Foodborne Illnesses – Quick Tips

It is estimated by the Centers for Disease Control and Prevention (CDC) that one in six Americans (or roughly 48 million people) suffer the effects of a foodborne illness annually. Of these individuals, 128,000 will require hospitalization and 3,000 will eventually die as a result of the illness. More than 250 known diseases are contracted through food contaminated by bacteria, viruses, parasites, toxins, metals and prions. Foodborne-disease outbreaks (FBDOs) happen every year, sometimes affecting multiple states and many people, which can be traced back to a variety of food items. Most FBDO attract a lot of media attention due to the improved illnesses reporting, which in most instances will lead to food item recalls.

One well known FBDO case, which started in September of 2008, according to the CDC would spread to 46 states and leave 714 individuals infected and nine dead in its wake. The outbreak would eventually be linked to peanut butter contaminated with Salmonella Typhimurium. This case prompted one of the largest food recalls in U.S. history, and lead to several company executives and employees receiving prison sentences.

Another FBDO the CDC reported in 2015 involved strains of Salmonella Poona infection that was traced to cucumbers imported from Mexico. A total of 907 people were infected in 40 states, which resulted in 204 hospitalizations and several deaths.

Three bacteria, E. coli, Salmonella, and C. perfringens, represent some of the most common causes of foodborne illness. These foodborne illnesses are easily diagnosed due to tests that allow for the detection of the pathogens in a person’s system.

- **coli:** This bacteria is carried in cattle or similar animals. Foodborne illness from this bacteria is caused by consumption of food or water contaminated by small amounts of feces. You can also contract E. coli by consuming

unpasteurized products. E. coli can spread from person to person. The symptoms resulting from this infection include severe and bloody diarrhea and painful abdominal cramps. These symptoms are usually not accompanied by a fever. The CDC estimates that around five to 10 percent who are diagnosed with certain strains of E. coli infections develop a potentially life-threatening complication known as hemolytic uremic syndrome (HUS) that can lead to temporary anemia, profuse bleeding and kidney failure.

- **Salmonella:** This is a bacteria carried in the intestines of birds, reptiles and mammals. It is contracted by ingesting a variety of different raw or undercooked foods from animal origin. The symptoms resulting from infection by these bacteria include fever, diarrhea and abdominal cramps as well as headaches and nausea.
- **perfringens:** This is a rod-shaped bacteria that lives in environments that do not contain oxygen, such as in the intestines of humans and domesticated animals. This bacteria is commonly called the cafeteria germ, as it results from food left at room temperature for extended periods of time. These bacteria produce spores that exist in soil, sediment, and areas prone to human or animal fecal pollution. The symptoms resulting from infection by this bacteria include abdominal cramps and diarrhea that usually resolve in one to two days. Ingesting large numbers of these bacteria could lead to necrotic enteritis, leading to severe damage to the intestines, which can be fatal.

Diagnosis

The foodborne illnesses caused by the pathogens above can be definitively diagnosed by tests that detect the pathogens in a person’s system or in the food that was consumed. However, many foodborne illnesses are caused by pathogens that cannot be detected or have not been identified, thus these sicknesses remain undiagnosed.

This inability to diagnose many of the illnesses caused by these unknown pathogens has led to complications in detecting when FBDOs

are occurring in the population. Additionally, although some foodborne diseases cause extreme symptoms such as kidney failure, paralysis, or even death, many cause common flu-like symptoms such as vomiting and fever. Because of this, many cases of foodborne illness simply go unreported. The CDC has instituted procedures that aid in the surveillance of foodborne illnesses in order to determine and act upon any FBDOs that may occur.

The CDC has defined a FBDO as the occurrence of two or more cases of a similar illness resulting from the ingestion of a common food. Often it is a combination of events which contribute to an outbreak. However, the ability to monitor FBDOs has steadily become more effective in recent years due to the electronic Foodborne Outbreak Reporting System (eFORS). This electronic database allows local, state, territorial and federal health agencies to report foodborne illness cases as they happen. The CDC then monitors this database and performs any investigations needed into multiple cases of the same illness, or patterns of illness in the population. This database has made it possible to react to FBDOs that may be occurring within the population quickly and effectively, maximizing the ability of health care providers to treat those that have been affected and increasing the safety and awareness of consumers.

Prevention

Although strides have been made to cope with FBDOs as they happen, there are a few simple habits that you can personally do that significantly decrease your chances of contracting a foodborne illness. When purchasing, transporting, storing and preparing food, there are measures that should be taken in order to ensure the safety of the food you are consuming. Many foodborne illnesses arise out of carelessness in the handling of our food prior to consumption. According to the U.S. Department of Agriculture (USDA), food borne illnesses peak during the summer months. The following is a list of practices that can be followed to minimize the likeliness of contracting a foodborne disease.

Choosing the Right Food at the Right Time:

1. When shopping, get canned and packaged foods first before heading to the refrigerated sections of the grocery store. Make sure cans are not bulging or dented. Check for cracks in jars and avoid jars with bulging lids. If canned or packaged goods are sticky on the outside this could indicate a leak, and these products should be avoided.
2. Choose pasteurized milks and cheeses, as well as juices and ciders that have been pasteurized or treated. Pasteurization is accomplished by significantly elevating the temperature of the product during processing, thus killing any microorganisms that may cause illness.
3. Select eggs that are refrigerated and check the eggs, before leaving the store, for any cracks. Cracks can allow microorganisms to enter the eggs, thus increasing the chances for illness.
4. Wait to select frozen food and perishables, such as meat, poultry, and seafood, until the end of your shopping trip, and bag these products separately in plastic bags so the drippings do not contaminate other food.
5. Bring a cooler full of ice to keep frozen and perishable foods cold if your return trip from the grocery store will be longer than one hour.

Storage

1. Refrigerate (40°F) or freeze (0°F) perishables immediately upon arriving home from the store.
2. Store eggs in the refrigerator. Avoid storing them in the door because the temperature is warmer there due to the door being opened and closed.
3. Meats, poultry and fish can be placed in the refrigerator in the packaging from the grocery store if they are to be cooked within one to two days. For longer storage, these items should be wrapped tightly and placed in the freezer.
4. Keep cold food cold and hot food hot.

Preparation

1. Produce should be cleaned prior to preparation in order to remove any dirt and grime. Pay special attention to cleaning

produce that will be eaten raw because there will be no heat involved during preparation to kill lingering bacteria.
2. Wash hands, utensils and cutting boards that have come in contact with meat or poultry before preparing other foods. This reduces the possibility of cross contamination.
3. Cook meat, poultry and eggs thoroughly. Ground beef should reach an internal temperature of 160°F, and eggs should be cooked until the yolk is firm. Make sure to use a meat thermometer to check internal temperatures.
4. Make sure to refrigerate any leftovers promptly so contamination is not allowed to occur.

Restaurant Safety

1. Restaurants are inspected by the local health department. Only patronize restaurants that have passed the health inspection.
2. Order your steaks or hamburgers well done and send your meal back if the meat is still pink in the center.
3. Ask if the eggs and other dairy products used to prepare your food are pasteurized.

These prevention measures are needed to limit the possibility of contamination of our food as it travels from the farm to our tables. However, if contamination does occur and a foodborne illness results, it is important to report this to your local health department. With the information you provide, health officials can gain a better understanding regarding the initialization, transmission and other contributing factors to FBDOs.

Commonly Asked Questions

Q: How can I tell if I have a foodborne illness or just the flu? Are there tell-tale signs indicating a foodborne illness?

A: Some of the symptoms of the flu are similar to those of foodborne illness, such as fever, loss of appetite, headache and vomiting. However, in addition to these symptoms the flu carries with it muscle and joint aches, fatigue and cough. A foodborne illness would not display the respiratory symptoms, such as cough,

that accompanies the flu.

Q: How long does it take to get sick from ingesting an illness causing pathogen?

A: After a pathogen is ingested an incubation period begins. This incubation period can last from a few hours to a few days. During this period, the microbes move through the stomach and begin multiplying in the intestines. At this point symptoms will be noticed, such as diarrhea or fever. Some microbes will cause symptoms via the intestines, while others will produce a toxin that can enter the bloodstream and attack other organs in the body, causing more severe symptoms, such as temporary anemia or kidney failure, in extreme cases.

Q: Are certain people more susceptible to foodborne illnesses?

A: Infants, pregnant women, the elderly and those individuals with weakened immune systems are more susceptible to foodborne illness because they do not have strong natural mechanisms to fend off a microbial attack in their system. These individuals are also more likely to have severe symptoms associated with a foodborne illness.

Q: What should I do if I suspect a foodborne illness?

A: First and most important, seek medical treatment as necessary, especially if you are considered to be someone more susceptible (infants, pregnant women, the elderly and those individuals with weakened immune systems) to foodborne illness. If you suspect the foodborne illness originated from a restaurant or large gathering, contact your local health department.

Sources

Foodsafety.gov
CDC Food Safety

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Fall Protection Plan Meeting Kit

FALL PROTECTION IS IMPORTANT

Employers must set up the workplace to prevent employees from falling off of overhead platforms, elevated work stations or into holes in the floor and walls. OSHA requires that fall protection be provided at elevations of four feet in general industry workplaces, five feet in shipyards, six feet in the construction industry and eight feet in longshoring operations. In addition, OSHA requires that fall protection be provided when working over dangerous equipment and machinery, regardless of the fall distance.

FALL PROTECTION PLAN FOR WORKERS

A fall protection plan is a safety plan for workers who will be at elevated work areas. Having a detailed fall protection plan is essential to ensure the highest degree of worker safety.

WHAT TO ADDRESS IN A FALL PROTECTION PLAN

1. Assess All Fall Hazards In The Work Area.

An essential step to take when developing a fall protection plan is identifying all existing and potential fall hazards in the work area. There are many different types of hazards that are detrimental to worker safety. **The 5 fall hazards to watch for include: holes, skylights, platforms, sharp edges, and debris.**

2. The Fall Protection Applications Employees Will Be Working In, And The Equipment Needed

Potential fall protection applications include:

- Fall Arrest
- Fall Restraint
- Work Positioning
- Rescue/Confined Space

Potential equipment includes:

- Full Body Harnesses
- Lanyards
- Horizontal lifelines
- Guardrails
- Anchorage Connectors
- Self-Retracting Lifelines

3. Correct Procedures For Assembly, Maintenance, Inspection, And Disassembly Of Fall Protection Systems Used.

Assembly and disassembly of all equipment must be done according to the product manufacturer’s recommended procedures. Inspection of all safety equipment must be done by the end user before each use. Additionally, a Competent Person needs to inspect the user’s equipment in intervals of no more than one year.

4. Correct Procedures For Handling, Storage, And Securing Of Tools And Materials.

Organizations must have a plan to ensure that their fall protection equipment is handled and secured properly. If not stored properly, equipment can become contaminated or otherwise damaged and will not be safe to use. Contamination can include rust, corrosion, discoloration, and deformation, etc.

5. Training Methods For The Employees Working On The Jobsite.

All new and current employees should be given instructions on the proper use of fall protection devices before they begin to work.

6. The Method For Prompt, Safe Rescue Of Injured Workers (I.E., Your Rescue Plan).

A plan for the rescue and recovery of fallen workers is essential to include in all fall protection plans. OSHA requires that employers provide for prompt rescue of employees in the event of a fall, or ensure that employees are able to rescue themselves.

7. The Fall Protection Plan Must Be Jobsite Specific.

Every job is different and will present different types of fall hazards. It is extremely important that each jobsite is analyzed for these hazards, and that they are eliminated prior to the beginning of any work.

8. The Fall Protection Plan Must Be Available To Employees.

Your written fall protection plan should be reviewed before work begins on any jobsite. It is recommended that you have a sheet for employees to sign at the jobsite stating that they have been trained in and understand the fall protection plan.

KEEP WORKERS SAFE FROM FALLS

Vigilance is the key to keep workers safe when working at heights.

- Guard every floor hole into which a worker can accidentally walk (using a railing and toe-board or a floor hole cover).
- Provide a guard rail and toe-board around every elevated open sided platform, floor or runway.

- Regardless of height, if a worker can fall into or onto dangerous machines or equipment (such as a vat of acid or a conveyor belt) employers must provide guardrails and toe-boards to prevent workers from falling and getting injured.
- Other means of fall protection that may be required on certain jobs include safety harness and line, safety nets, stair railings and handrails.

