

MAJOR PROGRAM POINTS

"CHEMICAL SAFETY IN THE LABORATORY"

**Training for
THE OSHA LABORATORY STANDARD**

Quality Safety and Health Products, for Today...and Tomorrow

Outline of Major Points Covered in the "The OSHA Laboratory Standard" Course

The following outline summarizes the major points of information presented in the Course on The OSHA Laboratory Standard. The outline can be used to survey the Course before taking it on a computer, as well as to review the Course when a computer is not available.

- **Imagine a laboratory where:**
 - All the chemical containers have no labels.
 - All measuring tools and vessels have no markings.
 - All chemicals are the same color.
- **There would be no way to tell which chemicals you are using.**
 - No way to measure them.
 - No way to know what hazards they present.
 - No way to know what would happen if you combined them.
 - This is the way you would feel in your lab if it weren't for OSHA's Laboratory Standard.
- **OSHA's Hazard Communication or "Right-To-Know" Standard helps ensure that we get the information and training we need to work safely with hazardous chemicals.**
- **The Laboratory Standard goes one step further, and requires employers to maintain a chemical hygiene plan.**
 - This written program identifies the equipment and procedures used to protect employees from hazardous chemicals.
- **But what is a "laboratory" according to OSHA, and how is it different from other workplaces?**
 - First and foremost, work is carried out on a "laboratory scale"(this means that containers used for reactions, transfers and other handling can be used easily and safely by one person).
 - The use of a variety of different chemicals or procedures is also a characteristic of a laboratory.

- **However, none of the procedures used in a laboratory can be part of... or a simulation of... a "production process".**
 - Such as setting up a prototype production line.
- **A laboratory must also have protective equipment and practices available and in use to minimize employees' exposure to hazardous chemicals.**
- **Your facility's "Chemical Hygiene Officer" can answer any questions about:**
 - Working with hazardous chemicals.
 - Details of your facility's "chemical hygiene plan".
- **The chemical hygiene plan outlines the standard operating procedures that should be followed when working with chemicals.**
 - The first step is to determine what hazards are presented by the chemical that you are using.
- **The Material Safety Data Sheet (MSDS) is the primary source for information about a chemical.**
 - Your facility maintains an MSDS for every chemical in your laboratory.
- **The MSDS lists:**
 - The various names of a chemical.
 - The company that manufactures it.
 - Any hazardous ingredients that the chemical contains.
- **The MSDS also describes:**
 - The types of hazards that the chemical may present.
 - First aid procedures for chemical exposures.
 - Spill cleanup techniques.
- **To help you work with a chemical safely, the MSDS will also tell you:**
 - How to handle and store the chemical properly.
 - What exposure controls and personal protective equipment (PPE) to use to protect yourself.

- **Material Safety Data Sheets can come in different formats, but they all contain the same kinds of information.**
 - Remember to read the MSDS before you work with an unfamiliar chemical (this could help prevent problems).
 - Review the MSDS occasionally while you work to ensure that you are using the chemical safely.
 - MSDS's get updated periodically, so make sure you are looking at the most recent version.

- **Another source of hazard information in your laboratory is a chemical's container label.**
 - Remember to read the container label before working with a chemical.

- **The container label:**
 - Identifies the chemical.
 - Spells out the primary hazards.
 - And states any required safety precautions.

- **Like MSDSs, all labels do not present their information in the same way.**
 - Some labels are written.
 - Others use shapes, numbers or letters as warnings.
 - There are also labels that use "symbols" or "pictures" to represent hazards or PPE that should be used.

- **Remember, if you transfer a chemical to another container, it is your responsibility to label that new container.**
 - This is so everyone else will know what chemical is inside.
 - Your facility probably has a standardized labeling system for these "secondary" containers.

- **All chemicals need to be handled with care, but hazardous chemicals demand extra caution.**
 - The protective measures we should take depend on the hazards of the material.

- **For the purposes of the OSHA Laboratory Standard, a "hazardous chemical" is a substance that has the potential to cause "negative health effects".**

- **Chemicals can be divided into five categories, based on the type of health hazard each presents:**
 - Sensitizers.
 - Irritants.
 - Corrosives.
 - Toxic chemicals.
 - Carcinogens.

- **After repeated exposures to a "sensitizer", many people develop an allergic skin reaction... such as a mild rash.**

- **A single exposure to an "irritant" can often result in inflammation of the:**
 - Skin.
 - Eyes.
 - Respiratory system.
 - (These effects are usually temporary).

