the irritant level of vapors.

What If I Have To Vent My Cabinet?

If a decision is made to vent, follow the engineering guidelines from the AHJ that requires the venting. At the very minimum, venting should incorporate the following steps:

- Remove both metal bungs from sides of cabinet and replace flame arrester screens (normally these come with the cabinets) into the openings.
- Connect the bottom opening to the exhaust fan using rigid metal tubing equivalent or better than that used in construction of cabinet. Tubing must have an inner diameter no less than that of the opening. Several places require welding of the tubing to the cabinet to avoid riveting or other methods that may impede the cabinet's fire protection. PVC should not be used since it can not withstand excessive temperatures.
- The top opening shall serve as the fresh air inlet. The make-up air should be supplied to the fresh air inlet in tubing similar to that used for the exhaust.
- A suitable fan should be constructed of non-sparking blades and shrouds. Mechanical exhaust ventilation is preferred and should also comply with NFPA 91 *Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists and Noncompatible Particulate Solids*.
- The total run of the exhaust duct should not exceed 25 feet.
- **DO NOT** manifold vents of multiple cabinets—in many localities it is prohibited.



While the above guidelines refer most specifically to flammable liquid storage cabinets, they can be modified slightly for use on corrosive or pesticide/poison storage cabinets. Again, the AHJ that requires the venting needs to be consulted for engineering guidance to ensure their specific venting protocol is met. A couple important points to remember are corrosive cabinets require blowers that are chemically compatible with the vapors they move, and some pesticide/poison cabinets can not be vented to the outside due to potential health hazards associated with exposures to the vapors.

Corrosive/Acid Cabinets

There currently are no regulations regarding the construction of corrosive/acid cabinets, however, most manufacturers construct them of either wood or polyethylene and they are usually blue in color. The EPA does require that the cabinets be able to contain any possible spills. Polyethylene is the most common material used for acid/corrosive cabinets. Chemical compatibility is the biggest reason to use this material along with the fact that polyethylene can be welded at the seams to provide better spill protection. Wood can be another choice of material for these cabinets, but chemical handling and storage requirements should be closely evaluated since several acids are incompatible with wood and could ignite if spilled.

Acid/Corrosive cabinets are primarily vented only when required by local authorities or the company. Cabinets made from either wood or polyethylene are normally not provided with bungs. However, some manufacturers will custom make them for those very few areas where venting would be required. Metal cabinets are the final option, and most likely need to be vented to prevent rusting and corrosion. When venting a corrosive cabinet, as opposed to a flammable cabinet, connecting to an existing exhaust such as a fume hood is strongly recommended. Fume hood exhaust systems are designed to handle corrosive vapors. Flame arrestors do not need to be used and PVC is the best material for venting of corrosives.

Pesticide/Poison Cabinets

There are currently no NFPA regulations for the construction of these cabinets, other than the EPA secondary containment regulations and that the cabinet must be lockable. Cabinets for this category are often constructed to the NFPA 30 standard since more often than not these chemicals will also be flammable. Pesticide cabinets are most often green in color while Poison cabinets are most often white or gray. Venting should be avoided if at all possible. Many pesticides/poisons should not be vented outdoors due to potential health hazards. Again refer to the MSDS and/or manufacturer for storage requirements as well as EPA regulations and restrictions.

Commonly Asked Questions

Q. ***What is a flame arrester?***

A. A flame arrester is a special fine metallic screen that prevents back flow or flashbacks of flames. Designed to allow liquids and vapors to pass through, it provides a barrier to flame passage if the vapors on either side should ignite.

Q. ***Do I need separate flammable and combustible cabinets?***

A. No, provided that the total amount stored in the cabinet does not exceed 120 gallons of which only 60 gallons may be from Class I and Class II. Also note that no more than three of these cabinets may be stored in the same fire area unless there is a separation of greater that 100 feet.

Q. ***Do I need self-closing doors?***

A. Self -closing doors are not a NFPA requirement; however, the Uniform Fire Code 66 does require that all flammable cabinets have self-closing doors. Many States and local codes do require compliance with the UFC. To find out if you are in an area with this additional requirement, contact your local Fire Marshall.

30. Welding Safety

Introduction

Welding is the most common method of joining metals in industry today. When welded, two pieces of similar metals are fused (melted) together. Once completed, the welded joint is as strong or stronger than the pieces from which the joint is formed. General hazards of welding include impact, penetration, harmful dust, smoke, fumes, heat and light radiation. The proper personal protective equipment can protect you from these hazards.

Types of Welding -- Gas Welding, Arc Welding, Oxygen and Arc Cutting

Gas Welding -- In gas welding, two metals are joined by melting or fusing their adjoining surfaces. This is done by directing a gas flame over the metals until a molten puddle is formed. The energy for gas welding comes from the combustion of a fuel with oxygen or air. A few of the most popular fuels are acetylene, Mapp gas and hydrogen. Since gas welding is slower and easier to control than electric arc welding, it is often used in applications such as general maintenance work, brazing and soldering.

Arc Welding -- Arc welding involves a different process - two metals are joined by generating an electric arc between a covered metal electrode and the base metals. Heat is produced by the arc which in turn melts the metal and mixes the molten deposits of the coated electrode. The arc energy is provided by a power supply unit that furnishes direct or alternating current. The electrodes carry the current to form the arc, producing a gas that shields the arc from the atmosphere, and add metal to control the weld shape.

When an arc is struck using a coated electrode, the intense heat melts the top of the electrode. The drops of metal from the electrode enter the arc stream and are deposited on the base metal.

The equipment needed for electric arc welding is a power supply, electrode holder, ground clamp, protective shield, and welder's protective clothing.

Oxygen and Arc Cutting -- Metal cutting in welding is the severing or removal of metal by a flame or arc. The most common cutting processes are:

- Oxygen Cutting: Metal is heated by gas flame and an oxygen jet does the cutting.
- Arc Cutting: Intense heat of electric arc melts away the metal.

Personal Protective Equipment

Eye and Face Protection -- Proper eye and face protection varies depending on the particular task being performed. Helmet, hand shield, goggles and safety glasses or combination of these are acceptable protection in various applications. All filter lenses and plates must meet the test for transmission of radiant energy prescribed in ANSI/ISEA Z87.1-2010, Practice for Occupational and Educational Eye and Face Protection.

According to OSHA 29 CFR 1910.252, "Helmets and hand shields shall protect the face, forehead, neck and ears to a vertical line in back of the ears, from the arc direct radiant energy, and weld splatter."

Welding helmets with filter plates are intended to protect users from arc rays and from weld sparks and spatters which strike directly against the helmet. They are not intended to protect against slag chips, grinding fragments, wire wheel bristles, and similar hazards which can ricochet under the helmet. Spectacles, goggles or other appropriate eye protection must also be worn to protect against these impact hazards.

OSHA requires that when arc cutting and arc welding with open arcs, helmets or hand shields with filter lenses and cover plates shall be used by operators and nearby personnel viewing the arc also subject to wear proper protection. Spectacles with a shade 2 lens are recommended for general purpose protection for viewers. When resistance welding or brazing: operators of resistance welding must use face shields, spectacles, or goggles depending on the particular job to protect their faces and eyes from welding hazards.