- Select and provide required personal protective equipment at no cost to workers.
- Train workers about job hazards in a language that they can understand.

FINAL WORD

Fall protection is not just for working at heights. It can also include slippery or unstable surfaces, working on elevated surfaces, sloping surfaces (e.g. roof), or working in close proximity to an unprotected edge, hole or pit.

Fall Protection Plan Meeting Kit – Spanish

QUÉ ESTÁ EN RIESGO

LA PROTECCIÓN CONTRA CAÍDAS ES IMPORTANTE

Los empleadores deben preparar el lugar de trabajo para evitar que los empleados se caigan de las plataformas aéreas, los puestos de trabajo elevados o los huecos en el suelo y las paredes. La OSHA exige que se proporcione protección contra caídas a una altura de cuatro pies en los lugares de trabajo de la industria general,

cinco pies en los astilleros, seis pies en la industria de la construcción y ocho pies en las operaciones de estiba. Además, la OSHA exige que se proporcione protección contra caídas cuando se trabaje sobre equipos y maquinaria peligrosos, independientemente de la distancia de caída.

CUÁL ES EL PELIGRO

PLAN DE PROTECCIÓN CONTRA CAÍDAS PARA LOS TRABAJADORES

Un plan de protección contra caídas es un plan de seguridad para los trabajadores que estarán en zonas de trabajo elevadas. Disponer de un plan de protección contra caídas detallado es esencial para garantizar el mayor grado de seguridad de los trabajadores.

COMO PROTEGERSE

QUÉ DEBE INCLUIRSE EN UN PLAN DE PROTECCIÓN CONTRA CAÍDAS

1. Evaluar todos los riesgos de caída en el área de trabajo.

Un paso esencial a la hora de desarrollar un plan de protección contra caídas es identificar todos los riesgos de caída existentes y potenciales en el área de trabajo. Hay muchos tipos diferentes de peligros que son perjudiciales para la seguridad de los trabajadores. Los 5 peligros de caída que hay que vigilar son: agujeros, tragaluces, plataformas, bordes afilados y escombros.

2. Las aplicaciones de protección contra caídas en las que trabajarán los empleados, y el equipo necesario

Las posibles aplicaciones de protección contra caídas incluyen

- Detención de caídas
- Restricción de caídas
- Posicionamiento en el trabajo
- Rescate/Espacio confinado

El equipo potencial incluye:

- Arneses de cuerpo entero
- Cuerdas de seguridad
- Líneas de vida horizontales
- Barandillas
- Conectores de anclaje
- Líneas de vida autorretráctiles

3. Procedimientos correctos para el montaje, el mantenimiento, la inspección y el desmontaje de los sistemas de protección contra caídas utilizados.

El montaje y desmontaje de todo el equipo debe realizarse de acuerdo con los procedimientos recomendados por el fabricante del producto. El usuario final debe inspeccionar todos los equipos de seguridad antes de cada uso. Además, una persona competente debe inspeccionar el equipo del usuario en intervalos no superiores a un año.

4. Procedimientos correctos para la manipulación, el almacenamiento y la seguridad de las herramientas y los materiales.

Las organizaciones deben tener un plan para asegurar que su equipo de protección contra caídas se maneja y se asegura correctamente. Si no se almacena adecuadamente, el equipo puede contaminarse o dañarse de alguna manera y no será seguro de usar. La contaminación puede incluir óxido, corrosión, decoloración y deformación, etc.

5. Métodos de capacitación para los empleados que trabajan en la obra.

Todos los empleados nuevos y actuales deben recibir instrucciones sobre el uso adecuado de los dispositivos de protección contra caídas antes de comenzar a trabajar.

6. El método para el rescate rápido y seguro de los trabajadores lesionados (es decir, su plan de rescate).

Es esencial incluir en todos los planes de protección contra caídas un plan de rescate y recuperación de los trabajadores

caídos. OSHA exige que los empleadores prevean el rápido rescate de los empleados en caso de caída, o que se aseguren de que los empleados son capaces de rescatarse a sí mismos.

7. El plan de protección contra caídas debe ser específico para el lugar de trabajo.

Cada trabajo es diferente y presentará diferentes tipos de riesgos de caída. Es extremadamente importante que cada sitio de trabajo sea analizado para estos peligros, y que sean eliminados antes de comenzar cualquier trabajo.

8. El plan de protección contra caídas debe estar disponible para los empleados.

Su plan de protección contra caídas por escrito debe ser revisado antes de comenzar el trabajo en cualquier sitio de trabajo. Se recomienda tener una hoja para que los empleados firmen en el lugar de trabajo indicando que han sido capacitados y entienden el plan de protección contra caídas.

MANTENER A LOS TRABAJADORES A SALVO DE LAS CAÍDAS

La vigilancia es la clave para mantener la seguridad de los trabajadores cuando trabajan en altura.

- Proteja todos los agujeros del suelo en los que un trabajador pueda caer accidentalmente (utilizando una barandilla y un rodapié o una tapa para los agujeros del suelo).
- Coloque una barandilla y un rodapié alrededor de cada plataforma elevada de lado abierto, piso o pista.
- Independientemente de la altura, si un trabajador puede caer dentro o sobre máquinas o equipos peligrosos (como una cuba de ácido o una cinta transportadora) los empleadores deben proporcionar barandillas y rodapiés para evitar que los trabajadores se caigan y se lesionen.
- Otros medios de protección contra caídas que pueden ser necesarios en determinados trabajos son el arnés y la cuerda de seguridad, las redes de seguridad, las barandillas de las escaleras y los pasamanos.

- Seleccione y proporcione los equipos de protección personal necesarios sin coste alguno para los trabajadores.
- Formar a los trabajadores sobre los riesgos del trabajo en un idioma que puedan entender.

CONCLUSIÓN

La protección contra las caídas no se limita a los trabajos en altura. También puede incluir superficies resbaladizas o inestables, trabajar en superficies elevadas, superficies inclinadas (por ejemplo, el techo), o trabajar muy cerca de un borde, un agujero o un pozo sin protección.

Standards of Laboratory Safety – Quick Tips

OSHA adapted a general standard for occupational exposure to hazardous chemicals in laboratories. This standard recognizes the unique characteristics of working in a laboratory. The goals of the OSHA Laboratory Standard are to reduce the risk of injury or illness to laboratory workers by ensuring that they have the information, equipment, training and support required to work safely. Failure to comply could result in heavy fines, especially EPA infringements regarding hazardous waste regulations. Even fines for minor violations can be financially crippling, so pay close attention to compliance requirements.

Lab safety programs should be tailored to the work and experiments done there. Chemical experiment planning decisions are affected by a company’s personnel knowledge and skill level, the experiment size and scale, the chemical hazards or the operations being considered, company policies and environmental regulations that might apply.

The following outline provides an overview of information that can be included in a company's or institution's lab safety program.

1. **OSHA Standard, Policies and Responsibilities**

- OSHA Laboratory Standard
- Company Policies
- Employee Roles and Responsibilities

1. **Chemical Hygiene Plan**

- Standard Operating Procedures or SOPs
- Employee Exposure/Controlling Chemical Exposure
    - Exposure Monitoring
    - Engineering Controls
    - Fume hoods and Laboratory Ventilation
    - Personal Protective Equipment or PPE
    - Administrative Controls
- Chemical and Hazard Identification
- Information and Training
- Record Keeping, Lab Inspections and Audits
- Emergency Procedures and Response
    - Fire or Explosion
    - Medical Injury or Poisoning
    - Chemical Personal Exposure/Response
    - Spill Control Response
    - Accident Reporting

III. Laboratory Equipment

1. **Laboratory Waste Disposal**
2. **OSHA Lab Standard, Policies and Responsibilities**
   The OSHA Lab Standard helps ensure that laboratory workers understand the hazards of chemicals in their workplace and are protected from chemical exposure exceeding allowable levels, OSHA Permissible Exposure Limits. While on the job, lab workers have a "right-to-know" the types of hazards they may encounter. One key component of The Laboratory Standard is the Chemical Hygiene Plan. The OSHA Laboratory Standard requires that Chemical Hygiene Plans include specific elements and measures to promote employee safety in the

laboratory. All individuals who work with hazardous chemicals in science and engineering laboratories should comply with the Lab Standard.

Company policies

Companies should have a written health, safety and environmental affairs (HS&E) policy statement. Companies can organize an HS&E committee consisting of employees, management, faculty, staff and students who can meet regularly to discuss HS&E issues. Companies should develop an HS&E orientation for all new employees and/or students.

Roles and Responsibilities

There are four typical roles involved in laboratory safety; the Chemical Hygiene Officer, a Supervisor or Principal Investigator, Environmental Health and Safety Personnel, and the Laboratory Worker.

The **Chemical Hygiene Officer** is responsible for developing and implementing the Chemical Hygiene Plan.

The responsibilities of a **Supervisor or Principal Investigator** may include sending laboratory workers to additional lab safety training. This might include: chemical awareness; procedural safety; understanding engineering controls; personal protective equipment needed to work safely with hazardous materials; and how to use equipment safely. They may also have laboratory workers complete hazardous substance approval forms and submit them for approval before using any particularly hazardous substance.

Environmental Health and Safety Personnel responsibilities typically include providing training, resources and consultation for a variety of laboratory safety issues. This might include chemical safety, biological safety, electrical safety, laser safety, radiation safety or other related topics. They may review the Chemical Hygiene Plan, develop and maintain laboratory safety manuals, conduct exposure monitoring, inspect fume hoods annually and perform safety audits.

Laboratory workers prepare and conduct experiments and actively

monitor conditions. They pariticipate in and contribute to the planning process.

The highest level of leadership must introduce and support effective implementation of lab review programs. Individuals who supervise laboratory activities should be responsible for supporting functions and individuals. While laboratory workers prepare and conduct experiments, the laboratory supervisor determines what level of planning is required. They are accountable for required training, documentation and compliance with regulations. Each worker should be responsible for safety and for a specific role in the experiment.

1. **Chemical Hygiene Plan**
   Under the Laboratory Standard, employers that use hazardous chemicals in the laboratory must develop and carry out the provisions of a written chemical hygiene plan (CHP). The CHP must include the necessary work practices, procedures, and policies to ensure that employees are protected from all potentially hazardous chemicals in their laboratory. Complete hazard assessments should be made for all chemicals, materials and any other products associated with experiments or procedures. Employers are required to develop and carry out a written CHP that addresses all aspects of the Laboratory Standard. The laboratory is regulated under the general industry standards if a company does not have a fully implemented written plan.

Standard Operating Procedures

A requirement of the CHP is to develop Standard Operating Procedures (SOP) relevant to safety and health considerations to be followed when laboratory work involves the use of hazardous chemicals. This is especially the case when select carcinogens, reproductive toxins and substances that have a high degree of acute toxicity are present. SOP can be stand-alone documents or supplemental information included as part of research notebooks, experiment documentation, or research proposals. Operating procedures should help ensure a process is in place so that an experiment is well-planned and includes and addresses relevant

health and safety issues.

Employee Exposure/Controlling Chemical Exposure
CHP also requires monitoring, measuring and controlling employee exposure to chemicals in the lab.

1. **Exposure Monitoring** can be conducted by Environmental Health and Safety personnel if there is reason to believe that exposure levels for a particular substance may routinely exceed either the action level or the permissible exposure limit set forth by OSHA. Based on the results, periodic monitoring may be scheduled at the discretion of health, safety and environmental affairs personnel in accordance with applicable federal, state and local regulations. Air can be monitored in several different ways. To determine a workers chemical exposure, diffusion detector tubes, vapor monitoring badges or personal air sampling pumps can be used. Detector tubes and pumps, hand-held electronic monitors or fixed, wall-mounted electronic monitors can be used to monitor specific areas. Employers must provide monitoring results to employees within a specific time frame and keep records of exposure monitoring, medical consultations and exams.
2. **Engineering Controls** are the primary means of control for exposure to hazardous chemicals. They include local ventilation, including fume hoods, ducted safety cabinets, glove boxes, vented storage cabinets, and vented canopies. A member of the safety committee or EHS can provide help determine the appropriate type of engineering controls for specific operations. Some engineering controls include providing secure, adequately spaced, well ventilated storage of chemicals, providing fireproof cabinets for storage of flammable chemicals, allowing only minimum amounts of flammable liquids in each laboratory, storing acids and bases separately and storing fuels and oxidizers separately.
3. **Fume Hoods and Laboratory Ventilation** A chemical fume hood is critical in a lab. A well-designed hood, when properly installed and maintained, offers a large degree of protection to the user, provided that it is used

appropriately and its limitations are understood. A fume hood is a ventilated enclosure in which gases, vapors and fumes are contained. It is used to control chemical exposure to the user and lab occupants and helps prevent chemical release into the laboratory. A fume hood can also limit the effects of a spill by partially enclosing the work area and drawing air into the enclosure through an exhaust fan. An exhaust fan installed on top of the laboratory building pulls air and airborne contaminants through ductwork out of the building. In a well-designed, properly functioning fume hood, only about 0.0001% to 0.001% of the material released within the hood actually escapes from the hood into the laboratory.