- **On the other hand, a "corrosive" can cause irreversible damage in the form of severe burns.**

- **A "toxic" chemical has the potential to disrupt bodily functions such as:**
 - Breathing.
 - Blood circulation.

- **Some toxic chemicals have "target organ effects", which means they can damage specific organs such as the:**
 - Lungs.
 - Kidneys.
 - Liver.

- **A "poison" is an extremely toxic substance that can cause death in a short period of time.**
 - Even in a very small dose.

- **A "carcinogen" is a substance that, over time, can cause cancer.**

- **Once we have used resources such as the MSDS and the container label to identify the hazards a chemical presents, we need to take steps to protect ourselves.**

- **There are three basic approaches.**
 - Administrative controls.
 - Engineering controls.
 - Personal protective equipment.
 - Most situations call for the use of all three.
- **Administrative controls can include:**
 - General policies.
 - Specific procedures.
 - Even work schedules that limit or eliminate your chances of exposure.
- **Engineering controls are physical barriers or equipment that can reduce or prevent exposure, and include:**
 - Splash shields.
 - Laboratory hoods.
- **Personal protective equipment is your last line of defense against exposure to hazardous chemicals.**
 - But it must be the first thing you take care of when you enter the lab.
- **If you are uncertain as to what PPE to use:**
 - Consult your chemical hygiene plan.
 - Ask your supervisor.
 - "Guessing" about PPE can have serious consequences.
- **Safety glasses are usually the minimum requirement for eye protection in the laboratory.**
 - Work involving corrosives or other splash hazards may require splash-proof goggles, or the addition of a face shield.
- **Surgical and other rubber gloves can protect your hands from most contact hazards.**
 - Insulated gloves are needed when working with very hot or cold materials.
- **Respiratory protection in the lab includes:**
 - A simple filter mask.
 - An air-purifying cartridge respirator.
 - A self-contained breathing apparatus.

- **No matter what kind of respirator you use, you must be tested for a proper fit.**
 - If it does not fit correctly, it will not protect you.
 - Hazardous fumes may leak in through gaps between the mask and your face.
- **When selecting PPE, remember to consider all the hazards that a material represents.**
 - When working with cryogenic liquids, wear goggles and a face shield to defend against splashes.
 - And wear insulated gloves to protect your hands.
- **Laboratory hoods are the most common "engineering control" used in the lab.**
 - They can protect us from hazardous chemicals (but only if we use them properly).
- **A lab hood is a ventilated enclosure that helps to contain fumes and vapors.**
 - But for it to work, you can't block the flow of air with equipment or materials.
 - It can also act as a "physical barrier" against spills, splashes and explosions.
 - But only if you lower the sash when working.
- **Remember that a lab hood is a tool for your protection, not a storage cabinet for materials or equipment.**
 - Storing chemicals in a hood can be dangerous, especially if they are flammable or reactive.
 - Always return supplies and glassware to their appropriate storage places.
- **Training is also a key part of working safely with chemicals.**
 - A training schedule, and other details of your facility's safety training program are included in the chemical hygiene plan.

- **Learn to handle glassware safely, because improper handling of glassware is the leading cause of accidents in the lab.**
 - When the hazardous chemicals are involved, little accidents can develop into significant exposure situations.
- **Inspect glassware for cracks, chips and other flaws before you begin to use it.**
 - Even a "hairline" crack can cause big problems, especially if you add heat.
 - Heating glass causes it to expand, putting pressure on the flaw until it fractures.
 - When handling heated glassware, remember to use insulated gloves.
- **To prevent problems with glassware:**
 - Always return glass equipment to its proper storage place.
 - Keep glassware away from the edge of shelves and countertops.
- **Sometimes a chemical spill leads to an exposure situation. There are four basic "routes of entry"... ways a chemical can get into the body:**
 - Contact with the skin or eyes.
 - Inhalation.
 - Ingestion.
 - Injection.
- **If a hazardous chemical comes into contact with the skin or eyes, it could cause a localized reaction.**
 - It could also be absorbed into the bloodstream and circulate throughout the body.
- **In these cases, water is the first line of defense against injury.**
 - Know the locations of the nearest safety shower and eye wash station.
 - You should be able to find them with your eyes closed.