Filter Shade Selection for Type of Welding				
Operation	Electrode Size (mm)	Arc Current (A)	Min Shade	Suggested Shade
Shielded Metal	< 2.5 mm	< 60	7	*
Arc Welding	2.5 - 4mm 4 - 6.4mm > 6.4mm	60 - 160 160 - 250 250 - 550	8 10 11	10 12 14
Gas Metal Welding and Flux Cored Arc Welding		< 60 60 - 160 160 - 250 250 - 500	7 10 10 10	* 11 12 14
Gas Tungsten Arc Welding		< 50 50 - 150	8 8	10 12
Air Carbon Arc Cutting		150 - 500 < 500 500 - 1000	10 10 11	14 12 14
Torch Brazing				3 or 4
Torch Soldering				2
Carbon Arc Welding				14
Gas Welding (plate under 1/8" thick, light)				4 or 5
Gas Welding (plate 1/8" to 1/2" thick, medium)				5 or 6
Gas Welding (plate over 1/2" thick, heavy)				6 or 8
Oxygen Cutting (plate under 1" thick, light)				3 or 4
Oxygen Cutting (plate 1" to 6" thick, medium)				4 or 5

Oxygen (plate over 6" thick, heavy)			Cutting	5 or 6
*As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade which gives sufficient view of the weld zone without going below the minimum. In Oxyfuel Gas Welding or Cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the operation.				
**This applies to where the actual arc is clearly seen. Experience has shown that lighter filters may be used when the arc is hidden by the workpiece.				
Note: Workers with prescription lenses are not exempt from wearing proper eye protection.				

Protective Clothing -- According to ANSI Z49.1.88-Welding and Cutting (4.3), appropriate protective clothing for any welding and cutting operation will vary with the size nature and location of the work to be performed. Clothing shall provide sufficient coverage and be made of suitable materials to minimize skin burns caused by sparks, spatter or radiation. covering all parts of the body is recommended to protect against ultraviolet and infrared ray flash burn.

Dark clothing works best to reduce reflection under the face shield. Heavier materials such as wool clothing, heavy cotton or leather are preferred as they resist deterioration. Materials that can melt or can cause severe burn due to sparks that may lodge in rolled-up sleeves, pockets of clothing or pant cuffs are not recommended.

The ANSI standard requires all welders and cutters to wear protective flame-resistant gloves, such as leather welder's gloves, which provide the heat resistance needed for welding. A gauntlet cuff offers additional arm protection, and insulated linings should be used to protect areas exposed to high radiant energy.

Other protective clothing would include durable, flame-resistant aprons made of leather or other suitable materials to provide protection to the front of the body when additional protection against sparks and radiant energy is needed.

Ventilation

Ventilation refers to changes of room air as often as necessary to prevent welders and other workers from breathing high levels of airborne contaminants. Ventilation is a means of providing adequate breathing air, and must be provided for all welding, cutting, brazing and related operations. Adequate ventilation depends on the following factors:

- Volume and configuration of the space where the welding operations occur
- Number and type of operations that are generating contaminants
- Natural air flow rate where operations are taking place
- Locations of the welders' and other workers' breathing zones in relation to the contaminants or sources

Proper ventilation can be obtained either naturally or mechanically.

Natural Ventilation -- Natural ventilation is considered sufficient for welding and brazing operations if the present work area meets these requirements:

- Space of more than 10,000 square feet is provided per welder;
- A ceiling height of more than 16 feet
- Welding is not done in a confined space
- Welding space does not contain partitions, balconies or structured barriers that obstruct cross ventilation

If your specific operation does not fall within these guidelines, mechanical ventilation will be required.

Mechanical Ventilation -- Mechanical ventilation options generally fall into two basic categories. The first is the low vacuum system which takes large volumes of air at low velocities. These systems consist of hoods positioned at a distance from the work area. The hood and housing may have to be repositioned by the worker to get maximum benefit from this means of ventilation. Hoods generally remove the fumes and contaminated air through ducting and exhaust the contaminants to the outdoors. Hoods should be placed as near as practical to the work, and should provide effective air flow with a velocity of 100 linear feet (30m) per minute at its most remote distance from the point of welding. Processes where low vacuum systems work best are arc air gouging, taking afterburner, and arc cutting.

Another category of mechanical ventilation is the high vacuum system. These are close-range extractors that are aimed at capturing and extracting fumes as near to the work as possible. Fume extractors often have an immediate area of welding. By removing a small volume of air at a high velocity, the potentially hazardous materials are effectively removed before reaching the welder's breathing zone. These systems often are equipped with a fan that pulls the contaminants into a filtration system, with a HEPA (High Efficiency Particulate Absolute) filter or combination of HEPA filter and prefilter and then recirculated the clean air back into the work area. Advantages of high vacuum systems are greater flexibility for job adaptation, more efficient means of fume removal, and greater visibility to the welder due to reduced clouds of fumes and vapors being created.

Fumes and gases from welding and cutting cannot be easily classified. The quantity of fumes and gases is relative to the metal being worked and the processes and consumable material being used (such as coatings, like paint, galvanizing and platings), along with contaminants in the atmosphere (such as halogenated hydrocarbon vapors from cleaning and degreasing activities).

Air sampling to verify the concentration levels of toxic fumes and gases is necessary, and respiratory protection is required along with mechanical ventilation in the cutting and/or welding of certain metals and compounds. For more information, see OSHA 29 CFR 1910.252 on welding regulations.

Commonly Asked Questions

Q. ***What is a fume plume?***

A. The fume plume is the clearly visible column of fume which rises directly from the spot of welding or cutting. Welders and cutters should take precautions to avoid breathing this area directly. Ventilation can direct the plume away from the face. (Fume removal is most effective when the air flow is directed across the face of the welder, rather than from behind.)

Q. ***How do I know what hazardous materials I may be using?***

A. Check the Material Safety Data Sheet (MSDS). The suppliers of welding materials must provide an MSDS or equivalent documentation which identifies the hazardous materials, if any, used in their welding and cutting products.

Q. ***Where should oxygen not be used and why?***

A. Oxygen should not be used as a substitute for compressed air. It should not be used in pneumatic tools, in oil preheating burners, to start internal combustion engines, to blow out pipelines, to dust clothing or work, or to create pressure for ventilation or similar applications. Oxygen should not be used as described due to the possibility of a raging oxygen-fed fire occurring. Oxygen is not flammable, but vigorously supports combustion. Oxygen can be absorbed by clothing. A slight spark can result in severe burns.

Q. ***What is Mapp gas?***

A. Mapp gas is a product that was developed as a fuel for welding, brazing, cutting, flame hardening, and metallizing operations. It has many of the physical properties of acetylene, but lacks its shock sensitivity and therefore can be stored and shipped in lighter containers. Mapp gas is the result of rearranging the molecular structure of acetylene and propane. It also has a very distinct odor so any leakage can readily be detected.

Sources for More Information

ANSI Z49.1-88, American National Standards Institute-Safety in Welding and Cutting.

29 CFR 1910.251-257, Welding.

Safety in Welding and Cutting, American Welding Society, 1988.

31. What is NFPA 704?

Introduction

The National Fire Protection Association (NFPA) designed NFPA 704 as a standard for the Identification of the Hazards of Materials for Emergency Response. This is commonly known as the NFPA diamond. The four section multicolor diamond shape indicates the health, flammability, instability and related hazards that are presented by short-term, acute exposure to a material during a fire, spill or other emergency-related condition. These identifiers in sign form are found on the outside doors or walls and the inside of many facilities that use chemicals in their daily processes.

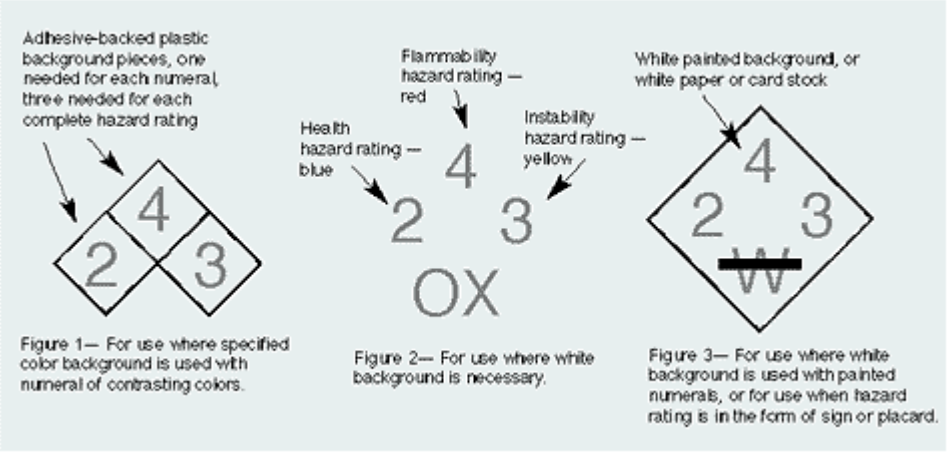
The object of this standard is to inform responders to fires, spills or other emergencies of the hazards of the material contained in the facilities.