A hazard analysis can help determine if a fume hood is necessary for an experiment. Such an analysis should include: a review of the physical characteristics; the quantity and toxicity of the materials to be used; the experimental procedure; the volatility of the materials present during the experiment and the probability of their release; the number and sophistication of manipulations; and the skill level of the person performing the work.

Many laboratories use equipment and apparatuses that can generate airborne contaminants, but cannot be used within a fume hood. Examples include gas chromatographs, ovens, and vacuum pumps.

4. **Personal Protective Equipment** Personal protective equipment (PPE) is gear used to protect the wearer from a hazardous chemical. It is a protection system used as a last resort, when substitution or engineering controls are not an option. PPE does not reduce or eliminate the hazard; it helps protect the wearer. PPE includes eye protection, respiratory protection, protective clothing and shoes and gloves. The need for PPE is dependent upon the type of operations and the nature and quantity of the materials in use, and must be determined on an individual basis. Personal protective equipment must be carefully selected to ensure that it is compatible with the chemicals used. Workers who rely on PPE

must understand the functioning, proper use, and limitations of the PPE used.

5. **Administrative Controls** It may be necessary to supplement engineering controls and PPE with administrative controls, like restricting access to an area, restricting the use of particular chemicals to a specific group of people, or limiting the time workers are exposed to chemicals.

Chemical and Hazard Identification

Chemical manufacturers or distributors perform an assessment of the physical and health hazards of each chemical they produce. This information is included in a material safety data sheet (MSDS) and partial information contained on the MSDS is also listed on container labels. The information found on the original container label and the MSDS may provide a great deal of information about the identity of the chemical constituents and their health and physical hazards. The manufacturer or distributor is required to provide an MSDS with the initial shipment of their products. Any MSDSs received by a laboratory must be maintained in a central location in the laboratory or department and be readily available to laboratory workers. The Chemical Hygiene Plan should outline what to do with MSDSs received by a laboratory. The manufacturer’s label should always be kept intact. When a chemical is transferred to another container for storage, the new containers should be labeled with the name of the product, the chemical constituents, any hazard warnings and the appropriate precautions.

Information and Training

Employers must provide information and training regarding safe work practices for employees on such issues as: hazard awareness; handling of chemicals; procedures and permissible exposure limits; health and hygiene; physical hazards; electrical safety; emergency procedures; personal protective equipment; working alone in the laboratory; laboratory security;, and handling visitors to the lab. Laboratory workers may need very specific training on safe work practices when working in areas such as controlled environments and cleanrooms. Employees should learn and be aware of the location of the Chemical Hygiene Plan, the Laboratory

Standard and all pertinent MSDS information and be familiar with the details and contents.

Employers should schedule regular departmental safety meetings for all students and/or employees to discuss the results of inspections and aspects of laboratory safety. Employers should also forbid employees from working alone in any laboratory or if this is impossible, employees should always alert a staff member when working alone. Experiments should not be allowed to run unattended unless they are failsafe. Good housekeeping practices should be performed in all work areas.

Recordkeeping

It is essential for any lab where chemicals are used to keep accurate records such as MSDS, Certificates of Analysis, lab analysis documentation, logs of chemical usage, cleaning logs and maintenance logs. This information can be used in inspections and audits.

Laboratory supervisors are responsible for the health and safety conditions in the laboratories under their management. An important tool in managing this responsibility is the laboratory self-inspection. Properly conducted, self-inspections help ensure healthful working conditions and improve regulatory compliance. The laboratory supervisor is responsible for correcting all problems found during these audits, and for maintaining copies of self-inspection checklists and forms. These forms should be available for review by lab workers, other company personnel and external auditors.

If your company requires laboratory auditing as part of its qualification or quality policy, the lab supervisor or manager should develop a well-defined laboratory Audit Plan. Some aspects that this laboratory Audit Plan should address include: the audit purpose; identification of laboratory auditors and responsibilities; scope; objectives; requirements; and criteria for the laboratory audit. Once the laboratory Audit Plan is approved, communication of plan, an audit schedule and checklist help set expectations.

Emergency Procedures/Response

Spills and chemical exposure can occur if chemicals are transported incorrectly, even when moving chemicals only a short distance within the lab. Regulations require companies and institutions to develop plans and conduct drills for dealing with emergencies such as fire, explosion, accidental poisoning, chemical spill or vapor release, electric shock, bleeding and personal contamination. Individual departments should have a written emergency action plan, a designated emergency coordinator and a designated assembly point. The emergency coordinator is the first point of contact for questions about the emergency procedures and the emergency action plan. A designated assembly point is where building occupants should gather in the case of a building evacuation. Make sure you are accounted for before leaving the assembly point. Rescue personnel are required to enter a building and search for individuals who are thought to still be in the building. Be sure to familiarize yourself with the emergency action plan for your department.

Employers must provide appropriate safety equipment and first aid kits in case of emergency. Safety equipment may include fire extinguishers, fire blankets, AEDs, safety showers, eye wash fountains, spill control materials and fume hoods. These items should be tested or checked monthly. An appropriate supply of first aid equipment should be provided as well as instructions for their proper use.

What To Do in the Event of:

1. **Fire or Explosion**
   Dial 911. If fire or explosion occurs, public safety should be notified immediately.. Notify a supervisor or manager in charge immediately so that emergency procedures can be followed.
2. **Medical Injuries or Chemical Poisoning**
   Dial 911. If any injury or illness occurs and assistance is needed, contact public safety. If an ambulance is needed, public safety will arrange for one. Poison Control may also be contacted. Notify a supervisor or manager in charge

immediately so that the appropriate emergency procedures can be followed.

3. **Personal Chemical Exposure/Response**
   How a chemical exposure affects a person depends on many factors. The dose is the amount of a chemical that actually enters the body. The actual dose that a person receives depends on the concentration of the chemical and the frequency and duration of the exposure. The sum of all routes of exposure must be considered when determining the dose. In addition to the dose, the outcome of the exposure is determined by (1) the way the chemical enters the body, (2) the physical properties of the chemical, and (3) the susceptibility of the individual receiving the dose. In all cases, the incident should be reported to your laboratory manager, supervisor or principal investigator, regardless of severity.
4. **Chemicals on Skin or Clothing**
    1. Immediately flush with water for no less than 15 minutes (except for Hydrofluoric Acid, Flammable Solids or >10% Phenol). For larger spills, the safety shower should be used.
    2. While rinsing, quickly remove all contaminated clothing or jewelry.
    3. Use caution when removing pullover shirts or sweaters to prevent contamination of the eyes.
    4. Check the Material Safety Data Sheet (MSDS) to determine if any delayed effects should be expected.
    5. Discard contaminated clothing or launder them separately from other clothing. Leather garments or accessories cannot be decontaminated and should be discarded.
5. **Spill Control Response**
   The complexity and detail of the emergency plan will depend on the physical characteristics and volume of materials handled, their potential toxicity, and the potential for releases to the environment. An effective spill response procedure should consider all of the following:

    1. Review Material Safety Data Sheets (MSDSs) or other

references for recommended spill cleanup methods and materials, and the need for personal protective equipment, respirators, gloves, protective clothing, etc.

2. Acquire sufficient quantities and types of appropriate spill control materials to contain any spills that can be reasonably anticipated. The need for equipment to disperse, collect and contain spill control materials brushes, scoops, sealable containers should also be reviewed.
3. Require proper use of recommended personal protective equipment and training. For example, if an air purifying respirator or self-contained breathing apparatus are needed, personnel must attend annual training and fit-testing.
4. Position spill control materials and protective equipment in a readily accessible location within or immediately adjacent to the laboratory.
5. Develop a spill response plan that includes:
    - Contact information for the individuals to be contacted in the event of a spill
    - Evacuation plans for the room or building, as appropriate
    - Instructions for containing the spilled material, including potential releases to the environment, protect floor drains
    - Inventory of spill control materials and personal protective equipment
    - Means for proper disposal of cleanup materials (in most cases, as hazardous waste) including contaminated tools and clothing
    - Decontamination of the area following the cleanup

Your laboratory or work area should have access to sufficient quantity of sorbents or other types of materials to control any spill that can be reasonably anticipated. Absorption and neutralizing materials may include acid neutralizer, caustic

neutralizer and solvent neutralizer. For mercury spills, necessary clean up equipment may include a small mercury vacuum, Hg Absorb Sponges, Hg Absorb Powder, Hg Vapor Absorbent and Mercury Indicator.

1. **Accident reporting**
   All accidents, injuries, or close calls should be reported to your supervisor or principal investigator. Companies may require that all incidents be reported, evaluated by the departmental safety committee, and discussed at departmental safety meetings.

III. Laboratory Equipment

Laboratory equipment may include refrigerators, centrifuges, microscopes, glassware, vacuum systems, stirring and mixing devices, heating devices and autoclaves. Laboratory workers should be trained in their use and know the possible hazards when working with this equipment. Laboratory workers should follow cleaning, maintenance and calibration schedules to ensure all lab equipment is working properly.

Electrically powered equipment, such as hot plates, stirrers, vacuum pumps, electrophoresis apparatus, lasers, heating mantles, ultrasonicators, power supplies, and microwave ovens are essential elements of many laboratories. These devices can pose a significant hazard to laboratory workers, particularly when mishandled or not maintained. Many laboratory electrical devices have high voltage or high power requirements, carrying increased risk. All electrical connections should be removed from the inside of chemical refrigerators and magnetic closures should be required. Temperature monitoring may be required for incubators, refrigerators and freezers. Require grounded plugs on all electrical equipment and install ground fault interrupters (GFIs) where appropriate.

Compressed gases can be toxic, flammable, oxidizing, corrosive, inert or a combination of hazards. In addition to the chemical hazards, compressed gases may be under a great deal of pressure. The amount of energy in a compressed gas cylinder makes it particularly dangerous. Appropriate care, handling and storage of

compressed gas cylinders is essential. Always secure all compressed gas cylinders.

Working with hazardous chemicals at high or low pressures requires planning and special precautions. Procedures should be implemented to protect against explosion or implosion through appropriate equipment selection and the use of safety shields. Care should be taken to select glass apparatus that can safely withstand designated pressure extremes. Always provide safe guards on all vacuum pumps. Vacuum work can result in an implosion and the hazards of flying glass, splattering chemicals and fire. All vacuum operations must be set up and operated with careful consideration of the potential risks. Equipment at reduced pressure is especially prone to rapid pressure. Such conditions can force liquids through an apparatus, which can also be dangerous.

1. **Laboratory Waste Disposal**
   Systems should be developed for the legal, safe and ecologically acceptable disposal of chemical wastes. In order to responsibly manage chemical waste, each employee should be familiar with the following: hazardous waste characteristics, properly packaging hazardous waste, effective labeling and following waste collection protocol. It is beneficial to maintain a chemical inventory to avoid purchasing unnecessary quantities of chemicals. Date stored chemicals and re-certify or discard them after predetermined maximum periods of storage. Other questions that may arise are: What are the procedures and company policy for drain disposal of chemical waste? What is the proper procedure for the disposal of empty chemical containers? Always follow federal, state and local guidelines for proper disposal of batteries, item mercury containing items, used oil and the recycling of silica gel as well as other chemicals.