- **If a chemical splashes into your eyes, get to an eye wash as quickly as possible.**
 - Hold your eyes open and in the stream of water for at least 15 minutes.
 - This may be uncomfortable, but your eyesight could be at stake.
- **If a chemical splashes onto your body, call out for help and head for the nearest safety shower.**
 - You will have to remove your PPE and your clothing.
 - The shower water may be cold, but remember a corrosive chemical can cause permanent damage.
 - Stay in the shower for at least 15 minutes, rinsing the affected areas thoroughly.
- **"Inhalation" is another possible route of entry. if someone has inhaled gases, fumes or vapors:**
 - Remove them from the immediate area.
 - Get them into fresh air.
- **The third route of entry is "ingestion". If someone swallows a chemical, consult the MSDS for instructions.**
 - They may need to take an antidote.
 - Water or milk can sometimes be used to dilute the chemical.
- **"Injection" is another route of entry. Needles are not the only source of this kind of exposure. Others include:**
 - Broken glassware.
 - Sharp instruments.
- **Report any exposure to a hazardous chemical to your supervisor.**
 - Seek professional medical attention as quickly as possible, no matter how minor the exposure.
 - Even small doses of some chemicals can have serious health effects.
- **Because accidents always take us by surprise, we need to be prepared to deal with emergencies before they happen.**
 - Consult the MSDS or your chemical hygiene plan before you start to work with a chemical or a process.

- **If there is a leak or a spill of a hazardous chemical, quickly evaluate the situation.**
 - First, attend to anyone who is injured.
 - If other people are in danger, evacuate the area immediately.
- **Then notify the appropriate personnel. Depending on the situation, this may be:**
 - Your supervisor.
 - Your facility's Chemical Hygiene Officer.
 - An outside HAZMAT response team.
- **If it is a spill or leak that you can handle yourself, work to contain it.**
 - Use an absorbent pillow or neutral material to create a barrier around the chemical.
 - Then clean it up.
- **Remember, not all spilled chemicals should be cleaned up the same way.**
 - Many chemicals can be absorbed with a non-reactive material, such as vermiculite or dry sand.
 - However, inorganic acids and bases need to be absorbed with a neutralizing substance, such as soda ash.
 - Check the MSDS for proper cleanup procedures.
- **If you have been exposed to a hazardous chemical, you will be given the opportunity to talk to a doctor.**
 - This will determine if you need a more detailed medical examination.
 - You can also receive a medical exam if you ever display any symptoms of exposure.
- **Working with some hazardous substances, such as formaldehyde, is specifically regulated by OSHA.**
 - If you work around these types of chemicals, "medical surveillance" may be required.
 - This includes periodic examinations or medical tests.

- **Any medical consultations, examinations or tests will be performed by (or under the direct supervision of) a licensed physician.**
 - These will be provided to you free of charge.
 - For more information, consult with your supervisor or your facility's chemical hygiene plan.
- **We also have to protect ourselves from other dangers in the laboratory. some chemicals can present "physical hazards".**
 - For example, working with flammable or combustible chemicals requires special precautions.
 - These types of hazards are covered by OSHA's Hazard Communication Standard.
- **The safe handling of compressed gas cylinders is also very important.**
 - Chemicals are stored in these containers under great pressure.
 - The rupture of a valve or cylinder can be extremely dangerous.
- **At times, protecting yourself from "biological hazards" may be an issue. OSHA's Bloodborne Pathogens Standard focuses on precautions for:**
 - Viruses.
 - Bacteria.
 - Other bloodborne biohazards.
 - This information can be found in your facility's "exposure control plan".
- **Other types of hazards can also be encountered in the laboratory, such as:**
 - Lasers.
 - Ultraviolet light.
 - X-ray radiation.
 - These all play important roles in the lab, but can be dangerous if we don't take proper precautions.

- **Remember, if you ever have questions about safety, you should talk to your:**
 - Chemical Hygiene Officer.
 - Safety Director.
 - Area supervisor.
- **There is no guesswork involved with working safely in the laboratory. The steps you should follow to protect yourself from hazardous chemicals are spelled out in:**
 - The OSHA Lab Standard.
 - Your facility's chemical hygiene plan.

*** * * SUMMARY * * ***

- **Be aware of the hazards around you.**
- **Read MSDS's and container labels before working with a chemical.**
- **Wear appropriate PPE and follow safe work practices.**
- **Be prepared for emergencies before they happen. Know what to do, where to go and who to contact in an exposure situation.**
- **If you think that you have been exposed to a hazardous chemical... consult a physician immediately.**
- **If you have questions, ask your supervisor or your Chemical Hygiene Officer.**