The standard, which was developed in the early 1950s and tweaked several times since, provides a “simple, recognizable and easily understood system of markings that provides a general idea of the hazards of a material and the severity of these hazards as they relate to emergency response”. NFPA 704 1.2.2.

Hazard Symbols

The numerical hazard rating system uses the numbers 0-4, with 4 denoting the highest hazard in that category and 0 indicating a non-hazard. The rating system has three categories, defined by their color. Blue for Health, Red for Flammability and Yellow for Instability. The fourth space at the bottom of the sign is not colored and indicates special hazards. These hazards can include the W symbol with a line through it for water reactive or the OX symbol for materials that may be oxidizers. This space can also be left blank. (Figure 1)

Figure 1



Assignment of Ratings

The assignment of these ratings is to be performed by a technically competent person who is experienced in interpreting the hazard criteria. That person will assign the ratings based on their knowledge of the inherent hazards of those materials. Information on assignment of ratings can be found in Chapter 4 of the standard. It is quite common that when chemicals arrive with their Material Safety Data Sheet (MSDS), the MSDS will have a diamond shape located on it with the ratings already determined. This rating can then be transferred to your sign or used for further determination of the ratings.

Sign Location

The location requirements for signs at your facility are located in Chapter 4 of this standard. Local authorities have jurisdiction as to where and how many are needed, but NFPA suggests as a minimum signs be located in the following locations: (1) Two exterior walls or enclosures containing a means of access to a building or facility (2) Each access to a room or area (3) Each principal means of access to an exterior storage area. Access, configuration, size, location and construction of the building will factor in the location and number of signs required.

The parameters to determine each rating of the health, flammability, instability of the hazards and special notice, which are extensive, are listed in chapters 5, 6, 7 and 8 of the standard. These will help determine the degree of the hazard and how the numerical value is arrived at whether it be a 0, 1, 2, 3 or 4.

A common question regarding the ratings is how to determine a number when you have a variety of different chemicals in the facility. According to NFPA 704 Chapter 4 -4.2.3.3, a composite method for determination can be used. This states that a single sign can be used to summarize the maximum ratings contribution by the materials in each category or area. When you have a mixture of chemicals, the MSDS information from each chemical should be used for the determination.

Another common question is “what size should the numbers be?” The numbers should be visible from a minimum distance of 50 ft. The NFPA 704 has the chart below (Figure 2) with recommended distance and letter height requirements.

Figure 2

Distance at which hazard ratings are legible	Minimum size of hazard ratings required
15.24 m (50 ft)	25 mm (1 in.)
22.86 m (75 ft)	51 mm (2 in.)
30.48 m (100 ft)	76 mm (3 in.)
60.96 m (200 ft)	102 mm (4 in.)
91.44 m (300 ft)	152 mm (6 in.)

This overview addresses some of the more common inquiries regarding the NFPA 704 standard. For a more in-depth breakdown and explanation of the criteria to meet this standard, the NFPA can be contacted at www.nfpa.org or by telephone at 617-770-3000.

Commonly Asked Questions

Q. ***Is The NFPA 704 a requirement? Who enforces this requirement?***

A. The NFPA 704 standard is a voluntary standard; each local jurisdiction determines whether or not it will be maintained as a requirement.

Sources For More Information

NFPA 704 Identification of the Hazards of Materials for Emergency Response 2001 Edition

32. Workplace Safety

Today, safety is a way of life. Not just on the job, but at home, in public places, and on the road. People are taking personal responsibility for their own safety, and making plans to keep their families, communities, and workplaces safe.

- Foster an attitude of safety awareness; make it part of your company's culture, and get management on board.
- Designate a safety team leader who is committed to staying up to date on current safety issues. Form a safety team and report on its meetings to all employees. People will work harder to implement new ideas if they are given responsibility to develop those ideas themselves.
- Develop a systematic approach to accident investigation.
- Establish an effective emergency response and evacuation plan; keep it updated and practice it regularly.
- Be familiar with the location of fire extinguishers.
- Keep fire lanes clear at all times. They exist for emergency vehicles only.
- Keep personal work space areas clear of any debris that may be a fire hazard or may impede a safe exit.
- Create a schedule of monthly or weekly safety briefings.
- Focus on safety training and continuing education. Select courses that are appropriate to your business and make it a priority to provide them to your workers. Consider offering Defensive Driving and First Aid courses to any interested employees.
- Urge workers to take advantage of employee assistance programs when necessary. They'll find it hard to concentrate on safety if they're struggling with personal problems.
- Address off-the-job safety and health issues by promoting your company's wellness programs, or consider subsidizing health club fees. Provide magazines which offer safety and wellness tips and articles for families.
- In case of an emergency, alert others in your area.
- Use the posted building escape plan.
- Follow emergency exit signs to an exit.
- Do not use the elevators. Use stairwells to evacuate the building. Proceed down to the street level exit.
- Be familiar with your secondary exit in case the primary exit is blocked.
- Assist those with physical handicaps to an exit.
- Once out... STAY OUT! Meet at a designated meeting place.
- Call 9-1-1 from a safe location.
- Give the dispatcher as much accurate information as possible.
- If it's not possible to escape from the floor that you are on, try to go to a room with an outside window.

Office Safety Checklist

General Safety Yes No

- Is housekeeping and sanitation adequate throughout the office?
- Are all office areas provided with adequate lighting and ventilation?
- Are all outside areas and parking lots properly maintained and do they have adequate illumination?

Documentation

- Are OSHA and other required posters prominently displayed?
- Are all accidents reported to HR/Personnel in a timely manner?
- Have Supervisors investigated all accidents and distributed corresponding reports?
- Is the OSHA log being maintained, summary posted Feb.-Apr., and is it kept for five years?
- Is the safety program properly filed and reviewed for revisions?

First Aid

- Are a sufficient number of currently trained attendants available at all times?
- Are responders certified in First Aid, CPR, and Bloodborne Pathogens?
- Are first aid supplies inventoried and replenished as needed?

Means of Egress

- Are the required exits clearly evident and marked with illuminated signage?
- Do the exit doors swing outward to accommodate for traffic flow?
- Are all illuminated exit signs and emergency lights working properly?
- Are all exits and exitways unobstructed, ready for immediate use?
- Are all emergency action plans and procedures reviewed regularly?
- Are evacuation routes up-to-date and clearly posted?
- Date of last evacuation drill.

Fire Protection

- Are the proper class fire extinguishers available and visually checked every month?
- Are all extinguishers wall mounted, unobstructed (18” clearance), readily available?
- Is annual service performed on all extinguishers and are date tags attached?
- Have an adequate number of staff member been properly trained for extinguisher use?

Walking and Working Surfaces

- Are all floors relatively smooth and free of tripping hazards?
- Are steps, ramps, and handrails maintained in good repair?
- Are all corridors, walkways, and aisles maintained and free of obstructions?

Electrical

- Is all electrical equipment maintained in good working order?
- Are all electrical cords free of frayed areas, splices, or other worn conditions?
- Do all outlets and switches have cover plates to prevent accidental contact?
- No electrical cords are running over/under walls or through doorways, etc?
- Are all circuits properly identified in breaker/fuse panel boxes?
- Are breakers or fuse panel boxes readily accessible in emergencies and are unobstructed (at least 30” free space)?
- Is all electrical equipment grounded or double-insulated type?
- Are wall outlets/power strips overloaded (piggy backed) with too many electrical devices?
- Are Ground Fault Circuit Interrupters (GFCI) present?