Related EZ Facts Topics

208 First Aid Regulation, 29 CFR 1910.151 and Z308.1-2003 Summary
240 Personal Protective Equipment Standards
190 Selecting Chemical Protective Clothing

145 Fume Extraction: Engineering Controls for Reducing Employee Chemical Exposure
120 Emergency Eye/Face Wash/Shower Requirements
200 Hazard Communication Labeling
147 Spill Cleanup: Assessing Your Needs and Choosing the Right Sorbents

Source

OSHA Standard 1910.1450 Occupational Exposures to Hazardous Chemicals in Laboratories

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Infrared Thermometers – Quick Tips

Handheld infrared (IR) thermometers are used in many industries and work environments to measure surface temperatures rapidly and at a safe distance. Elevated temperature can be the first sign of trouble for mechanical equipment, electrical circuits and building systems. A quick temperature check of key components can find

potential trouble areas and prevent catastrophic failures. This article will discuss the basics of infrared radiation, as well as two important concepts to understand when choosing and using an infrared thermometer: D:S ratio and emissivity.

Infrared Radiation and the Electromagnetic Spectrum

Infrared radiation is one type of radiation in the electromagnetic spectrum. Other types of electromagnetic radiation include microwaves, X-rays and visible light.

We can’t see infrared radiation—its wavelength is slightly too long for our eyes to perceive it as visible light—but we feel it on the skin as the sensation of warmth.

How is Infrared Radiation Used to Determine Temperature?

Like visible light, infrared energy can be focused, reflected and absorbed. Handheld IR thermometers use a lens to focus the infrared energy from an object onto a sensor that measures it, typically a thermopile. The sensor absorbs infrared radiation and converts it to an electrical signal, with more intense radiation creating a stronger signal. The IR thermometer processes this signal in order to deliver a temperature readout.

What Is Emissivity?

Everything emits infrared energy, but some things emit it more efficiently than others. Emissivity is a measure of this efficiency and the measurement is expressed in a range from 0 to 1. In general, surfaces that are reflective or shiny have lower emissivity than other surfaces. It’s important to understand emissivity, especially if you’ll be taking measurements from shiny or reflective surfaces. Failing to take it into account can result in incorrect temperature readings.

The simplest IR thermometers are designed to produce accurate measurements from surfaces that have an emissivity of approximately 0.95. According to test instrument manufacturer Fluke, most organic, oxidized or painted surfaces have emissivities close to that value. However, reflective

surfaces have a much lower emissivity, which means that fixed-emissivity IR thermometers are not able to accurately measure their temperature directly. Polished aluminum, for example, has an emissivity of around 0.05.

One way to take more accurate temperature measurements from reflective surfaces is to use an IR thermometer that has variable emissivity settings. These can range from simple “high, medium and low” settings to fully adjustable settings. Check your device’s manual for the manufacturer’s recommended emissivity setting for specific materials.

Another way to take more accurate measurements from shiny surfaces is to add a piece of flat-black, non-reflective tape or a patch of high-temperature paint to the surface and take the reading from this non-shiny area, after it’s had time to come to temperature.

Selection tip: If you’ll frequently be measuring the temperature of shiny or reflective surfaces, you’ll probably want to consider an infrared thermometer that offers variable emissivity settings.

Using an Infrared Thermometer: Understanding Field of View and D:S Ratio

Because an IR thermometer uses an optical system with a lens to focus infrared energy, the area from which that energy is focused is sometimes called the thermometer’s field of view. The field of view is also sometimes called the spot. To get the best results from an infrared thermometer, you need to understand its field of view.

The field of view widens as the distance between the IR measuring device and the surface it’s measuring increases. The orientation of the device to the surface being measured also affects the field of view. To get the tightest field of view, hold the device at a perpendicular or 90° angle to the surface you’re measuring.

To use an IR thermometer correctly, it’s important to keep in mind that an IR thermometer measures the average temperature over its *entire* field of view. When a surface does not fill the instrument’s field of view, the instrument will be unable to

measure its temperature well, because its readout will also include the temperature of things that are next to or behind the surface.

To determine the size of an IR thermometer's field of view at a given distance, you can use the device's distance-to-spot (D:S) ratio, also sometimes called distance-to-target ratio (DTR). The D:S ratio is related to the sophistication of the device's optical system and can vary from 1:1 on inexpensive infrared thermometers to 60:1 or higher on high-end instruments.

This chart below shows examples of the field of view diameter for different D:S ratios at different measurement distances.

How D:S Ratio Affects Field of View (FOV) Diameter

D:S ratio	Approximate FOV diameter when target is 1 ft away	Approximate FOV diameter when target is 3 ft away	Approximate FOV diameter when target is 5 ft away
1:1	12 in	36 in	60 in
6:1	2 in	6 in	10 in
12:1	1 in	3 in	5 in
60:1	0.2 in	0.6 in	1 in

IR thermometers with high D:S ratios, such as 60:1, can measure smaller areas from a greater distance. Because the field of view of a device with a 1:1 D:S ratio expands so quickly as you get further away from the object, manufacturers typically recommend using them at as close distance as possible.

Selection tip: When choosing an IR thermometer, think about how far away you'll need to be from the things you're measuring, and how small those things are. The smaller and farther away the

target, the higher D:S ratio you'll need.

Laser Targeting System

Most IR thermometers have laser pointers to help target the measurement. The simplest of these targeting systems is a single laser that points at the approximate center of the field of view.

IR thermometers with more complex targeting systems use two or more lasers to indicate the full size of the field of view at the measured distance, which can save you the trouble of estimating its size on the fly using the D:S ratio. A dual-laser or multiple-laser instrument may be easier to use correctly, especially for an inexperienced operator.

Other Causes of Incorrect Readings

As described above, to get accurate measurements, the two most critical things to keep in mind are: field of view (D:S ratio) and emissivity. Nevertheless, there are a few other things that can potentially influence results:

- Steam, smoke, fog, frost and dust in the air can deflect some of an object's infrared energy before it reaches the thermometer.
- A dirty or damaged lens on an IR thermometer can interfere with its ability to focus infrared radiation.
- An IR thermometer that has been stored somewhere that's hotter or colder than the environment in which it's being used may need some time to come to temperature before delivering accurate readings.
- Strong radio frequency (RF) interference can influence infrared temperature readings.

Temperature Range

IR thermometers have maximum temperature readouts that can be anywhere from a few hundred degrees to several thousand degrees Fahrenheit. Manufacturers usually describe the accuracy of the temperature measurements in both relative *and* absolute terms. For example, one thermometer might be accurate to within 3° F *or* 3%,

whichever is greater. This means that at very high temperatures, the accuracy diminishes in absolute terms—but practically speaking, a difference of, say, 30° F is inconsequential when the measured temperature is 1000° F.

Selection tip: The three most important factors to consider when choosing an IR thermometer are temperature range, D:S ratio and emissivity functionality.

Clinical Non-contact Infrared Thermometers

Clinical non-contact infrared thermometers (also called medical non-contact thermometers) work on the same basic principles as industrial IR thermometers, but they have a specialized design that helps them produce accurate measurements of body temperature.

Clinical non-contact IR thermometers are considered medical devices and normally must be cleared for sale by the Food and Drug Administration (FDA). However, during the COVID-19 pandemic, the FDA temporarily relaxed this restriction to help prevent a shortage of these devices.

How Are Clinical Infrared Thermometers Different from Industrial Infrared Thermometers?

Here are some of the important differences between infrared thermometers designed to measure body temperature and industrial IR thermometers:

- Clinical non-contact IR thermometers are designed to produce highly accurate measurements over a very narrow range of temperatures (also known as “biological range”). In comparison, industrial IR thermometers are designed to produce slightly less accurate measurements over an enormous range of temperatures.
- Clinical non-contact IR thermometers are designed to be used only at close range, usually about two to six inches. Check the instruction manual for the correct distance for your specific device.

Additionally, clinical non-contact IR thermometers have a feature

that compensates for the expected difference between skin temperature and internal body temperature. This compensation allows the clinical non-contact IR thermometer to produce a reading that's more directly comparable to body temperature as measured by an under-the-tongue thermometer. Clinical non-contact IR thermometers are typically used for screenings, rather than for diagnostic measurements. In other words, a non-contact IR thermometer can identify people who *may* have a fever, but a readout from a complementary device, such as an under-the-tongue thermometer, would usually be required to *diagnose* that person with a fever.

Frequently Asked Questions

Q: Can infrared thermometers see through glass and plexiglass?

A: Glass, plexiglass and other visually transparent materials are usually "opaque" to infrared light. If you try to measure a temperature of something on the other side of a window, for example, the readout will tell you the temperature of the glass, even if the thermometer's laser pointer passes through it.

Q: Can I use an industrial infrared thermometer to measure body temperature?

A: Most industrial IR thermometers are not well-suited to measuring body temperature. Many industrial IR thermometers produce measurements that are accurate to within three or four degrees Fahrenheit, which is acceptable for industrial applications but would not be helpful for determining whether or not a person has a fever. Also, the temperature of a person's forehead is somewhat cooler than their internal body temperature, and clinical IR thermometers are designed to deliver readouts that compensate for this difference, while industrial IR thermometers are not. Check manufacturer's specifications to determine whether an instrument can be used to measure body temperature.

Q: What's the best way to clean an IR thermometer?

A: To be accurate, IR thermometers must be kept clean. To clean, use a soft cloth or cotton swab with water or medical grade

rubbing alcohol and carefully wipe first the lens and then the body of the thermometer. Allow the lens to dry fully before using the thermometer. Never use soap or chemicals and never submerge any part of the thermometer in water. Industrial IR thermometers should be cleaned when dirty, or roughly every six months according to some manufacturers. Consult the instructions for your device before cleaning. Clinical IR thermometers used for temperature screening should be cleaned and disinfected according to manufacturer's instructions and facility policies, according to the Centers for Disease Control and Prevention.

Q: How close do I need to be to an object to measure its temperature accurately with an IR thermometer?

A: There's a quick way to estimate the maximum distance from which you can reliably measure an object of a certain size with an infrared thermometer: Multiply the size of the object by the first number in the distance-to-spot ratio.

For example, an IR thermometer with a D:S ratio of 12:1 can measure a 4-inch surface at a maximum distance of about 48 inches (12 x 4 = 48). This shortcut won't work if the second number in the D:S ratio is anything other than 1, but instruments with such ratios are uncommon.

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Choosing a Digital Multimeter – Quick Tips

These modern-day tape measures consolidate the functions of voltmeters, ammeters, and ohmmeters into a single unit.

As one of most widely-used electronic testing instruments, the digital multimeter (DMM) is more commonly known as the modern-day tape measure. But instead of being able to handle a single function (i.e., linear measurement), DMMs consolidate the functions of multiple instruments, such as voltmeters, ammeters, and ohmmeters into one unit.

DMMs are used in electrical engineering design, maintenance, quality control, inspection, and/or any application requiring electrical servicing and diagnostic testing. A basic DMM works with energized and de-energized electrical circuits and measures alternating current (AC), AC voltage, direct current (DC), DC voltage, resistance, continuity, and diodes. Advanced models measure capacitance, frequency, temperature, pressure, and vacuum (special accessories are required for some of these measurements).

Choosing a Multimeter

When selecting a DMM for a specific application, consider these three points:

- Resolution refers to how fine a measurement a meter can make. By knowing the resolution of a meter, you can determine if it is possible to see a small change in the measured signal. The terms digits and counts are used to describe a meter's resolution. DMMs are grouped by the number of counts or digits they display. A 3 ½-digit meter can display three full digits ranging from 0-9 and one-half digit, which displays only a "1" or is left blank. A 3 ½ digit meter will display up to 1,999 counts of resolution

and a 4 ½ digit meter can display up to 19,999 counts of resolution. Some DMMs may have enhanced resolution offering higher counts within their digit range.

- Accuracy is the largest allowable error in the readings. It's an indication of how close the DMM's displayed measurement is to the actual value of the signal being measured. Accuracy is generally expressed as a percent of the reading. An accuracy of one percent of the reading means that for a display of 100 volts, the actual value of the voltage could be somewhere between 99 and 101 volts.
- Autoranging (or "dialing"), is a useful feature that allows the user to quickly move from the instruments' various measuring scales while maintaining accurate readings.

Another important consideration to factor in when selecting a DMM is whether it is a True RMS (root mean square) meter or not. True RMS meters allow non-sinusoidal AC signals to be accurately measured. The typical DMM is not a True RMS meter, and the former will produce misleading voltage readings when used to measure anything other than DC signals or pure sine wave AC signals.

Regardless of which multimeter you chose, electrical test equipment should be used with caution, respect, and maintained in accordance with the manufacturer's guidelines. As with all electrical test equipment, individuals using a DMM should receive training in its proper operation.

It's important to use extreme caution anytime you work with current (AC or DC) and voltage. To avoid catastrophic consequences, an electrical safe work program should be established and followed whenever working with electricity.

