



## **MSHA Annual Refresher Training**

### **Module 6**

#### **Hazardous Chemicals and HazCom Programs**

**MSHA Training Requirement:**

An introduction to the rules and procedures for reporting hazards. [Section 46.5(b)(4)], