SAFE TEACHING ENVIRONMENTS

Are there hazards in your teaching environment?

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Purpose:

- Provide information on federal and state health and safety regulations as they pertain to ensuring a safe teaching environment for TCC faculty, staff, and students.
- Provide information on 12 critical safety issues to consider when conducting a hazard analysis of instructional programs

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Objective

- Bring focus to achieving a safe teaching environment in academic programs where faculty, staff and students are exposed or potentially exposed to hazardous conditions and reduce or eliminate exposure to these unsafe conditions

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Must Know OSHA Standards for Higher Education Sector

10 most frequently cited by OSHA

- Hazard Communication - 29 CFR 1910.1200
- Occupational Exposure to Hazardous Chemicals in Labs - 29 CFR 1910.1450
- Respiratory Protection - 29 CFR 1910.134
- Personal Protective Equipment - 29 CFR 1910.132-138
- Hearing Conservation - 29 CFR 1910.95
- Occupational Exposure to Bloodborne Pathogens - 29 CFR 1910.1030
- Flammable & Combustible Liquids - 29 CFR 1910.106
- Compressed Gases - 29 CFR 1910.101
- Electrical Wiring & Design - 29 CFR 1910.301-399
- Emergency Action Plans - 29 CFR 1910.38

Requirements:

- Written Program
- Proper labels with product name & hazard warning (workplace labels)
- Safety data sheets (SDSs) must be maintained and accessible
- Training must be provided on the chemicals or hazardous substances used

GHS Revisions Published March 26, 2012

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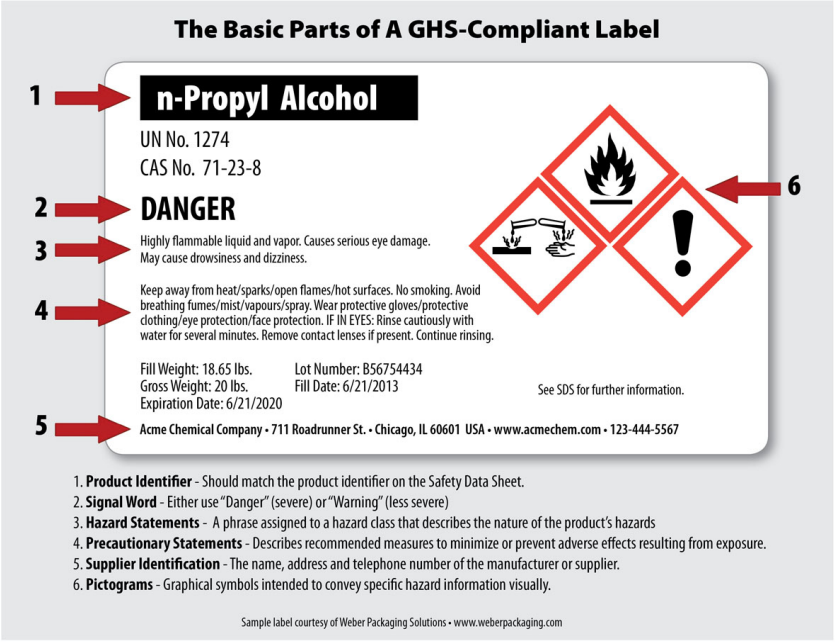
Hazard Communication GHS Compliant Label



Secondary container labels:

Employers can either put ALL of the original container label information on the secondary container label, or just the product identifier and signal word(s), pictograms, symbols or a combination thereof.

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Pictograms:

This GHS revision is now required on all original container labels.

Health Hazard  • Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity	**Flame**  • Flammables • Pyrophorics • Self-Heating • Emits Flammable Gas • Self-Reactives • Organic Peroxides	**Exclamation Mark**  • Irritant (skin and eye) • Skin Sensitizer • Acute Toxicity (harmful) • Narcotic Effects • Respiratory Tract Irritant • Hazardous to Ozone Layer (Non-Mandatory)
Gas Cylinder  • Gases Under Pressure	**Corrosion**  • Skin Corrosion/ Burns • Eye Damage • Corrosive to Metals	**Exploding Bomb**  • Explosives • Self-Reactives • Organic Peroxides
Flame Over Circle  • Oxidizers	**Environment** (Non-Mandatory)  • Aquatic Toxicity	**Skull and Crossbones**  • Acute Toxicity (fatal or toxic)

Hazard Communication – GHS – Effective Dates

Date	Description
March 26, 2012	Final rule published in the *Federal Register*. Replaces the previous OSHA Hazard Communication Standard.
December 1, 2013	Deadline to train employees on the new label elements and Safety Data Sheet formats.
June 1, 2015	Deadline for manufacturers and employers to be in compliance with all modified sections of the rule except for the two following situations:
December 1, 2015	Date after which distributors may no longer ship products without compliant labels
June 1, 2016	Date by which employers must have updated workplace labeling systems and hazard communication programs / procedures.