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Ladder Requirements – Quick Tips

According to the Centers for Disease Control and Prevention (CDC), across all workers, approximately 20% of all fall injuries involve a ladder. Among construction workers – especially roofing, framing, siding, and painting contractors – the dangers of ladder falls are even more clear: An estimated 81% of fall injuries treated in emergency rooms across the country involve a ladder. Construction has the highest rate of ladder fall injuries of any industry.

Ladders come in a variety of shapes, sizes, and materials. They are useful in many industries for a variety of applications. This document offers an overview of the Occupational Safety and Health Administration (OSHA) and the American National Standards Institute (ANSI) Accredited Standards Committee (ASC) standards for ladders, along with tips for proper ladder usage. A critical component of fall prevention is making sure all ladders meet OSHA and ANSI-ASC standards. Read on to see if yours pass the test.

OSHA Regulatory Requirements

In late 2016, OSHA published an update to its walking-working surface rule (subpart D) for general industry. Subpart D applies to all general industry workplaces and covers all walking-working surfaces unless specifically excluded by an individual section of the subpart. Specifically, the update incorporates advances in

technology, industry best practices and national consensus standards to provide effective and cost-efficient worker protection addressing slip, trip and fall hazards.

The update ushered in some sweeping changes where ladders were concerned. As part of the update, OSHA combined its previously separate regulations for portable wood ladders, portable metal ladders and fixed ladders under one comprehensive ladder standard: 29 Code of Federal Regulations (CFR) 1910.23 which applies to all ladders used in general industry with a few exceptions. Those exceptions are ladders used in emergency operations such as firefighting, rescue and tactical law enforcement operations, or training for those operations, and ladders that are an integral part of a machine or piece of equipment.

The four main components of OSHA's ladder standard cover:

- General Requirements for all ladders
- Portable Ladders
- Fixed Ladders
- Mobile Ladder Stands and Mobile Ladder Stand Platforms

Under the General Requirements for all ladders, 29 CFR 1910.23(b)(11-13), OSHA addresses proper ladder climbing technique When ascending or descending a ladder, employees must always maintain three points of contact by:

- Facing the ladder
- Using at least one hand to firmly grasp the ladder
- Not carrying any object or load that could cause them to lose balance and fall

Employers are required to ensure that every employee follows this climbing technique.

The General Requirements for all ladders also covers the design specifications for rungs and steps used on ladders and stepstools. The design for rungs and steps must meet the following criteria:

Ladder Rungs, Steps and Cleats 29 CFR 1910.23(b)(1) – (4)(iv)
Parallel, level and uniformly spaced when the ladder is in position for use.
Spaced not less than 10 inches and not more than 14 inches apart.
Rungs and steps in elevator shafts must be spaced not less than six inches or more than 16.5 inches apart
Fixed ladder rungs and steps on telecommunication towers must be spaced not more than 18 inches apart
Minimum clear width of 11.5 inches on portable ladders and 16 inches for fixed ladders.
Manhole entry ladders rungs and steps supported by the manhole opening must have a minimum clear width of nine inches.
Telecommunication center rolling ladders rungs and steps must have a minimum clear width of eight inches.
Stepstools must have a minimum clear width of 10.5 inches and the steps are not spaced less than eight inches or more than 12 inches apart.

In addition, the General Requirements for all ladders mandate the following:

General Requirements 29 CFR 1910.23(b)(5) – (10)
Wooden ladders must not be coated with any material that may obscure structural defects.
Metal ladders must be made with corrosion-resistant material or protected against corrosion.
Ladder surfaces must be free of puncture and laceration hazards.
Ladders must only be used for the purpose for which they were designed.
Ladders must be inspected before initial use in each work shift, and more frequently as necessary, to identify any visible defects that could cause employee injury.
Any ladder with structural or other defects must be immediately tagged "Dangerous: Do Not Use," or with similar language in accordance with 29 CFR 1910.145, and removed from service until repaired in accordance with 29 CFR 1910.22(d) or replaced.

Portable Ladders

OSHA defines a portable ladder as one that can readily be moved or carried, usually consisting of side rails joined at intervals by steps, rungs, or cleats.(29 CFR 1910.21(b)). They can be self-supporting or lean against a supporting structure (non-self-supporting).

Employers must ensure that:

Portable Ladders 29 CFR 1910.23(c)(1) – (13)
Rungs and steps of portable metal ladders are corrugated, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize the possibility of slipping
Each stepladder or combination ladder used in a stepladder mode is equipped with a metal spreader or locking device that securely locks ladder in open position.
Ladders are not loaded beyond maximum intended load.
Ladders are used only on stable and level surfaces unless they are secured or stabilized to prevent accidental displacement.
No single rail ladders are used.
Ladders are secured to prevent accidental displacement or guarded by a temporary barricade when used in passageways, doorways, or driveways.
Ladders are secured and stabilized if used on slippery surfaces.
Ladders are not moved, shifted, or extended while being used.

Fixed Ladders 29 CFR 1910.23(d)(1) -13(ii)
Ladders can support their maximum intended load.
The minimum perpendicular distance from the centerline of the steps or rungs, or grab bars, or both, to the nearest permanent object behind the ladder is seven inches, except for elevator pit ladders, which have a minimum perpendicular distance of four and one-half inches..
Grab bars do not protrude on the climbing side beyond the rungs of the ladder that they serve.
The side rails of through or sidestep ladders extend 42 inches above the top of the access level or landing platform served by the ladder. For parapet ladders, the access level is the roof, if the parapet is cut to permit passage through the parapet; or the top of the parapet, if the parapet is continuous.
For through ladders, the steps or rungs are omitted from the extensions, and the side rails are flared to provide not less than 24 inches and not more than 30 inches of clearance (when a ladder safety system is provided, the maximum

Fixed Ladders

OSHA defines a fixed ladder as a ladder with rails or individual rungs that is permanently attached to a structure, building or equipment (29 CFR 1910.21(b)). These do not include ship stairs, step bolts, or manhole steps.

OSHA gets more granular with design requirements for specific types of fixed ladders above and beyond what's specified under the General Requirements. Employers must ensure that:

Fixed Ladders 29 CFR 1910.23(d)(1) -13(ii)
Ladders can support their maximum intended load.
The minimum perpendicular distance from the centerline of the steps or rungs, or grab bars, or both, to the nearest permanent object behind the ladder is seven inches, except for elevator pit ladders, which have a minimum perpendicular distance of four and one-half inches..
Grab bars do not protrude on the climbing side beyond the rungs of the ladder that they serve.
The side rails of through or sidestep ladders extend 42 inches above the top of the access level or landing platform served by the ladder. For parapet ladders, the access level is the roof, if the parapet is cut to permit passage through the parapet; or the top of the parapet, if the parapet is continuous.
For through ladders, the steps or rungs are omitted from the extensions, and the side rails are flared to provide not less than 24 inches and not more than 30 inches of clearance (when a ladder safety system is provided, the maximum

clearance between side rails of the extension must not exceed 36 inches).
For side-step ladders, the side rails, rungs, and steps are continuous in the extension.
Grab bars extend 42 inches above the access level or landing platforms served by the ladder.
The minimum cross-section size of grab bars is the same size as the rungs of the ladder.
When a fixed ladder terminates at a hatch, the hatch cover opens with enough clearance to provide easy access to or from the ladder and opens at least 70° from horizontal if the hatch is counterbalanced..
Individual-rung ladders are constructed to prevent the employee's feet from sliding off the ends of the rungs.
Ladders having a pitch greater than 90° from the horizontal are not used.
The step-across distance from the centerline of the rungs or steps for through ladders, is not less than seven inches and not more than 12 inches to the nearest edge of the structure, building, or equipment accessed from the ladders.

The step-across distance from the centerline of the rungs or steps for side-step ladders is not less than 15 inches and not more than 20 inches to the access points of the platform edge.
Ladders that do not have cages or wells have a clear width of at least 15 inches on each side of the ladder centerline to the nearest permanent object and a minimum perpendicular distance of 30 inches from the centerline of the steps or rungs to the nearest object on the climbing side (when unavoidable obstructions are encountered, the minimum clearance at the obstruction may be reduced to 24 inches provided deflector plates are installed).

OSHA's updated walking-working surfaces rule also addresses fixed ladders under 29 CFR 1910.28(b)(9), Duty to Have Fall Protection and Falling Object Protection. The rule phases in, over 20 years, a requirement to equip fixed ladders (that extend over 24 feet above a lower level) with ladder safety or personal fall arrest systems, and it prohibits the use of cages and wells as a means of fall protection after the phase-in deadlines. The rule grandfathers in cages and wells on existing ladders but requires that employers equip new ladders and replacement ladders/ladder sections with ladder safety or personal fall arrest systems during the phase-in period. Shown below are the established phase-in dates:

Fixed Ladders (Extending More Than 24 Feet Above a Lower Level) 29 CFR 1910.28(b)(9)(A-D)	
After January 17, 2018	Any section/portion of an existing fixed ladder that is replaced must be equipped with a ladder safety or personal fall arrest system - may also install new cages/wells along with the ladder safety or personal fall arrest system if there is no interference.
Erected before November 19, 2018	Employers have up to 20 years to install ladder safety or personal fall arrest systems.
Erected on/or after November 19, 2018	Employers must equip the ladder with a ladder safety or personal fall arrest system.
After November 18, 2036	All fixed ladders must be equipped with a ladder safety or personal fall arrest system.

Mobile Ladder Stands and Mobile Ladder Stand Platforms

OSHA defines a mobile ladder stand as a mobile, fixed-height, self-supporting ladder that usually consists of wheels or casters on a rigid base and steps leading to a top step (29 CFR 1910.21(b)). A mobile ladder stand may also have handrails and is designed for use by one employee at a time. OSHA defines a mobile ladder stand platform as a mobile, fixed-height, self-supporting unit having one or more standing platforms that are provided with means of access or egress. Employers must ensure that:

Mobile Ladder Stands and Platforms 29 CFR 1910.23(e)(1) - 3)(iv)
Have a step width of at least 16 inches.
Have slip resistant steps and platforms.
Can support at least four times their maximum intended load.
Wheels or casters under load can support their proportional share of four times the maximum intended load, plus their proportional share of the unit's weight.
With a top step height of four feet or above have handrails with a vertical height of 29.5 to 37 inches, measured from the front edge of a step - removable gates or non-rigid members, such as chains, may be used instead of handrails in special-use applications.
Maximum work-surface height does not exceed four times the shortest base dimension, without additional support - stabilizing outriggers, counterweights, or comparable means to prevent overturning must be used for greater heights.

Have wheels or casters equipped with a system to impede horizontal movement when an employee is on it.
Does not move when an employee is on it.
Stand and platform steps are uniformly spaced and arranged, with a rise of not more than 10 inches and a depth of not less than seven inches, and the slope of the step stringer is less than 60 degrees, measured from the horizontal.
When the step spacing and arrangement is not feasible for platforms, units must be stabilized (to prevent overturning) with steeper slopes or vertical rung ladders are used.
Stands with a top step height above 10 feet, have the top step protected on three sides by a handrail with a vertical height of at least 36 inches and top steps that are 20 inches or more, front to back, have a midrail and toeboard. Removable gates or non-rigid members, such as chains, may be used instead of handrails in special-use applications..
Stands standing area is within the base frame.
Platforms with a platform height of four to 10 feet have, in the platform area, handrails with a vertical height of at least 36 inches and midrails – removable gates or non-rigid

members, such as chains, may be used instead of handrails in special-use applications.
Platforms with a platform height above 10 feet have guardrails and toeboards on the exposed sides and ends of the platform - removable gates or non-rigid members, such as chains, may be used instead of guardrails in special-use applications.
Removable gates or non-rigid members, such as chains, may be used on mobile ladder stand platforms instead of handrails and guardrails in special-use applications.

ANSI-ASC Ladder Standards

ANSI – ASC consensus standards for ladders detail the materials, safe construction, design, testing, care and use, and labeling/marking for various types and styles of ladders, and include:

- ANSI-ASC A14.1-2017 – American National Standard for Ladders – Wood Safety Requirements
- ANSI-ASC A14.2-2017 American National Standard for Ladders – Portable Metal – Safety Requirements
- ANSI-ASC A14.3-2018 American National Standard for Ladders – Fixed – Safety Requirements
- ANSI-ASC A14.4-2018 American National Standard for Ladders Safety Requirements for Job-Made Wooden Ladders
- ANSI-ASC A14.5-2017 American National Standard for Ladders – Portable Reinforced Plastic – Safety Requirements
- ANSI-ASC A14.7-2011 American National Standard for Mobile Ladder Stands and Mobile Ladder Stand Platforms
- ANSI-ASC A14.8-2020 American National Standard Safety Requirements for Ladder Accessories
- ANSI-ASC A14.9-2019 American National Standard Safety Requirements for Disappearing Attic Stairways ANSI-ASC A14.11-2018 American National Standard Safety Requirements

for Stepstools

Portable Ladder Styles and Types

Portable ladder styles include stepstools, stepladders, extension ladders, trestle ladders, combination ladders which may also be used separately as single ladders, mobile ladder stand ladders, and mobile ladder stand platform ladders,.

The duty rating of a ladder is an indication of the maximum weight capacity the ladder can safely carry. There is no relationship between ladder length and weight capacity. There are five categories of ladder duty ratings:

Duty Rating	Ladder Type	Working Load (Pounds)
Special Duty	IAA	375
Extra Heavy Duty	IA	300
Heavy Duty	I	250
Medium Duty	II	225
Light Duty	III	200

Portable Ladder Material Guidelines

The environment the finished ladder will encounter (electrical hazards, temperature extremes, corrosion, outdoor weathering, etc.) should determine the material.

ANSI-ASC recommends various species of wood that are suitable for ladders. Physical characteristics such as grain, knot, pitch, and compression must be controlled when constructing wood ladders.

Specific design and construction requirements for metal ladders are minimized because of the wide variety of materials and design

possibilities. However, the designs must produce ladders of enough strength and stiffness to meet the performance requirements and must not have any structural defects or hazards such as sharp edges, burrs, etc.

Reinforced plastic ladders must use fully cured, commercial-grade, thermosetting polyester resin with glass-fiber reinforcement.

Test Requirements for Portable Ladders

Test requirements for the ladder materials vary. However, ladders generally are evaluated on their resistance to bending, strength in various positions, and the quality of the individual components that make up the ladder.

Portable Ladders Usage Guidelines

Usage guidelines for portable ladders encompass selecting the proper ladder for the job being performed; inspecting before use to verify proper operation and cleanliness; evaluating ladder placement so that footing and top supports are secure and not creating a traffic hazard for pedestrians; utilizing proper climbing technique; and caring for and storing ladders properly.

Before working with a ladder, read the manufacturer’s instructions. Do not use a ladder if sleepy or ill, if you are taking medication, or if there’s bad weather. Do not use ladders in doorways or other high-traffic areas. If a ladder must be used near a door, make sure the door is locked and it is marked with warning signs and/or cones. If the door must be open or the ladder is in a raised position, ask a coworker to stay with the ladder to make sure an incident does not occur. Use fiberglass or wood ladders, rather than metal, near power lines or other sources of electricity to avoid electrical shock hazards. Inspect your ladder for damage before using. During your inspection, if you find it is damaged remove the defective ladder from service and identify it with a “Do Not Use” tag.

Choose the right portable ladder for the job. When deciding which ladder to use – four key choices must be made:

- Choose the material – wood, metal (aluminum) or fiberglass – the environment of the work site dictates the material
- Choose the kind – several kinds for a variety of uses
- Select the proper length – it is unsafe to use a ladder that is too long or too short
- Consider the duty rating – indication of the maximum weight capacity the ladder can support

The Centers for Disease Control and Prevention / National Institute for Occupational Safety and Health (NIOSH) has developed a Ladder Safety App_for mobile devices that features a multimodal indicator and a graphic-oriented guide for ladder selection, inspection, positioning, accessorizing and safe use. The app is available in English and Spanish and can be downloaded for both iOS and Android users.

Marking Requirements

Ladders must be marked with ladder size, type and/or duty rating, maximum working length (if extension ladder), highest standing level, total length of sections (if extension ladder), model number or name, manufacturer's or distributor's name, manufacturer's plant location (if multiple plants may be coded), month and year of manufacture, and ANSI compliance and warranty (if applicable). Usage guidelines and other warning statements must also be placed on the ladders in specific locations depending on ladder type.

Sources

29 CFR 1910.21 Scope and definitions
29 CFR 1910.22 General requirements
29 CFR 1910.23, Ladders
29 CFR 1910.28, Duty to have fall protection and falling object protection
29 CFR 1910.29 Fall protection systems and falling object protection-criteria and practices
29 CFR 1910.145 Specifications for accident prevention signs and tags
ANSI-ASC A14.1-2017 – American National Standard for Ladders – Wood Safety Requirements

ANSI-ASC A14.2-2017 American National Standard for Ladders – Portable Metal – Safety Requirements
ANSI-ASC A14.3-2018 American National Standard for Ladders – Fixed – Safety Requirements
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ANSI-ASC A14.9-2019 American National Standard Safety Requirements for Disappearing Attic Stairways ANSI-ASC A14.11-2018 American National Standard Safety Requirements for Stepstools
Centers for Disease Control and Prevention / NIOSH Ladder Safety

Commonly Asked Questions

Question: How should I handle objects safely while on a ladder?

Answer: According to the U.S. Bureau of Labor Statistics, 50% of all ladder related accidents were due to individuals carrying items as they climbed. Keeping tools in a tool belt will keep them handy and free up your hands for climbing. The use of accessories such as tool lanyards to keep tools tethered to the worker can prevent them from falling while working on a ladder. Any heavy or bulky items should be brought up only after you have reached the top. Signs or barricades can be used to warn others that work is proceeding above them, and that they should be aware of possible falling objects.

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specific to your business and/or activities and should not be construed as legal advice or opinion. Readers with specific questions should refer to the applicable standards or consult with an attorney.

Source: Grainger Know How – https://www.grainger.com/know-how

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Fall Protection Stats and Facts – Spanish

HECHOS

Hay muchos actos inseguros específicos por parte de los empleados, así como condiciones inseguras que conducen a incidentes de caídas. A menudo son el resultado de múltiples condiciones y acciones inseguras combinadas.

1. Condiciones inseguras que conducen a las caídas

    - Bordes de ataque no protegidos
    - Agujeros abiertos
    - Barandillas inadecuadas
    - Equipamiento dañado (escaleras, escaleras, etc.)
    - Condiciones resbaladizas
    - Cambios de elevación no señalizados

2. Acciones inseguras que provocan caídas

    - Trabajar en altura sin protección contra caída
    - Uso inadecuado de las escaleras
    - Inclinarse por encima de las barandillas

3. A pesar de los esfuerzos de prevención, los trabajadores siguen

cayendo porque

- existen condiciones de trabajo como una iluminación deficiente, superficies resbaladizas para caminar y prácticas de limpieza deficientes
- faltan dispositivos de protección como barandillas
- el equipo, como las escaleras y los andamios, está en mal estado o no se utiliza correctamente.
- el equipo de protección contra caídas no está disponible, no se utiliza o se usa mal.
- las prácticas de trabajo son deficientes debido a procedimientos de trabajo poco claros, a la falta de capacitación de los trabajadores y a que éstos se apresuran y toman atajos para cumplir los plazos.

ESTADÍSTICAS

- Un total de 5.190 trabajadores murieron en el trabajo en 2016; 849 de ellos murieron por caídas. De ellos, aproximadamente 170 murieron por una caída de una escalera.
- En 2016 se produjeron 229.240 casos no mortales relacionados con caídas, resbalones y tropiezos; el más bajo desde 2014.
- Los sectores de servicios, comercio mayorista y minorista representan el 60% de los accidentes por resbalones y caídas.
- Con un 25%, las lesiones por resbalones y caídas son los accidentes de trabajo más frecuentes.
- Las caídas son la principal causa de pérdida de tiempo en el trabajo.
- El 22 por ciento de las caídas provocan más de 31 días de baja laboral.

Fall Protection Plan Stats and Facts

FACTS

There are many specific unsafe acts by employees as well as unsafe conditions that lead to fall incidents. They are often the result of multiple unsafe conditions and unsafe actions combined.

1. Unsafe Conditions that Lead to Falls

    - Unguarded leading edges
    - Open holes
    - Improper guardrails
    - Damaged equipment (ladders, stairs, etc.)
    - Slippery conditions
    - Unmarked elevation changes

2. Unsafe Actions that Lead to Falls

    - Working at heights without fall protection in place
    - Improper use of ladders
    - Leaning over guardrails

3. Despite prevention efforts, workers continue to fall because

    - working conditions such as poor lighting, slippery walking surfaces, and poor housekeeping practices exist.
    - protective devices like guardrails are missing.
    - equipment such as ladders and scaffolds are in poor condition or not used properly.
    - fall-protection equipment is not available, not used, or is misused.
    - work practices are poor due to unclear job procedures, lack of training for workers and workers rushing and taking short-cuts to meet deadlines.

STATS

- A total of 5,190 workers were killed on the job in 2016; 849 of them died from falls. Of those, approximately 170 died from a fall off of a ladder.
- In 2016 there were 229,240 nonfatal cases involving falls, slips, trips; the lowest since 2014.
- Services, wholesale, and retail trade industries account for 60 percent of slip and fall accidents.
- At 25 percent, slip and fall injuries are the most frequently reported work accidents.
- Falls are the primary cause of lost time at work.
- 22 percent of falls result in more than 31 days of missed work.

Quick Course – Be Safety Conscious Off the Job Too

This quick course covers the importance of taking safety seriously off the job including how to protect yourself when you're not at work and tips on working safely in places like your garage or in your vehicle or during recreational activities.

Safety Data Sheets

Course Description

Safety Data Sheets – or SDS's – are summary documents that provide information about the hazards of a product and advice about safety precautions. This course covers what an SDS is, when an SDS should be used, what information is found on the SDS and more.

Fall Protection Fatality File

Cessco Fabrication and Engineering Ltd. pleaded guilty in Edmonton Alberta provincial court to a single charge of failing to ensure a worker used a fall protection system for the Jan. 19, 2016, death of Barry Maitland.

Maitland, a pressure welder for 29 years, was fatally injured after falling more than five metres (17 feet) from the top of a liquified natural gas storage vessel on which he was preforming a weld. He later died in hospital.

Maitland had just started a night shift in a fabrication shop at Cessco's Edmonton facility at 7310 99 St. on the day of the accident.

Maitland, 52, was setting up to perform a weld on top of the LNG equipment, which measured 28 metres long and just over four metres in diameter. At some point, he stepped off an aerial work platform used to hold his welding equipment.

An agreed statement of facts states Maitland did not anchor the lanyard on his fall protection harness before stepping off the platform. A short time later, the night shift supervisor and another worker heard Maitland hit the concrete floor, though no one witnessed the fall itself.

His son Steven Maitland, who also works at Cessco, was on the earlier shift and rushed back to site to find police officers

everywhere, Linda Maitland said. He then went to the hospital.

The parties agreed that while Cessco's fall protection plan complied with occupational health and safety legislation, it did not specifically cover welding work on the LNG vessels.

Under a joint submission on sentencing, Cessco will pay a $5,000 fine and pay the Manufacturer's Health and Safety Association $170,000 to create an enhanced fall protection program.

An autopsy found Maitland's cause of death was blunt cranial trauma, according to the agreed facts. It also found evidence of alcohol in his system and severe heart disease, including an enlarged heart.

A medical examiner said it was possible Maitland experienced symptoms of angina or irregular heartbeat, which could have contributed to the fall.

Court heard Maitland was known as a very safety conscious worker who regularly raised issues during safety meetings. His family described him as "anal retentive when it came to safety."

He loved to cook, and was famous within his family for his homemade pizzas. He also mentored family members entering the welding trade.

Linda Maitland said that while she received compensation from Occupational Health and Safety for her husband's death, she will end up having to sell her home.

Fall Protection Fatality File – Spanish

Cessco Fabrication and Engineering Ltd. se declaró culpable en el tribunal provincial de Edmonton, Alberta, de un único cargo por no

garantizar que un trabajador utilizara un sistema de protección contra caídas por la muerte de Barry Maitland el 19 de enero de 2016.

Maitland, soldador a presión durante 29 años, resultó herido de muerte tras caer más de cinco metros (17 pies) desde la parte superior de un recipiente de almacenamiento de gas natural licuado en el que estaba realizando una soldadura. Posteriormente falleció en el hospital.

El día del accidente, Maitland acababa de empezar un turno de noche en el taller de fabricación de las instalaciones de Cessco en Edmonton, en el 7310 de la calle 99.

Maitland, de 52 años, se disponía a realizar una soldadura en la parte superior del equipo de GNL, que medía 28 metros de largo y algo más de cuatro metros de diámetro. En algún momento, se bajó de una plataforma de trabajo aéreo utilizada para sostener su equipo de soldadura.

Una declaración de hechos acordada afirma que Maitland no ancló el cordón de su arnés anticaídas antes de bajarse de la plataforma. Poco después, el supervisor del turno de noche y otro trabajador oyeron cómo Maitland se golpeaba contra el suelo de hormigón, aunque nadie presenció la caída en sí.

Su hijo Steven Maitland, que también trabaja en Cessco, estaba en el turno de mañana y volvió corriendo al lugar para encontrarse con agentes de policía por todas partes, dijo Linda Maitland. A continuación, acudió al hospital.

Las partes acordaron que, aunque el plan de protección contra caídas de Cessco cumplía la legislación sobre salud y seguridad en el trabajo, no cubría específicamente los trabajos de soldadura en los buques de GNL.

En virtud de una propuesta conjunta de sentencia, Cessco pagará una multa de 5.000 dólares y abonará a la Asociación de Salud y Seguridad del Fabricante 170.000 dólares para crear un programa mejorado de protección contra caídas.

La autopsia determinó que la causa de la muerte de Maitland fue un traumatismo craneal cerrado, según los hechos acordados. También se encontraron pruebas de la presencia de alcohol en su organismo y de una grave enfermedad cardíaca, incluido un corazón agrandado.

El médico forense dijo que era posible que Maitland experimentara síntomas de angina de pecho o latidos irregulares del corazón, lo que podría haber contribuido a la caída.

El tribunal escuchó que Maitland era conocido por ser un trabajador muy consciente de la seguridad, que planteaba regularmente cuestiones durante las reuniones de seguridad.

Le encantaba cocinar y era famoso en su familia por sus pizzas caseras. También fue mentor de los miembros de su familia que se iniciaban en el oficio de soldador.

Linda Maitland dijo que, aunque recibió una indemnización de Salud y Seguridad en el Trabajo por la muerte de su marido, acabará teniendo que vender su casa.

Working in extreme heat Stats and Facts – Spanish

HECHOS

1. Millones de trabajadores estadounidenses están expuestos al calor en sus lugares de trabajo. Aunque las enfermedades derivadas de la exposición al calor se pueden prevenir, cada año, miles de personas enferman por la exposición al calor en el trabajo, y algunos casos son mortales.
2. La mayoría de las muertes en el exterior, entre el 50% y el 70%, se producen en los primeros días de trabajo en ambientes cálidos o calurosos porque el cuerpo necesita

crear una tolerancia al calor de forma gradual con el tiempo. El proceso de creación de tolerancia se denomina aclimatación al calor. La falta de aclimatación representa un importante factor de riesgo de resultados mortales.

3. Los factores de riesgo laborales de las enfermedades por calor incluyen la actividad física intensa, las condiciones ambientales cálidas o calurosas, la falta de aclimatación y el uso de ropa que retiene el calor corporal.
4. La exposición peligrosa al calor puede producirse en el interior o en el exterior y puede ocurrir durante cualquier estación del año si las condiciones son adecuadas, no sólo durante las olas de calor.
5. Trabajar en un entorno caluroso puede desencadenar dolencias como sarpullido por calor, calambres por calor, agotamiento por calor e insolación, que se consideran una emergencia médica. Los síntomas del agotamiento por calor incluyen sensación de desmayo o mareo; sudoración excesiva; piel fría, pálida y húmeda; náuseas o vómitos; pulso rápido y débil; y calambres musculares.

ESTADÍSTICAS

- Algunas aproximaciones estadísticas estiman que más de 1.300 muertes al año en Estados Unidos se deben al calor extremo.
- Según la Oficina de Estadísticas Laborales, en Estados Unidos murieron 783 trabajadores y más de 69.000 sufrieron lesiones graves debido a la exposición al calor en el trabajo.
- La exposición al calor ambiental provocó 37 muertes relacionadas con el trabajo y 2.830 lesiones y enfermedades profesionales no mortales.
- Casi el 90% (33) de las muertes se produjeron entre junio y septiembre.
- Los trabajadores del sector del transporte y el movimiento de materiales estuvieron implicados en 720 de los casos de lesiones y enfermedades no mortales que implicaron días de ausencia del trabajo.
- Las enfermedades relacionadas con el calor representaron 783

muertes de trabajadores y casi 70.000 lesiones graves en Estados Unidos entre 1992 y 2016. Y solo en 2018, 3.950 trabajadores experimentaron días de ausencia en el trabajo debido a lesiones y enfermedades no mortales por exposición al calor en el trabajo.

- Según las proyecciones realizadas por la organización sin ánimo de lucro Climate Central, el número de días de calor peligrosos para 133 ciudades de Estados Unidos aumentará de 20 al año de media en 2000 a 58 en 2050. Un día de calor peligroso se define como aquel en el que el índice de calor, teniendo en cuenta el calor y la humedad, supera los 40C (104F).

Working in extreme heat Stats and Facts

FACTS

1. Millions of U.S. workers are exposed to heat in their workplaces. Although illness from exposure to heat is preventable, every year, thousands become sick from occupational heat exposure, and some cases are fatal.
2. Most outdoor fatalities, 50% to 70%, occur in the first few days of working in warm or hot environments because the body needs to build a tolerance to the heat gradually over time. The process of building tolerance is called heat acclimatization. Lack of acclimatization represents a major risk factor for fatal outcomes.
3. Occupational risk factors for heat illness include heavy physical activity, warm or hot environmental conditions, lack of acclimatization, and wearing clothing that holds in body heat.

4. Hazardous heat exposure can occur indoors or outdoors and can occur during any season if the conditions are right, not only during heat waves.
5. Working in a hot environment can trigger ailments that include heat rash, heat cramps, heat exhaustion and heatstroke – considered a medical emergency. Symptoms of heat exhaustion include feeling faint or dizzy; excessive sweating; cool, pale, clammy skin; nausea or vomiting; rapid, weak pulse; and muscle cramps.

STATS

- Some statistical approaches estimate that more than 1,300 deaths per year in the United States are due to extreme heat.
- According to the Bureau of Labor Statistics, 783 workers in the US died and more than 69,000 workers suffered serious injuries due to heat exposure on the job.
- Exposure to environmental heat led to 37 work-related deaths and 2,830 nonfatal occupational injuries and illnesses.
- Nearly 90 % (33) of the deaths occurred from June through September.
- Workers in transportation and material moving occupations were involved in 720 of the nonfatal injury and illness cases involving days away from work.
- Heat-related illnesses accounted for 783 worker deaths and nearly 70,000 serious injuries in the United States from 1992 to 2016. And in 2018 alone, 3,950 workers experienced days away from work as a result of nonfatal injuries and illnesses from on-the-job heat exposure.
- According to projections conducted by the not-for-profit organization Climate Central, the number of dangerous heat days for 133 US cities, will increase from 20 a year on average in 2000 to 58 in 2050. A dangerous heat day is defined as one in which the heat index, accounting for heat and humidity, exceeds 104F (40C).

Quick Course – Comedy Isn’t Always Funny

Course Description

Horseplay on the job is dangerous. This quick course covers the dangers of horseplay at work and how you can help get rid of this dangerous habit.

Fall Protection Plan Picture This



What's wrong in this picture? There is a man painting a wall without any fall protection. He is standing on thin boards that are not well secured. How dangerous and painful can it be if this person falls from that height?

One of the most frequent causes of slips, trips, and falls is the presence of poor walking/working surface conditions, such as slippery, uneven, or wet floors; dimly lit walkways; or areas covered with debris.

Fall injuries constitute a considerable amount of workers' compensation and medical costs; approximately $70 billion annually in the United States, according to the National Safety Council.

Fall protection gear and proper equipment, such as ladders and scaffolds, are required for workers who are six feet or more above a lower level. Different ladders and scaffolds are appropriate for different jobs, so make sure you are providing the correct kind. If your job requires the use of personal fall arrest systems (PFAS), make sure each worker has a harness. Be sure to inspect all of the equipment to make sure it's in good order before using it.

Fall Protection Plan Picture This – Spanish



¿Qué hay de malo en esta foto? Hay un hombre pintando una pared sin ninguna protección contra caídas. Está de pie sobre unas finas tablas que no están bien aseguradas. ¿Cuán peligroso y doloroso puede ser que esta persona se caiga desde esa altura?

Una de las causas más frecuentes de los resbalones, tropiezos y caídas es la presencia de superficies de trabajo o de tránsito deficientes, como suelos resbaladizos, irregulares o húmedos, pasillos poco iluminados o zonas cubiertas de escombros.

Las lesiones por caídas suponen una cantidad considerable de gastos médicos y de indemnización a los trabajadores; aproximadamente 70.000 millones de dólares anuales en Estados Unidos, según el Consejo Nacional de Seguridad.

El equipo de protección contra caídas y el equipamiento adecuado, como las escaleras y los andamios, son necesarios para los trabajadores que se encuentran a seis pies o más por encima de un nivel inferior. Hay diferentes escaleras y andamios que son apropiados para diferentes trabajos, así que asegúrese de que está proporcionando el tipo correcto. Si su trabajo requiere el uso de sistemas personales de detención de caídas (PFAS), asegúrese de que cada trabajador tenga un arnés. Asegúrese de inspeccionar todo el equipo para comprobar que está en buen estado antes de utilizarlo.

Working in extreme heat Fatality File – Spanish

Un trabajador agrícola muere por un golpe de calor

Joe llevaba poco más de una semana trabajando en el campo de tabaco de Carolina del Norte. Los primeros días en la granja fueron calurosos y húmedos, con bienvenidas pausas de lluvia. Pero ese día no llovió. El termómetro ya había subido a 95F cuando Joe se detuvo para su descanso de refresco y galletas a las 10 a.m. Para cuando la temperatura alcanzó entre 100F y 108F a las 3 p.m., Joe se quejó con el líder de la cuadrilla de que no se sentía bien. El jefe de la cuadrilla le dio a Joe un vaso de agua y lo llevó de vuelta a la vivienda de los trabajadores. El líder de la cuadrilla le dio a Joe un trago de agua y lo llevó de vuelta a la vivienda de los trabajadores, donde lo dejó descansar un rato. Cuarenta y cinco minutos después, Joe fue encontrado en las escaleras de la casa. Estaba inconsciente. Se llamó a los servicios médicos de emergencia y Joe fue trasladado al hospital, donde su temperatura corporal central se registró en 108F. Pero

Joe no respondió a los intentos del personal médico por enfriarlo. Su muerte se atribuyó a un golpe de calor.

Un poco sobre Joe

Joe, de 44 años, había viajado desde México a Estados Unidos para unirse a una cuadrilla de 12 trabajadores H-2A contratados por el agricultor, que también empleaba a 5 trabajadores a tiempo completo y 3 a tiempo parcial. (Los trabajadores H-2A son trabajadores extranjeros temporales, no inmigrantes, que son contratados para realizar trabajos agrícolas en Estados Unidos cuando no hay trabajadores estadounidenses disponibles). Joe no tenía experiencia en el cultivo de tabaco y, cuando murió, llevaba 11 días en Estados Unidos.

La investigación

Los investigadores se enteraron de que el agricultor había distribuido a todos los trabajadores agrícolas, incluido Joe, un folleto de seguridad y salud escrito en español que incluía información sobre las enfermedades y los golpes de calor. Lamentablemente, el empresario no exigió que los trabajadores leyeran el folleto ni se discutió o revisó su contenido.

Working in extreme heat Fatality File

Farm Worker Dies From Heat Stroke

Joe had been working in the North Carolina tobacco field for just over a week. The first few days on the farm were hot and humid, with welcome breaks of rain. But on this day, there was no rain. The thermometer had already climbed to 95F when Joe stopped for his soda and cracker break at 10 a.m. By the time the temperature

reached between 100F and 108F at 3 p.m., Joe complained to the crew leader that he wasn’t feeling well. The crew leader gave Joe a drink of water and drove him back to the workers? Housing, where he left Joe to rest for a while. Forty-five minutes later, Joe was found on the steps of the house. He was unconscious. Emergency medical services were called and Joe was transported to the hospital, where his core body temperature was recorded at 108F. But Joe didn’t respond to the medical personnel’s attempts to cool him. His death was attributed to heat stroke.

A Little about Joe

Joe, 44, had traveled from Mexico to the US to join a crew of 12 H-2A workers employed by the farmer, who also employed 5 full-time workers and 3 part-time workers. (H-2A workers are temporary, nonimmigrant foreign workers who are hired under contract to perform farm work in the United States when American workers are not available.) Joe had no tobacco farming experience and when he died he’d been in the United States for 11 days.

The Investigation

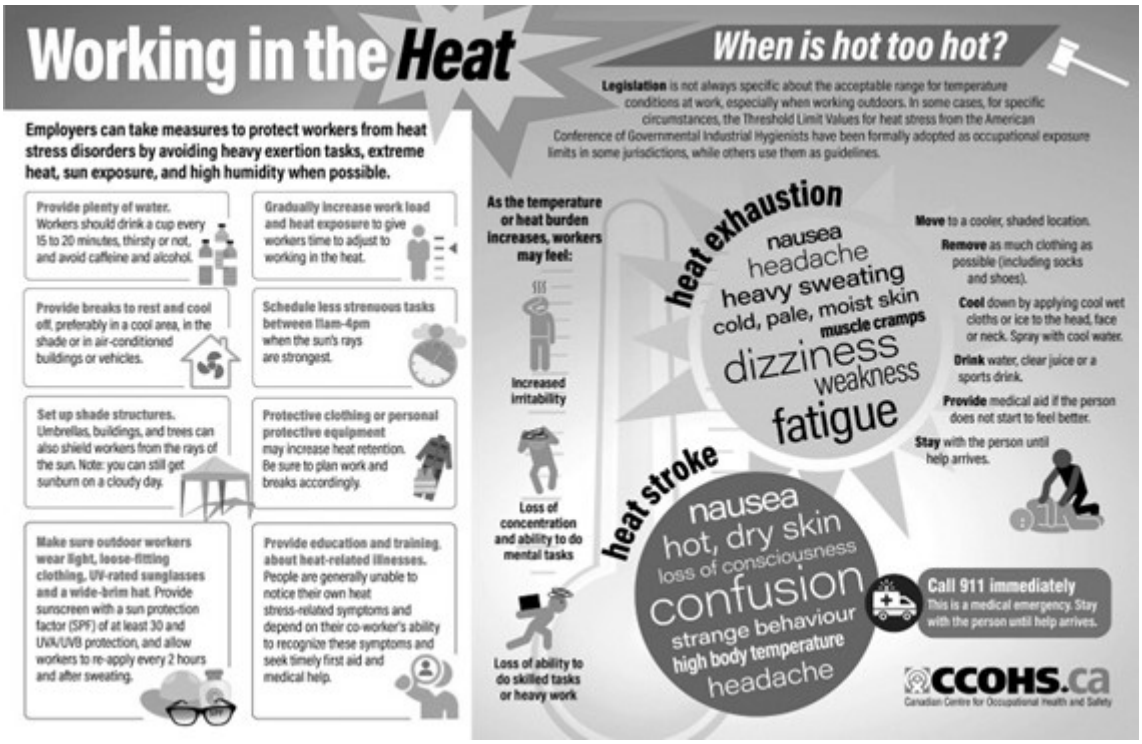
Investigators learned that the farmer had distributed to all farm workers, including Joe, a safety and health booklet written in Spanish that included information on heat illness and heat stroke. Unfortunately, the employer did not make it a requirement that the workers read the booklet nor were the contents of the booklet discussed or reviewed.

Working in extreme heat Picture This – Spanish



Fuente: ***http://www.exyge.eu/***

Working in extreme heat Picture This



Source: ***https://www.ccohs.ca***

Organization of Work Areas Meeting Kit

WORK AREAS BEST PRACTICES

Our work areas are setup and not changed for long periods of time, even when a rearrangement would be a great improvement. Complacency often plays a factor in why our work areas are not changed for the better. Taking the time to evaluate your work areas as well as taking action to eliminate hazards can prevent an injury from occurring.

Often times much of our focus is given to the hazards of a work task, but less focus is given to the hazards poor work area conditions create. Work areas that are chaotic and that have poor organization can lead to more injuries and property damage incidents.

HAZARDS CREATED BY POOR ORGANIZATION OF WORK AREAS

Some hazards of poorly organized work areas include:

- **Sprain/ Strain hazards-** Poor foresight or carelessness often leads to heavy or awkward objects being left on the floor or in a space that makes it difficult for someone to lift them up. These situations put individuals at risk for sprain and strain injuries which are some of the most common and costly injuries that occur in the workplace.
- **Overhead hazards-** Poor organization leads to objects being hastily thrown on overhead shelves which leads to dropped object hazards as well as a struck-by hazard for someone working in the area.
- **Risks to property**– When items are left everywhere or in the line of fire, damage to tools, equipment, or materials often occurs.

Struck-by incidents- Work areas that do not have any designated paths for personnel walking through or areas blocked off for specific work tasks such as grinding, create struck-by hazards can be particularly dangerous. Flying debris, lifting loads, and moving objects can all create struck-by hazards for anyone in the area.

Slips, trips, and falls- Objects on the ground due to poor organization or housekeeping create trip hazards for any walking through that area. Slippery surfaces due to moisture or other liquids such as oil can cause a slip or a fall. Uneven surfaces, steps, or unexpected drop-offs are also a common trip hazards in poorly designed work areas.

Caught in or between incidents– Work areas that place people near moving parts or equipment is also a huge concern. Moving equipment such as belts or fans can grab a hold of a person’s clothing or hair pulling them into the moving parts.

BEST PRACTICES FOR WORK AREA ORGANIZATION

- Delineate walking paths from actual work areas. Consider when physical barriers such as a fence or wall are needed to

protect people from a hazardous work process.

- Organize all tools, equipment, materials, etc. in an area. Everything should have its own place that does not pose a hazard to anyone in that area.
- Always guard moving parts and equipment even when they are not in the immediate planned walking path. If people can fit into an area and the moving parts are not physically blocked off there is a chance of a caught in or between injury.
- Keep walking and working surfaces kept up and safe. Mark any elevation changes with bright fluorescent paint. Patch any holes or major cracks to prevent trip hazards. Always strive to keep dry clean floors. Consider applying some type of grit or material that improves traction in areas where moisture can occur.

MORE BEST PRACTICES FOR EMPLOYEES TO STAY ORGANIZED AT WORK

You have heard the saying, “A cluttered desk is a sign of a cluttered mind?” A workspace decently organized can leave more time for productivity. However, somewhere between meetings, conference calls and client work… things can quickly get out of hand. The important thing is to strive to stay organized, because it really can make a difference – in fact, the average office employee spends 1.5 hours a day just looking for things. That’s almost six weeks per year!

Make time to organize. Although you don’t have to make organizing your top priority for the day, it is important to at least make time for it. Set aside at least 30 minutes each week to get your desk, computer and even your thoughts in order. Try to spend time at the end of each workday organizing your desk before you leave. This will make the following day much easier, as you will already know where everything is. It’s a good idea to spend time at least one day a week organizing your computer to make sure that everything is in its proper folder. We know that there can be times when you are in a rush and you have to save something to the desktop. Having appropriate folders in your computer can really come in handy when you are quickly trying to locate a particular document. It’s also a good idea to start your workday off by

regrouping and recalling all of your assigned daily responsibilities and tasks. This will help organize your mind for a productive start to your day while keeping you focused.

Establish a filing system. Filing cabinets or computer folders? In this case, it really doesn't matter because both have the potential to be organized. Most importantly, be consistent with your system. Establish a filing system and stick with it. If you prefer to keep hard copies all of your documents in folders or in a filing cabinet, spend the time establishing a proper place for each type of document. Make various folders or use different drawers to distinguish between different types of work. On the other hand, if you prefer to keep track of everything online or on your computer, make sure you have a backup system to save your work in case something terrible happens.

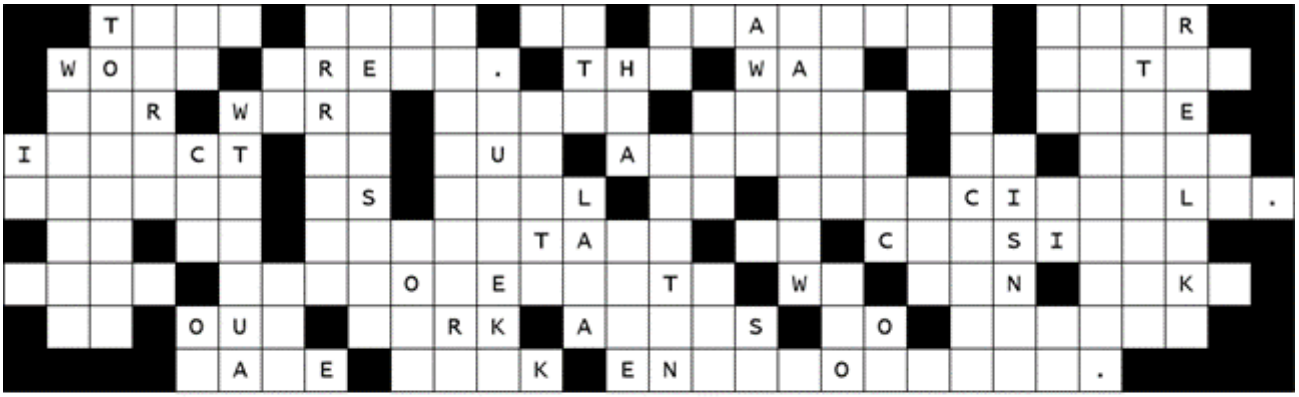
Label Everything. Labeling is always a key factor to organization because it helps you stay consistent with your work. When you properly label everything, your organization process runs smoothly and cohesively. It helps keep everything in its proper place and ensures that you (hopefully) won't misplace or lose track of something.

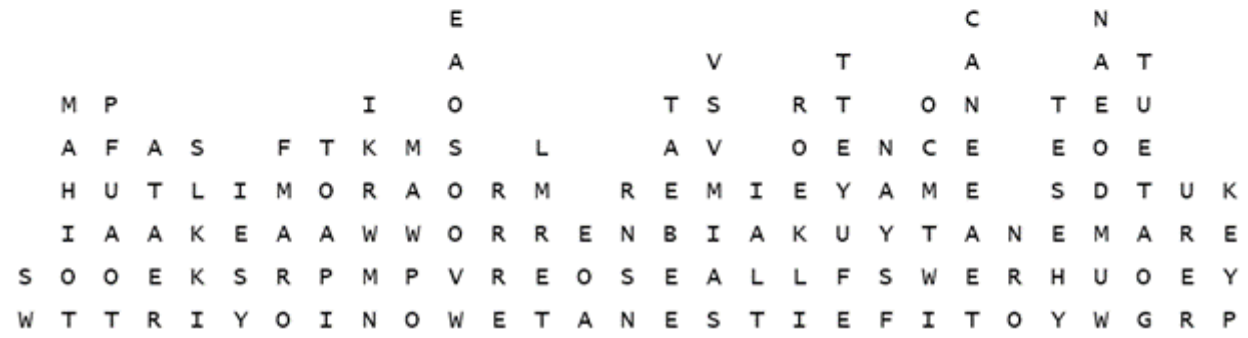
Don't forget to breathe. No one is perfect and we don't expect you to become an organized genius overnight. If you find that the process of trying to stay organized is stressing you out, then take a break and breathe. Although organization might be a key to success, it is not the only factor. Just remember that it really can make a big difference in your work life. Find the time and the method that works best for you and stick with it.

FINAL WORD

Take time to evaluate your work areas today. How long have they been organized in their current state? Is there a better way to setup a certain area? Were they better organized at one time and now they are not up to par? Think about how rearranging certain things can lead to fewer hazards as well as create a more pleasant place to work in general.

Organization of Work Areas Fallen Phrases





Take time to evaluate your work areas. The way we setup our work areas makes a huge impact on our ability to work safely as well as efficiently. it is important to consider what improvements we can make to our work areas to create safe work environment.

Organization of Work Areas Word Search



- Safety Now
- Organization
- Work
- Area
- Practices
- Setup
- Complacency
- Evaluate
- Hazards
- Injuries
- Sprain
- Strain
- Overhead
- Slips
- Falls