Employee Safety

Best Practices for Managing Chemical Safety

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What You Need to Know

More than 32 million workers are exposed to dangerous chemicals at work, with more than 650,000 chemicals present in 3 million facilities.
Handling and storing these types of toxic substances in a safe, planned way is paramount.
Labeling is your team's first line of defense in keeping associates safe from hazardous chemical exposure.
Not all chemical substances are equal; they can be divided into six distinct types.
Proper chemical storage requires the right kind of cabinetry for ventilation, separation and reaction—and often will need an anti-roll lip to avoid spills and unintended breakage.

Is your shop handling and storing dangerous substances with the proper care to keep workers and the work environment safe from explosion, deadly inhalation or life-threatening fire?

Whether you are welding metals, cutting, milling, programming or machining, manufacturing can be a dangerous, and sometimes deadly, job—not necessarily due to the work, but to the chemicals used (or the byproduct of the work accomplished) on the factory floor or in the shop.

According to ***OSHA***, more than 32 million workers (more than 20 percent of the U.S. workforce) are exposed to dangerous chemicals at work, with more than 650,000 chemicals present in 3 million facilities. While most professionals are trained to handle dangerous concoctions, nearly 3 million nonfatal injuries occurred from chemicals in 2012 alone, with lung, skin, kidney, heart, stomach, brain, nerve and reproductive ailments being the most common.

Given the potential for serious injuries and fatalities, it should come as no surprise that the storage and handling of chemicals are paramount for manufacturers—and another important area of compliance.

"When storing materials, the No. 1 rule is to understand EPA, OSHA and national fire code regulations for chemical storage," explains Lonnie Chunn, health and safety coordinator for ***MC Assembly*** in Melbourne, Florida, in an interview with ***Better MRO***. "Proper management and handling of chemicals prevents accidental exposure and helps businesses comply with statutory obligations under federal regulations."

But like it is with many OSHA-imposed sanctions, cutting through the regulatory noise––and understanding how to handle the chemicals your facility deems crucial––can be a challenge.

Here, we outline a list of best practices to help you with storing and handling chemicals.

Chemical Labeling, SDS & MSDS

Long before any type of toxic substance arrives at your facility, your team should have a plan-of-action ready to execute. Namely, this includes ensuring you have ample Safety Data Sheets (SDS) available to all employees, and having all hazardous chemicals properly labeled.

Key to all of this, as usual, is ensuring workers are properly trained in SDS and labels—which should include: pictograms, signal words (such as "DANGER" or "WARNING"), hazard statements, precaution statements and supplier location information.

But labels are not enough. All companies dealing with hazardous chemicals also need to have SDS available. Formerly known as Material Safety Data Sheets (MSDSs), SDSs became OSHA's defacto regulation as of June 1st, 2015 and established an all-encompassing standard in line with international standards.

Giving employees a data sheet does not equal training, ***noted*** Daniel Levine, President, Product Safety Solutions, in an interview with *Safety+Health* magazine. OSHA has held this stance since the original hazard communications standard went into effect. These sheets are required to be provided by suppliers, but are also available per request and include:

- **Identification,** including the product identifier, manufacturer and distributor information
- **Hazard identification** relating to the chemical
- **Composition** or ingredients of the chemical
- **First-aid measures**, including what steps to take when coming in contact with the chemical
- **Fire-fighting measures** and extinguishing techniques
- **Accidental release measures** that list emergency procedures and protective equipment/cleanup
- **Handling and storage** steps for the chemical, including incompatibilities
- **Exposure controls and personal protection**
- **Physical and chemical properties**
- **Stability and reactivity** listing the possibility of hazardous reactions
- **Toxicological information**, including the routes of exposure, symptoms and chronic effects

Just because a label has been created for a chemical, doesn't necessarily mean your job is done. Chemicals should be inspected by trained, certified individuals, with special attention from given to shelf life and other incoming materials that might mix, Chunn notes.