Equipment, Furniture, and Fixtures

- Are all office furniture (chairs, desks, tables, etc.) in safe, useable condition?
- Are all cabinets and shelves properly loaded?

Hazardous Materials and Storage

- Is proper separation and appropriate storage (i.e. flammable cabinets) for hazardous materials available?
- Are current Material Safety Data Sheets (MSDS) easily available?

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Safety Inspection General Guidelines

These general guidelines have been designed to provide you with the necessary assistance in making the appropriate determination as to what should be observed and identified during the course of the safety inspection.

Chemical Substances

1. Is an inventory of all chemical substances available?
2. Are material safety data sheets available for any toxic or hazardous substances?
3. Have proper control procedures been instituted for any toxic or hazardous substances?
4. Are all chemicals properly labeled, dated and stored?

Housekeeping

1. Are all areas kept clean and arranged in an orderly fashion?
2. Are aisles and passageways kept clear?
3. Are storage areas posted with no smoking signs?
4. Are heavy items-stored on top shelves?

Electrical Apparatus

1. Are all disconnecting switches and circuit breakers labeled to indicate their use or the equipment served?
2. Are all energized parts of electrical circuits and equipment guarded against accidental contact by approved cabinets or enclosures?
3. Is sufficient access and working space provided and maintained about all electrical equipment to permit safe operation and maintenance?
4. Are all unused (including conduit knock outs) and electrical enclosures and filings closed with appropriate covers, plugs, or plates?
5. Are electrical enclosures such as switches, receptacles, junction boxes, etc., provided with tight fitting covers or plates?
6. Is exposed wiring and cords with frayed or deteriorated insulation repaired or replaced?
7. Are flexible cords and cables free of splices?
8. Are multiple plug adapters prohibited?
9. Have extension cords been removed from use or is their use limited?
10. If extension cords are being used, do they have a grounding conductor?
11. Is the use of flexible cords in place of permanent wiring prohibited?

Fire Prevention and Fire Protection Equipment

1. Is the facility equipped with fire alarms?
2. Is the facility equipped with smoke detectors?
3. Are fire extinguishers available in the facility?
4. Are fire extinguishers properly mounted, clearly marked, and readily accessible?
5. Are fire doors in good operating condition? Is the annual inspection current?
6. Are the fire doors unobstructed and protected against obstructions?
7. Are fusible links in place on the fire doors?
8. Is the local fire department well acquainted with your facility?
9. Are automatic sprinklers in place?
10. Are the water control valves, air, and water pressures checked weekly on the sprinkler system?
11. Are the-sprinkler control valves locked in an open position?

Flammable and Combustible Material

1. Are sprinkler heads protected by metal guards when exposed to possible damage?
2. Is proper storage practiced to minimize the risk of fire including spontaneous combustion?
3. Are approved containers and tanks used for the storage and handling of flammable and combustible liquids?
4. Are approved storage cabinets used for indoor storage of flammable and combustible liquids?
5. Is smoking prohibited in the areas where flammable and combustible materials are stored?

Hand Tools & Portable Equipment

1. Are hand tools and other portable equipment regularly inspected for safe condition?
2. Are portable electric tools and equipment grounded or double insulated?
3. Are power tools equipped with safety guards?

Lighting

1. Is there an adequate interior and exterior lighting system?
2. Is the lighting appropriate for the type of activity that is being performed?
3. Is an emergency lighting system available should there be a power failure?

Overhead Structures

1. Is there a hazard of being struck by any falling material from an overhead structure?
2. Is ground to roof access minimized?
3. Is there a systematic method to inspect rooftops and other overhead structures on a regularly scheduled basis?

Personal Protective Equipment

1. Is personal protective equipment available?
2. Is all protective equipment maintained in a sanitary condition and ready for use?
3. Are eye wash facilities available if there is an exposure to a corrosive material?

Boilers and Internal Heating Systems

1. Is there a preventative maintenance plan?
2. Are boilers and heating systems thoroughly and periodically inspected?
3. Are all individuals properly trained to operate the boilers and heating systems?
4. Is there a fully enclosed boiler room and is it of non-combustible construction?
5. Is there a-non-combustible ceiling over the boiler and is an automatic sprinkler system available?
6. Is proper clearance provided around exteriors of the boiler room walls so that combustible materials are not stored against the walls?
7. Is there a test and servicing program whereby operating controls safety controls and safety and relief valves are tested and maintained at regular intervals?
8. Is there a service organization that checks and services the boilers during the heating season as well as doing the normal out-of-season checking and cleaning?
9. Is there a boiler log that is being kept to make sure that the necessary test, maintenance, and services are performed, and are these records available at all times?
10. Are all oil and gas fire devices equipped with flame failure controls that will prevent flow of fuel if pilots or main burners are not working?
11. Is the storage of flammable and combustible materials prohibited in the boiler room or in and around the internal heating system?

Exits and Access: Means of Egress

1. Are all exits visible and unobstructed?
2. Are all exits marked with a readily visible sign that is properly illuminated?
3. Are there sufficient exits to ensure prompt escape in case of emergency?
4. Are special precautions taken to protect individuals during construction, remodeling or repair operations?
5. Are the directions to exits, when not immediately apparent, marked with visible signs?
6. Are doors or other passageways, which are neither exits nor access to an exit, and located where they may be mistaken for exits, appropriately marked “NOT AN EXIT" OR “STOREROOM," ETC.?
7. Are floor openings guarded with a cover, a guardrail or equivalent on all sides (except at entrance to stairway or ladders)?

Walking and Standing Surfaces

1. Are aisles and passageways kept clear?
2. Are aisles and walkways appropriately marked?
3. Are wet surfaces covered with non-slip materials?
4. Are holes in the floor, sidewalk or other walking surface repaired properly, covered, or otherwise made safe?
5. Are spills cleaned up immediately?
6. Are standard guardrails provided wherever aisle or walkway surfaces are elevated more than 30" above any adjacent floor or the ground?
7. Do standard stair rails or handrails on all stairways have four or more risers?
8. Are all stairways at least 22" wide?
9. Do stairs have at least a 7' overhead clearance?
10. Are step risers on stairs uniform with no riser spacing greater than 7½"?
11. Are steps on stairs and stairways designed with a slip resistant surface?
12. Are stairway handrails located between 30" and 34" above the leading edge of stair treads?
13. Do stairway handrails have at least 1½" of clearance between the handrails and the wall or surface they are mounted on?
14. Are stairway handrails capable of withstanding a load of 200 pounds applied in any direction?
15. Are portable wood ladders and metal ladders adequate for their purpose, in good condition, and provided with secure footing?
16. Are surfaces elevated more than 30" above the floor or ground provided with standard guardrails?

Alarm Systems

1. Is there a fire alarm system?
2. Is there-a smoke detection system?
3. Is there a burglar or intrusion alarm system?
4. Do the alarm systems sound locally?
5. Does the alarm system sound at the police department, fire department?
6. Are these alarm systems tested on a periodic basis?
7. Are emergency phone numbers posted and readily available to employees?

Vehicles and Transportation Equipment

1. Is there a preventative maintenance program for all vehicles in use?
2. Are vehicles equipped with a first aid kit and fire extinguisher?
3. Is there an occupant restraint system in place in all vehicles?
4. Do all passengers of the vehicles utilize this occupant restraint?
5. Have all operators of the vehicles completed a defensive driving course?

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Safe Work Methods Interview

Department, Location and Shift: _____

Date and time of survey: _____

Subject	Yes	No	Comments
Is work area kept clean and organized?			
Are all employees using hearing protection?			
Are all employees using safety glasses?			
Are all employees using proper safety shoes?			
Are employees working in a safe position?			
Is the employee using the correct tool?			
Are tools being used in good condition?			
Are tools being properly stored?			
Is employee lifting with their legs?			
Does the employee work with a machine?			
If yes, do they know where to E-Stop is?			
Is the employee operating a forklift?			
If yes, do they have a license?			
If yes, is the forklift inspected?			
Does employee feel safe while working?			

Employee Concerns List three (3) housekeeping concerns the employee has:
1.
2.
3.

List five (5) safety concerns the employee has:
1.
2.
3.
4.
5.

How often does the Supervisor talk about safety with the employee?
How often does the Supervisor talk about housekeeping with the employee?
What is the number 1 injury in the workplace?
What can employees do to reduce heat injuries? (Drink water prior to work and every 20 minutes)
What can management do to improve safety?
What can management do to improve housekeeping?

Name of person conducting survey: _____

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Department Safety Survey

Department/Shift Surveyed: _____ Dept. Supervisor: _____

Subject	Yes	No	Comments
Are all flammables properly stored?			
Are pits and floor openings guarded?			
Are there any trip hazards present?			
Are walkways clear?			
Are employees using walkways?			
Are all guards in place?			
Are all guards in good condition?			
Is any additional guarding needed?			
Are all lights working?			
Are employees working safely?			Who/Why?
Are all personnel in area wearing required PPE?			Who?
Are all personnel wearing work specific PPE?			Who?
Are fire extinguishers freely accessible?			
Are exits freely accessible?			Where?
Are tools being stored properly?			
Is any horseplay observed in area?			
Are there any leaking containers?			
Are secondary containers labeled?			
Are all lockout points identified?			Where?
Are LOTO stations supplied and visible?			
Is LOTO utilized properly?			
Do machines have LOTO instructions posted?			
Are first aid kits available and stocked?			
Are eyewash/shower stations clean and working?			
Is fall protection used when needed?			
Are forklifts using their horn at intersections?			
Are any loads being lifted above employees head?			Who?
Does the forklift operator have a license on them?			
Has a forklift inspection been performed?			
Are forklifts being operated in a safe manner?			
Are electrical cords free from fraying or separation?			Where?
Do all electrical plugs have ground prongs?			Where?
Are there any electrical hazards or problems?			Where?
Are air hoses free from defects?			Where?
Is air reduced to 30psi or less?			Where?
Are cranes used properly and inspected daily?			
Is material stored at a safe height?			
Is stacked material stable?			
Are all safety concerns addressed by management?			

Supervisor Review Signature: _____

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33. Additional Checklists

A. Chain Sling Safety Inspection
B. Crane Inspection Record
C. Job Safety Analysis
D. Ladder Inspection Checklist
E. Lockout/Tagout Verification Checklist
F. Machine Guarding Survey
G. Maintenance Service Request
H. Near-Miss Incident Report
I. Power Press Inspection
J. Property Damage Report
K. Respirator Assignment Record
L. Respirator Cleaning Record
M. Respirator Filter Change Out Schedule and Record
N. Respirator Fit Test Record
O. Respirator Inspection Record
P. Respirator Not Required
Q. Respirator Selection Record
R. Respirator User Seal Check
S. Training Record
T. Waste Areas Weekly Inspection

A. CHAIN SLING SAFETY INSPECTION

Before use, inspect slings visually for damage or defects. Damaged or defective slings shall be immediately removed from service. If removed from service, notify Maintenance Dept. or Safety Coordinator.

Manufacturer:	Model:	Serial No:	Reach:	Capacity:	Location:

CHAIN SLINGS

CHAIN	PROBLEM	OK	DISCARD	REMARKS
Stretch or wear				
Grooving				
Twisted or bent links				
Cracks				
Gouges				
Corrosion				
Burns				
MASTER LINKS				
Stretch or wear				
Twisted or bent				
Cracks				
Gouges				
Corrosion				
Burns				
Hooks:				
Defects or cracks				
Throat opening (Expanded)				
Twist				
OTHER ITEMS				
Identification tag				

Date of Safety Inspection: Signature of Inspector:

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B. CRANE INSPECTION RECORD (MONTHLY)

DATE: _____ DEPARTMENT: _____ CRANE/HOIST ID: _____

EACH CRANE/HOIST MUST BE VISUALLY INSPECTED PRIOR TO USE EACH DAY:

1. CHECK CONDITION OF HOOK.

IS HOOK HARDWARE LOOSE OR MISSING?	YES [ ] NO [ ]
IS HOOK CRACKED OR BENT?	YES [ ] NO [ ]
DOES THE SAFETY LATCH FUNCTION PROPERLY?	YES [ ] NO [ ]
IS HOOK THROAT OPENING OVER EXTENDED?	YES [ ] NO [ ]

2. CHECK CONDITION OF HOIST CHAIN/CABLE.

DOES CHAIN/CABLE SHOW SIGNS OF EXCESSIVE WEAR?	YES [ ] NO [ ]
ARE CHAIN LINKS TWISTED, STRETCHED OR CRACKED?	YES [ ] NO [ ]
IS CABLE TWISTED, KINKED, OR CRACKED?	YES [ ] NO [ ] NA [ ]

3. CHECK FOR UNUSUAL NOISES AND HOIST CONDITIONS.

ARE UNUSUAL NOISES PRESENT?	YES [ ] NO [ ]
IS HOIST OPERATING SMOOTHLY?	YES [ ] NO [ ]
IS PENDANT CONTROL OPERATING PROPERLY?	YES [ ] NO [ ] NA [ ]

4. TEST "UP" LIMIT SWITCH, RUN HOIST WITHOUT A LOAD IN SLOW SPEED. THE HOOK MUST STOP BEFORE IT RUNS INTO THE BOTTOM OF THE HOIST.

DOES THE LIMIT SWITCH WORK?	YES [ ] NO [ ] NA [ ]

IF THE CRANE/HOIST DOES NOT PASS ALL OF THE ABOVE TESTS, CONTACT MAINTENANCE AND TAG THE CRANE/HOIST "OUT OF SERVICE".

INSPECTED BY: _____

REVIEWED BY: _____ DATE: _____

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C. JOB SAFETY ANALYSIS (JSA)

Workplace safety requires a complete understanding of the hazards associated with each job or task, and implementation of the necessary precautions to eliminate or minimize these hazards. At its most basic level, a hazard is considered a condition or activity that, if left unrecognized or uncontrolled, can result in an injury, illness, or even death. The Job Safety Analysis (JSA), is a proven and effective technique of focusing on the job or tasks to identify hazards and the controls necessary to eliminate or reduce hazards.

Town of			**JSA No: 001**
Job/Function:	**Analysis Date:**	**Review Date:**	**Department:**
Analysis Performed By:	**Approved By:**	**Implemented Date:**	
PPE Required:			

STEP	***HAZARD***	***PREVENTIVE MEASURE***
1. Inspecting spray equipment	A) Trip/Fall B) Chemical exposure C) High air pressure exposure	A) Watch your step. Keep floor clean from debris B) Wear rubber gloves when handling chemicals C) Ensure air valve is turned OFF
2. Mixing paint with thinner	A) Skin irritation, burn B) Inhalation	A) Wear gloves and tyvek suit B) Wear half mask respirator
3. Applying painting material	A) Trip/Fall B) Chemical exposure from hose and spray gun rupture	A) Watch your step. Keep floor clean from debris B) Use caution when dragging out spray lines for snags or sharp edges. Make sure tip guard is in at all times while spraying.
4. Disposing of used paint and thinner waste	A) Trip/Fall B) Back Strain C) Chemical spill and exposure	A) Watch your step. Keep floor clean from debris. Watch your sorroundings. B) Use proper lifting techniques. Keep back straight, bend at the knees C) Use care when carrying thinner container to prevent spill. Wear neoprene gloves and tyvek suit. Ensure drum funnel is properly closed and secured.

Ergonomics				
Over Stretching [X]	Excessive Bending/Squatting [ ]	Bent Neck [ ]	Excessive Walking [X]	Excessive Climbing [ ]
Over Reaching [X]	Long periods of Standing [ ]	Excessive Bending of the Wrist [ ]	Repetitive Lifting [ ]	

Employee's Signature:		Date:	
Instructor's Signature:		Date:	

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D. Ladder Inspection Checklist

S/N _____ Size _____ Type _____ Duty Rating _____ Load Rating _____

Examine each of the components listed to determine condition. Check the appropriate box as required.

	N/A	Damaged or Defective	Ok
SIDE RAILS: Check for bends, dents, splits, cracks or other defects…	☐	☐	☐
STEPS: Check for bends, splits, cracks or other defects…….	☐	☐	☐
RUNGS: Check for bends, splits, cracks or other defects …….	☐	☐	☐
TOP: Check for bends, splits, cracks or other defects…….	☐	☐	☐
BACK LEG BRACES: Check for bends, splits, cracks or other defects	☐	☐	☐
METAL LOCKS: Check to ensure locks are fully functional…..…….	☐	☐	☐
ALL METAL COMPONENTS: Check for excessive rust or corrosion…		☐	☐
RIVETS: Check to ensure both head and crimp are intact on all rivets..	☐	☐	☐
NUTS/BOLTS: Check to ensure nuts are tight and threads are not stripped ……..	☐	☐	☐
CRIMPS/SWAGES: Check for looseness, cracking or other conditions	☐	☐	☐
WELDS: Inspect all welds for cracks or damaged…….	☐	☐	☐
SAFETY FEET: Check to ensure feet and thread are in good condition	☐	☐	☐

List in detail all defects found: _____

_____

_____

DISPOSITION: (Check One)

- Remove From Service and Destroy ☐
- Remove From Service and Repair ☐
- Okay To Use As Is ☐

Inspected By: _____ Date: _____

Reviewed By: _____ Date: _____

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E. LOCKOUT/TAGOUT VERIFICATION CHECKLIST

This form must be completed prior to working on the machine or equipment

Equipment Name or S/N: _____Date: _____

(1) Are all the energy sources lockout point locked out according to the LOTO instructions?

Yes No If no, list: _____

(2) Is each lockout point listed, lockable? Yes No

If no, which needs replacing? _____

(3) After de-energizing, did you check for stored energy to ensure it was relieved?

Yes No If No, **"Do Not Work On The Machine Until You Have"**

(4) Insure every employee has his or her own Lockout Lock on the machine, prior to working on the machine.

(5) Are there any other hidden dangers not listed in the LOTO instructions? Yes No

If yes, list: _____

(6) Any additional safety instructions or comments that need to be added? Yes No

If yes, please make comments and list here: _____
_____

(7) Notify all affected employees of the LOTO. Yes No
_____
_____

(8) In the event of a shift change during a LOTO situation make sure you change locks with the next shift. Please sign below.
_____ to _____

Employee(s) locking out the machine please sign here: _____
_____
_____

Submit completed forms to the Risk Manager or Public Works Supervisor monthly

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F. Machine Guarding Survey

Location: _____ Machine Name/ID: _____

Safeguards Present: _____

Machine Safeguards (Number Code):

1- Gates	7- Back/Side Protection
2- Pullbacks	8- Safety Mats
3- Light Curtain	9- Trip Device
4- Two-Hand Control	10- Self-Adjusting
5- Barrier Guards	11- None
6- Interlock	12- Other

POINT-OF-OPERATION SAFEGUARDS

	YES	NO
Is the point-of-operation safeguard(s) provided for the machine in place?	_____	_____
Is the point-of-operation guard(s) in good condition? (i.e., not broken, permits adequate visibility, securely attached, etc.)	_____	_____
Can routine operations be performed without removing or bypassing the guard(s)?	_____	_____
Does the guard(s) allow proper body positioning while operating the machine?	_____	_____
Are machine operators properly trained in the use and purpose of the guard(s)?	_____	_____

If you answered **NO** to any of the above questions, please explain in the comments section. Also, if you think anything can be done to improve the guard(s) please explain.

Comments: _____

Do you know of any other hazards present to operators of this machine? Please list, along with any recommendations you may have to correct the situation:

Machine Operator: _____ Date: _____

Dept Supervisor: _____Date: _____

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G. MAINTENANCE SERVICE REQUEST

REQUESTOR: _____ DATE: _____ MACH S/N: _____

EQUIPMENT: _____ LOCATION: _____

CHECK ONE: **SAFETY [ ]** **MECHANICAL [ ]**

PROBLEM: _____

SUPERVISOR SIGNATURE: _____ DATE: _____

URGENT [ ]

MAINTENANCE REPORT

REPAIRS NEEDED: _____

PARTS REPLACED: _____

DATE REPAIRS COMPLETED: _____

REMARKS: _____

MAINTENANCE SIGNATURE: _____

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H. NEAR-MISS INCIDENT REPORT

Date: _____ **Dept:** _____ **Time of Incident:** _____ ***am [ ] pm [ ]***

Date of Incident: _____ **Location of Incident:** _____

Description of Incident: _____

_____

_____

_____

Person(s) involved in incident: _____
Equipment involved in incident: _____
Person(s) reporting incident: _____
Witness(es) to incident: _____

Describe actual/potential adverse effects to workers and/or equipment:

_____

_____

_____

Cause(s) of incident: _____

_____

_____

_____

Corrective Action: _____

_____

_____

_____

_____

Person completing report: _____ **Date:** _____
Supervisor: _____ **Date:** _____
Safety Coordinator: _____ **Date:** _____

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I. POWER PRESS INSPECTION CHECKLIST (WEEKLY)

Machine S/N: _____ Inspected by: _____ Date: _____

Inspect the following items to ensure they are functioning properly, in good working condition and adjusted properly:

FRAME AND CRANKSHAFT: Cracked, bent, broken or loose parts, loose brackets

LUBRICATOR LEVER: Pump once a week

FLYWHEEL: Rotates in correct direction, free running, covered

GEARS: Excess noise, lubrication

CLUTCH: **Full Revolution:** Single stroke capability, loose or worn parts, including linkage, weak or broken springs, compression springs operating on rod, or guided within hole or tube, properly adjusted.
Air or oil leads, proper alignment, disengagement, stopping position, worn clutch lining, weak or broken springs, power or air pressure failure or deactivation, momentary operation of stop control applies brake and releases clutch, retripping required, red stop button.

BRAKE: Brake lining worn, brake properly adjusted

SLIDE AND GIBS: Any scoring

CONNECTION/SLIDE ADJUSTING SCREW: Proper bearing/ball seat clearance, screw turns freely

AIR SYSTEM: Proper air pressure, valve operation, pressure gages, leaks

ELECTRICAL SYSTEM: Grounding, condition of wiring, relays, rotary limit switches, solenoids, motor starter. Retripping required is any components by-passed?

POINT OF OPERATION SAFEGUARDING: Barriers in place, proper adjustment and maintenance

If the power press does not pass all of the inspection points above, tag the press;

"OUT OF SERVICE"

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J. Property Damage Report

Report No: _____ Employee No: _____ Date: _____

Reported By: _____ Dept: _____

Date of Incident: _____ Time of Incident: _____ am [ ] pm [ ]

Location of Incident: _____

Employee Involved: _____

Provide brief description of the type of property damage: _____

_____

_____

_____

Describe what happened: _____

_____

_____

_____

Witnesses: _____

_____

Estimated Damage Value: _____

Employee Signature: _____ Date: _____

Supervisor Signature: _____ Date: _____

Attach Property Damage Photo

Report No: _____ Date: _____

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K. RESPIRATOR ASSIGNMENT RECORD

NOTE: The criteria under which a respirator is to be issued and used are specific for the conditions detailed below. If conditions (work practices, contaminants etc.) change, a new form must be filled out and filed.

1. EMPLOYEE INFORMATION

Employee Name:	ID Number:
Facility:	Dept: 200
Job Title:	Work Phone:

2. ISSUANCE VALIDITY PERIOD

Issue Date:	Start Date:	Stop Date:

3. RESPIRATOR USAGE REQUIREMENTS

Type Respirator	Dual Cartridge Air-Purifying, Half-Mask				
Manufacture		Model #		Size #	

Type of Respirator to be Issued: Half-Mask, Dual Cartridge Air-Purifying

To be Worn Under the Following Conditions:	To be worn only under non IDHL conditions.

Estimated Cartridge/Filter Replacement Frequency: See Cartridge Change-out Form

☐ Hourly	☐ Twice each Shift	☐ Daily	☐ Weekly	☐ Monthly	☐ Other/Specify

4. MEDICAL SURVEILLANCE

INITIAL EXAMINATION: ☐ NOT RECOMMENDED FOR RESPIRATOR ISSUANCE

At this examination on _____ no contraindications to the use of respiratory equipment described above have been identified.

Physician's Name:	Physician's Signature:

RE-EXAMINATION: ☐ NOT RECOMMENDED FOR RESPIRATOR ISSUANCE

Date:	Contraindications: ☐ Yes ☐ No

Comments:

Physician's Name:	Physician's Signature:

RE-EXAMINATION: ☐ NOT RECOMMENDED FOR RESPIRATOR ISSUANCE	
Date:	Contraindications: ☐ Yes ☐ No
Comments:	
Physician's Name:	Physician's Signature:

5. PROGRAM SURVEILLANCE

REQUIREMENT	DATE	BY WHOM	EMPLOYEE'S SIGNATURE	COMMENT
Informed of Hazard(s)				
Trained in Safe/Proper Work Practice(s)				
Issued Respirator				
Trained in Respirator Usage				
Fit Tested (qualitative)				
Trained in Emergency Procedure(s)				

6. ADDITIONAL COMMENTS

7. EMPLOYEE NOTIFICATION

I certify that I have been informed of the requirements detailed on the front and reverse side of this form. I will contact my supervisor if at any time I am not sure a safe work practice. * Further detailed on attachment: Yes ☐ No ☐

Name:	Signature:	
Title:	Date:	Time:

FORM RETENTION INFORMATION		**ATTACHMENTS**
Retention Location:	Filed By:	*Yes ☐ No ☐
Date Filed:		*See Following Pages

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L. RESPIRATOR CLEANING RECORD

OWNER INFORMATION

OWNER (if individually issued): LAST NAME FIRST

COMPANY NAME _____ DEPT _____

EMPLOYEE ID _____ WORK PHONE _____

RESPIRATOR INFORMATION

RESPIRATOR TYPE _____

MANUFACTURE _____ MODEL #

SIZE # _____ DESCRIPTION _____

DATE OF INSPECTION _____ TIME _____

SIGNATURE _____

CLEANING REQUIREMENTS TIGHT FITTING RESPIRATORS

Estimated Frequency: (Check all that apply)

☐ Annual	☐ Twice each Shift	☐ Daily	☐ Weekly	☐ Monthly	☐ Before Use	☐ After Use

COMPONENT:	CLEANING REQUIREMENTS	
Elastomeric Parts Deteriorating?	Are all plastic components in good condition, pliable?	OK ☐
Exhalation Valve Assembly:	Is exhalation valve cover and assembly in good condition?	OK ☐
Head Strap Assembly:	Are headbands and plastic cradle in good working condition?	OK ☐
Inhalation Valve Body:	Are any of the three lugs broken?	OK ☐
Inhalation Valve Diaphragms:	Are valve diaphragms distorted or missing?	OK ☐
Face Piece:	Are swivel clips in good condition?	OK ☐

COMMENTS:

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CLEANING REQUIREMENTS TIGHT FITTING RESPIRATORS – Continued

Respirator Cleaning Procedures (Mandatory)

These procedures are provided for employee use when cleaning respirators. They are general in nature, and the employee as an alternative may use the cleaning recommendations provided by the manufacturer of the respirators used by their employees, provided such procedures are as effective as those listed in 29 CFR 1910.134 Appendix B-2 (see below). Equivalent effectiveness simply means that the procedures used must accomplish the objectives set forth below.

Procedures for Cleaning Respirators:

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

B. Wash components in warm [110 deg. 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 [110 deg. F] maximum), preferably running water.

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

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

2. 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 [110 deg. F] maximum), preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.

F. Components should be hand-dried with a clean lint-free cloth or air-dried.

G. Reassemble facepiece, replacing filters, cartridges, and canisters where necessary.

H. Test the respirator to ensure that all components work properly.

INSPECTOR'S NAME/TITLE:			
SIGNATURE:		**DATE:**	

FORM RETENTION INFORMATION **ATTACHMENTS**

Retention Location: Filed By: **Yes ☐** **No ☐**

M. RESPIRATOR FILTER CHANGE-OUT SCHEDULE AND RECORD

OWNER INFORMATION			
OWNER (if individually issued):	**LAST NAME**	**FIRST**	**MIDDLE INITIAL**

COMPANY NAME		**DEPT**	
EMPLOYEE ID #		**WORK PHONE**	

JOB ASSESSMENT INFORMATION		
JOB TITLE:	**SHIFT:**	**JOB LOCATION:**
ASSESSMENT DATE:	**ASSESSORS NAME:**	
ASSESSORS TITLE:	**SIGNATURE OF ASSESSOR:**	
REMARKS		

RESPIRATOR INFORMATION					
RESPIRATOR MODEL		**MANUFACTURE**		***SIZE***	

CHANGE-OUT SCHEDULE						
Cartridge/Filter Replacement Frequency:						
☐ Annual	☐ Twice each Shift	☐ Daily	☐ Weekly	☐ Monthly	☐ Before Each Use	☐ After Each Use
☐ Other/Specify:	**ANNUALLY**	Date Changed:				

Conditions Under Which Change-Out Must Occur: (detail specifics for change-out):

Replace the cartridges and filters when breathing becomes unconfortable or you can smell or taste the comtaminant or you experience nose or throat irritation. Follow manufacturer's recommendations.

CHANGE-OUT LOG

Note: If any increase in breathing resistance is encountered prior to change-out report to your supervisor immediately.

Name	Signature	Date/Time	Filter Type	Increased Resistance In Breathing Prior To Change?		Remark/Problems
			Air-Purifying	☐ **YES**	☐ **NO**	
			Air-Purifying	☐ **YES**	☐ **NO**	
			Air-Purifying	☐ **YES**	☐ **NO**	
			Air-Purifying	☐ **YES**	☐ **NO**	
			Air-Purifying	☐ **YES**	☐ **NO**	
			Air-Purifying	☐ **YES**	☐ **NO**	
			Air-Purifying	☐ **YES**	☐ **NO**	
			Air-Purifying	☐ **YES**	☐ **NO**	
			Air-Purifying	☐ **YES**	☐ **NO**	
			Air-Purifying	☐ **YES**	☐ **NO**	
			Air-Purifying	☐ **YES**	☐ **NO**	
			Air-Purifying	☐ **YES**	☐ **NO**	
			Air-Purifying	☐ **YES**	☐ **NO**	
			Air-Purifying	☐ **YES**	☐ **NO**	
			Air-Purifying	☐ **YES**	☐ **NO**	
			Air-Purifying	☐ **YES**	☐ **NO**	
			Air-Purifying	☐ **YES**	☐ **NO**	

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N. RESPIRATOR FIT TEST RECORD

ASSESSOR INFORMATION			
NAME:		**ASSESSOR'S TITLE:**	
COMPANY NAME:		**DATE:**	
EMPLOYEE ID # (if applicable):		**WORK PHONE:**	

COMPANY INFORMATION			
COMPANY NAME:		**LOCATION:**	

RESPIRATOR INFORMATION			
RESPIRATOR BRAND NAME:		**RESPIRATOR TYPE:**	Half Mask, Air Purifying Cartridges for Organic Vapors
REMARKS:	This Fit Test meets the requirements of 1910.134 "Respiratory Protection" Appendix A		

EMPLOYEE INFORMATION

Employee Name	Signature	Emp ID:	*Pass*	*Fail*	Comments

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O. RESPIRATOR INSPECTION RECORD