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CHEMICALS IN LABS - 29 CFR 1910.1450

Requirements:

- Hazard Identification
- Chemical Hygiene Plan
- Information & Training
- Exposure Monitoring (exceeds action level, or permissible exposure level [PEL])
- Medical Consultation & Examination (symptoms from significant exposures)

Poor housekeeping practices are the leading causes of accidents in an academic laboratory. Bottles containing chemicals should not be stored on the floor where there is the potential hazard of breakage/leaks/spills.

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Laboratory Hazards

- Improper storage of chemicals
- Labels illegible
- Disposal schedule overdue
- Poor housekeeping

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CHEMICAL HYGIENE PLAN – 29 CFR 1910.1450(e)

Includes:

- Standard operating procedures (SOP) that cover prudent lab practices
- Control measures to reduce exposure to hazards chemicals
- Procedures to test chemical fume hoods and other equipment (eye wash & shower stations) to ensure each is functioning properly
- Circumstances requiring prior approval before implementation
- Provisions for medical consultation & examinations
- Assign Chemical Hygiene Officer
- Stipulations for additional protection for work with particularly hazardous chemicals
- Information & training requirement to ensure persons involved in laboratory activities are aware of the hazards of the chemicals used

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PERSONAL PROTECTIVE EQUIPMENT – 29 CFR 1910.132-138

Requirements:

- Written assessment required to determine if hazards are present or likely to be present which necessitate the use of PPE for eyes, face, head, and extremities
- Protective clothing, respiratory devices, protective shields and barriers shall be provided, used, and maintained in a sanitary condition

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Eye & Face Protection 29 CFR 1910.133

Requirements:

- Whenever the eye or face is exposed to the following:
- Flying particles/debris
- Molten metal
- Liquid Chemicals
- Acids or caustic/corrosive liquids
- Chemical gases or vapors
- Potentially injurious light radiation (UVA, UVB, or laser)

Face shield with attached mask

Safety glasses with fixed side shields

Chemical splash goggles

Logger's face shield

Welder's helmet with tinted lenses

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Respiratory Protection 29 CFR 1910.134

Requirements:

- The use of respirators should be the last resort if engineering controls such as an enclosure or confinement of the operation, or administrative controls cannot be used. Respirators must be NIOSH approved.
- Written program for required use
- Monitoring is required to determine exposure levels for required use
- Medical evaluations & fit testing required for both voluntary and required use

Dust Mask

N95 respirator

Half Mask

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Head Protection 29 CFR 1910.135

Requirements:

- Whenever there is the potential for injury to the head from falling objects, areas where the head could strike an object, or in close proximity of electrical hazards

Requirements:

- Must be worn in areas where there is a danger of foot injuries due to falling or rolling objects, objects piercing the sole, or where feet are exposed to electrical or chemical hazards

Chemical resistant

Steel toe, slip resistant sole

Shoe Covers

Traction shoe covers for slippery floors

Foot Protection 29 CFR 1910.136

Requirements:

- Whenever working on or near energized parts of equipment (arc flash protection NFPA 70E)
- Class A or B hard hat
- Face shield rated for arc flash
- Flame resistant clothing
- Gloves rated for electrical work
- Non-conductive footwear

Electrical Protective Equipment – 29 CFR 1910.137

Hand Protection -29 CFR 1910.138

Requirements:

- Whenever hands are exposed to hazards such as those from skin absorption of harmful substances or chemicals, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns, and harmful temperature extremes.

Rubber household

Metal mesh

Leather welding gloves

Nitrile (chemical use)

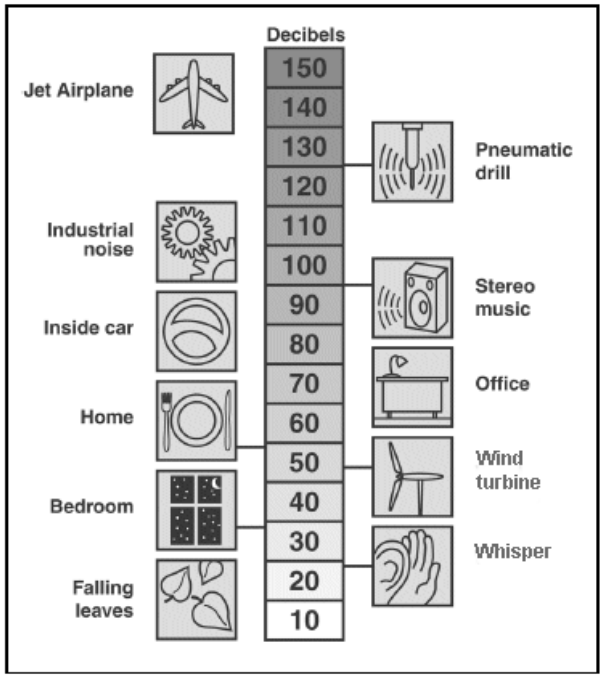
Cryogenic

Canvas work gloves

Hearing Conservation 29 CFR 1910.95

Exposure to noise levels at or above 85 decibels over an 8 hour time weighted average (TWA) requires:

- Written hearing conservation program
- Baseline monitoring
- Annual audiometric testing
- Required use of hearing protection



Requirements:

- Written Exposure Control Plan (ECP)
- List of all job classifications in which employees have an occupational exposure to blood or other potentially infectious materials (OPIM)
- Center for Disease Control (CDC) Guidelines – Universal Precautions (PPE) from HIV, HBV, HCV

Exposure to Bloodborne Pathogens – 29 CFR 1910.1030

Requirements:

- Bond and ground class 1, 2, and/or 3 liquids with a flashpoint below 100 degrees
- Flammable liquids shall not be stored in areas used for exits, stairways, or means of egress
- No more than 25 gallons of flammable liquids shall be stored in a room outside of an approved storage cabinet
- Materials which will react with water and create a fire hazard shall not be stored in the same room with flammable liquids
- Only approved containers shall be used for storage and handling of flammable liquids
- Keep ignition sources and static electricity away from flammable and combustible liquids

Chem lab at Texas Tech University where a 4 liter bottle of a flammable liquid located in a fume hood broke releasing the liquid. Heated hot plates provided a source of ignition and the spilled liquid caught fire and destroyed the lab.

Flammable & Combustible Liquids – 29 CFR 1910.106

Requirements:

- Visually inspect for cracks, leaks, any other malfunctions with an emphasis on the cylinder, safety relief devices, valves, protection caps, and stems.
- All cylinders, empty or full, must be upright
- Secure cylinders to prevent them from being knocked over or damaged
- Do not store incompatible gases together
- Caps shall be in place when the gas cylinder is in storage
- Do not store near sources of ignition

The fire originated from improperly stored Isopentane (2-methyl butane) in a non-explosion proof freezer in a college lab. The freezer exploded and a compressed gas line was sliced open; the flammable gas ignited. The damage to the lab was in excess of $160,000.00.

Compressed Gases 29 CFR 1910.101

Requirements:

- Electrical equipment must be free from recognized hazards – inspect before use
- Household appliances are not listed or labeled for use in the workplace
- Must be 3 feet of clear access in front of all electrical equipment (less than 600 volts)
- Electrical services near sources of water must be GFCI protected
- Damaged electrical equipment must be tagged out and removed from service

TV is blocking access to the electrical panel

Daisy-chained surge protectors

Electrical Wiring & Systems Design – 29 CFR 1910.301-399

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Electrical Hazards

What's wrong with this picture?

Flexible cord hidden behind ceiling tile

Electrical panel 3 ft. access is blocked by stored items in front

Missing faceplate

Requirements:

LOTO procedures are required before any servicing or maintenance on a machine or equipment where the unexpected energizing, start up or release of stored energy could occur and cause injury. The machine or equipment shall be isolated from the energy source, and rendered inoperable

LOTO device for gate valve

LOTO device for butterfly valve

Circuit breaker LOTO device

Equipment/machine main disconnect LOTO device

Cord/plug LOTO device

Universal LOTO device

Control of Hazardous Energy – Lockout/tagout – 29 CFR 1910.147

Machine Guarding – 29 CFR 1910.212

Requirements:

- One or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards such as those created by the point of operation, ingoing nip points, rotating parts, flying chips and sparks.
- Examples of guarding methods are: barrier guards, two-hand tripping devices, electronic safety devices
- Machines designed for fixed locations shall be securely anchored to prevent walking or moving during operation

Drill press with fixed guard

CNC lathe with traveling chip guard

Enclosure for milling point of operation

Vertical bandsaw with blade guard

The TCC Crisis and Emergency Management Plan (CEMP) can be accessed through TCC's website

Emergency Action Plans 29 CFR 1910.38

Miscellaneous Hazards

- Excess combustible material (fire hazard)
- Means of egress restricted due to clutter, violation of Life Safety Code (NFPA 101)
- Excess clutter attracts rodents and insects (health hazard)

Does your office look like this??? If so, it's a hazardous work environment and in violation of several OSHA regulations.

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12 CRITICAL SAFETY ISSUES
Known or Potential Hazards in a Teaching Environment

1. CHEMICALS OR HAZARDOUS MATERIALS
2. EXPLOSION
3. ELECTRICAL
4. ERGONOMIC
5. VISIBILITY
6. FALLS
7. FIRE/HEAT
8. MECHANICAL
9. NOISE
10. RADIATION
11. STRUCK BY/STRUCK AGAINST
12. BIO-HAZARDS

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Identifying the Hazards

* An instructional program hazard analysis is an exercise in detective work. Your goal is to discover the following:
  * What can go wrong?
  * What are the consequences?
  * How could it arise?
  * What are other contributing factors?
  * How likely is it that the hazard will occur?

A hazard is simply defined as a condition or a set of circumstances that present a potential for bodily harm. Hazards are divided into two broad categories:

- Health hazards (cause illnesses)
- Safety Hazards (cause injuries)

WHAT IS A HAZARD?

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Common Hazards in the Teaching Environment

Hazardous Condition	Hazard Type	Hazard Type	Hazard Type
Chemical	Toxic, Flammable, Combustible, Corrosive	Fire Over reaction explosion Over-exposures	Improper storage Unsafe practices Improper PPE
Explosion	Over pressurization, chemical reaction	Compressed gas cylinders, hoses	Improper storage cylinders, chemicals
Electrical	Shock from AC/DC voltage	Short circuit, arc flash	Electrostatic discharge
Ergonomic	Sprain/Strain	Lifting, bending	Body positioning, fatigue

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Common Hazards in the Teaching Environment

Hazardous Condition	Hazard Type	Hazard Type	Hazard Type
Visibility	Obstructed views, poor lighting	Inclement weather	Laser use during activity, UVB, UVA rays
Fall	Slips, trips, falls from same elevation	Falls from elevation (4ft from ground)	Using aerial lifts, ladders
Fire/Heat	Flame, thermal, steam	UVB, UVA rays	Chemical reactions
Mechanical	Rotating parts, ingoing nip points,	Unguarded equipment, flying chips	Vibration, chaffing, failure

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Common Hazards in the Workplace

Hazardous Condition	Hazard Type	Hazard Type	Hazard Type
Noise	Exposure at or above 85dBA for an 8 hr TWA	Exposure at or above 100 dBA for ½ hour	85dBA City Traffic 110dBA Power saw at 3ft range
Radiation	Ionizing – alpha, beta, gamma rays, ultra violet rays (tanning booth)	Non-ionizing – non-thermal, (power lines, radio frequencies)	Non-ionizing – thermal (laser, microwave, heat lamp, infrared)
Struck by/against	Struck by: object hitting the body	Struck against: coming in contact with an object	Falling objects hitting body, Needle sticks
Bio-hazard	Bacterial, viral, Parasitic	Fungal Microbial	Bloodborne pathogens, OPIM

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PERSONAL PROTECTIVE EQUIPMENT

BODY PART OR BODY SYSTEM	INJURY FROM HAZARD	PPE TYPE	PPE TYPE
Hand/arm	Cuts, burns, skin irritation	Gloves (nitrile, rubber, metal mesh)	Clothing (aprons, leather gauntlets, long sleeves)
Eye/Face	Eye injury from debris, laser, exposure from chemical splash	Safety glasses with side shields, chemical goggles (must meet ANSI Z87.1-2003),	Welding helmet, full face shield, Didymium lenses (UVB/UVA rays) FR shirt
Foot/leg	Severe cuts, broken toes, Electric shock	Leather close-toe shoes, steel-toe, Kevlar boots, Non-conductive	Leather chaps, long pants, FR pants
Respiratory System	Inhalation of dust, fumes, mist, vapors	NIOSH approved respirators – N95, half mask, full face	For voluntary or required use

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PERSONAL PROTECTIVE EQUIPMENT

BODY PART OR BODY SYSTEM	INJURY FROM HAZARD	PPE TYPE	PPE TYPE
Ear	Loss of hearing from exposure to noise levels	Ear plugs, ear muffs	Combination of both
Falls - Lower extremities, entire body	Contusions, fractures, death	Full body harness, guardrail protection, or safety nets	Retractable life lines
Body - Upper & lower extremities	Burns, cuts, skin irritation	Chemical aprons, leather aprons, FR clothing, Tyvek suits	Natural fiber clothing
Head	Cuts, fractures, electric shock	Hard Hat – ANSI Z89-2009	Rated for task

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