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> Lonnie Chunn
> Health and Safety Coordinator, MC Assembly, Melbourne, Florida

Understanding the Different Types of Chemical Classifications

Speaking of incompatible chemicals, labeling hazardous chemicals is only the start––you have to store them correctly, too.

Substances can be grouped into six distinct categories (explosive, oxidizing, flammable, toxic, corrosive and water-reactive), each with its own respective hazards and incompatibility with various types of chemicals.

“The regulations are meant to ensure that no incompatible materials are within the same area,” says Chunn. “Additionally, you should know the hazard class of the material you are storing and how incompatible it is with other chemicals.”

Additionally, Chunn says to never store chemicals above eye level or store incompatible materials together. Substances, says Chunn, can be grouped into six types, listed below.

The first, **explosive substances**, should be placed far away from structures to minimize damage in the event of an explosion. These chemicals should also be kept far away from oil, grease, waste, flammable material and open fire.

Oxidizing chemicals can combust and intensify any fire that might break out. If a container of this type of chemical is damaged, the contents might mix with other combustible materials and start a fire. Don’t store near liquids or even slightly flammable materials.

Naturally, **flammable chemicals** burn more easily when there is oxygen present. Make sure these containers are far away from hydrogen, propane, butane, ethylene, acetylene, hydrogen sulfide and coal gas, as these types of materials are highly flammable.

Toxic chemicals should be stored in extremely cool, ventilated spaces whenever possible and sealed with tape or sealant. The low temperature for storing helps minimize any evaporation, which would release the harmful substances directly into the air.

Spillage of **corrosive chemicals** like acids and alkalis (like hydrofluoric acid, hydrochloric acid and sulfuric acid) should be stored far away from the rest of the chemicals, and handling should be treated with the utmost care. Corrosive chemicals can cause serious burns and irritations.

Lastly, **water-reactive chemicals** (like sodium and potassium metals) will react with water to produce heat and flammable or explosive gases, sometimes burning violently. When storing these types of chemicals, keep non-water automatic sprinkler systems on hand.

Guidelines for Proper Chemical Storage, Cabinets & Ventilation

Proper storage includes using cabinets with the ***right kind of protection*** for the class, compatibility and propensity for reaction—as well as the proper ventilation or protection—including size limits and the ability to prevent stored chemicals from easily falling or being accidentally left out in the open.

The following ***list***, published by EHSO, are guidelines from the CDC about storage:

- Do not store chemicals alphabetically except within a grouping of compatible chemicals.
- Flammable materials should be stored in an approved, dedicated flammable-materials storage cabinet or storage room if the volume exceeds 10 gallons. Keep cabinet doors closed.
- Chemicals should be stored no higher than eye level and never on the top shelf of a storage unit. Do not overcrowd shelves. Each shelf should have an anti-roll lip.
- Avoid storing chemicals on the floor (even temporarily) or in traffic aisles.
- Liquids should be stored in unbreakable or double-contained packaging, or the storage cabinet should have the capacity to hold the contents if the container breaks.
- Store acids in a dedicated acid cabinet. Nitric acid may be stored there also, but only if it is kept isolated from all other acids.
- Store highly toxic or controlled materials in a locked, dedicated poison cabinet.
- Volatile or highly odorous chemicals should be stored in a ventilated cabinet. Chemical fume

hoods should not be used for storage, as containers block proper airflow in the hood and reduce available workspace.

For a detailed list of incompatible chemicals, see EHSO's ***list in Table 1***, which separates chemicals by column. Those found in column A should not be stored with or near the substances in column B. The EHSO page also has charts for basic chemical segregation (Table 2) and suggested time limits for "common peroxidizable compounds" (Table 3).

Always consult with a chemical safety expert and OSHA for the most up-to-date chemical storage and handling information.

How does your team properly store hazardous chemicals? Tell us in the comments below.