OWNER INFORMATION					
OWNER (if individually issued):	**LAST NAME**		**FIRST**		**MIDDLE INITIAL**
COMPANY NAME			**DEPT**		
EMPLOYEE ID # (if applicable)			**WORK PHONE**		

RESPIRATOR INFORMATION					
TYPE RESPIRATOR					
MANUFACTURE			**MODEL #**		
SIZE #		**DATE OF INSPECTION**		**TIME**	

INSPECTION CRITERIA		
THIS INSPECTION IS BEING CONDUCTED <u>PRIOR</u> TO USE	**INITIALS**	
THIS INSPECTION IS BEING CONDUCTED <u>AFTER</u> USE	**INITIALS**	

COMPONENTS:	**DEFECTS FOUND:**	**CORRECTIVE ACTION TAKEN:**
Cartridge Holder:		
Cartridge Threads/Fittings:		
Cartridge/Canister:		
Cartridge Filter:		
Connections:		
Elastomeric Parts Deteriorating?		
Elastomeric Parts Pliable?		
Exhalation Valve Assembly:		
Facepiece:		
Gaskets:		
Harness Assembly:		
Headbands:		
Hose Assembly:		
Inhalation Valve:		
Nosecup Valves:		
Speaking Diaphragm:		

COMMENTS:			
INSPECTOR'S NAME/TITLE			
SIGNATURE		**DATE**	

FORM RETENTION INFORMATION		**ATTACHMENTS**
Retention Location:	Filed By:	***Yes ☐ No ☐**

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P. Information for Employees Using Respirators When Not Required Under *29 CFR 1910.134*

To the employer: The statement below must be read by all employees using respirators not required under the Respiratory Protection Standard

To the employee:

Can you read?	Yes			No		

Your employer is required to have you read the statement below if you are using respirators not required under the Respiratory Protection. Ensure you keep a copy of this form for your personal records.

EMPLOYEE INFORMATION

Employee Name:	ID Number:
Facility:	Dept:
Job Title:	

CERTIFICATION: I certify that I have read and understand the below Respiratory Protection Statement as required by the Occupational Safety and Health Administration (OSHA).

EMPLOYEE SIGNATURE:		**DATE:**	

OSHA RESPIRATORY PROTECTION STATEMENT

To The Respirator User:

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, of if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You Should 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.

FORM RETENTION INFORMATION		ATTACHMENTS
Date Filed:	Filed By:	**Yes [ ] No [ ]**

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Q. RESPIRATOR SELECTION RECORD

ASSESSOR INFORMATION			
ASSESSORS TITLE:	**LAST NAME**	**FIRST**	**MIDDLE INITIAL**

COMPANY NAME		**DATE**	
EMPLOYEE ID # (if applicable)		**WORK PHONE:**	

JOB ASSESSMENT INFORMATION			
SOURCE OF DATA		**ASSESSMENT REPORT NAME**	
ASSESSMENT DATE		**ASSESSORS NAME**	
ASSESSORS TITLE		**SIGNATURE OF ASSESSOR**	
REMARKS			

RESPIRATOR SELECTION DATA					
Job Title:	**Department:**	**Exposure Means:**		**Basis of Data:**	**Type of Respirator to be used:**
		Vapor	**Levels**		

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R. User Seal Check Procedures For Respirators As Required Under *29 CFR 1910.134* (Mandatory)

To the employer: The seal check procedures listed below must be accomplished by all employees using respirators.

To the employee:

Can you read? Yes No

Your employer is required to have you perform check seal procedures if you are using a respirator. The procedures must be accomplished each time you put on a respirator before entering a hazardous respiratory environment. Ensure you keep a copy of this form for your personal records.

EMPLOYEE INFORMATION

Employee Name: Job Title:

ID Number: Dept:

CERTIFICATION: I certify that I have read and understand the below procedures as required by the Occupational Safety and Health Administration (OSHA).

EMPLOYEE SIGNATURE: _____ **DATE:** _____

OSHA RESPIRATORY PROTECTION SEAL CHECK PROCEDURES

To The Respirator User:

The individual who uses a tight-fitting respirator is to perform a user seal check to ensure that an adequate seal is achieved each time the respirator is put on. Either the OSHA required positive and negative pressure checks, or the respirator manufacturer's recommended user seal check method must be used. User seal checks are not substitutes for qualitative or quantitative fit tests.

Facepiece Positive and/or Negative Pressure Checks:

A. Positive pressure check. Close off the exhalation valve and exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.

B. Negative pressure check. Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the facepiece collapses slightly, and hold the breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

Manufacturer's Recommended User Seal Check Procedures:

The respirator manufacturer's recommended procedures for performing a user seal check may be used instead of the positive and/or negative pressure check procedures provided that the employer demonstrates that the manufacturer's procedures are equally effective.

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S. Training Record

Date: _____ Instructor's Name: _____ Title: _____

City/Town: _____ Length of Session: _____

Training Type: _____

Attendees (Print)	Dept. Name	Signature
1.		
2.		
3.		
4.		
5.		
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24.		
25.		

Instructor's Signature: _____ Date: _____

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T. Waste Area(s) Weekly Inspection

Date: _____ Inspected By: _____

Instructions*: Inspect each item and check "yes" if the item meets requirements, "no" if defective and n/a if not applicable. Defective items must be corrected immediately. Forward this inspection form to the Safety Dept. each week.*

1) Containers: Requirements	Meets
Containers clearly labeled. Labels are legible	[ ] Yes [ ] No [ ] N/A
Labels indicate accumulation start date	[ ] Yes [ ] No [ ] N/A
Stored less than 90 days	[ ] Yes [ ] No [ ] N/A
Containers placed on secondary containment	[ ] Yes [ ] No [ ] N/A
Containers are kept closed and securely sealed	[ ] Yes [ ] No [ ] N/A
Free of structural defects, dents, leaks, and severe rusting	[ ] Yes [ ] No [ ] N/A
Clean and free of chemical residue and/or debris	[ ] Yes [ ] No [ ] N/A
Containers are not overfilled. Liquids: Leave 3" headspace	[ ] Yes [ ] No [ ] N/A
Fire extinguishers are present	[ ] Yes [ ] No [ ] N/A
2) Secondary Containment Units and Areas	
Floor surfaces are clean, free of cracks, and in good repair	[ ] Yes [ ] No [ ] N/A
Area organized and free of clutter and debris	[ ] Yes [ ] No [ ] N/A
Empty of rainwater or any other residue liquid or solid	[ ] Yes [ ] No [ ] N/A
No obvious leaks or damage	[ ] Yes [ ] No [ ] N/A
Under of roof, covered or tarped	[ ] Yes [ ] No [ ] N/A
Fire extinguishers are present	[ ] Yes [ ] No [ ] N/A
3) Gas/Diesel & Oil Tanks	
All are clearly labeled. Proper signs and identification are in place	[ ] Yes [ ] No [ ] N/A
Any leaks visible from tanks, hoses, or nozzles	[ ] Yes [ ] No [ ] N/A
Gas/diesel tank cap gasket in good condition and secured	[ ] Yes [ ] No [ ] N/A
Fire extinguishers are present	[ ] Yes [ ] No [ ] N/A
Alarm test	[ ] Yes [ ] No [ ] N/A
4) Incompatible Materials	
Container is compatible with the type of waste	[ ] Yes [ ] No [ ] N/A
Incompatible wastes are segregated into separate containers	[ ] Yes [ ] No [ ] N/A
Hazardous wastes are not mixed with universal or common waste	[ ] Yes [ ] No [ ] N/A
5) Communication	
Radio and/or telephone in close proximity	[ ] Yes [ ] No [ ] N/A
6) Safety and Personal Protective Equipment (PPE)	
Shower/eyewash station available, functional, inspected, easily accessible	[ ] Yes [ ]No [ ] N/A
Personal protective equipment available and in good condition	[ ] Yes [ ] No [ ] N/A
Spill response and cleanup materials present and their location identified	[ ] Yes [ ] No [ ] N/A

Comments: _____

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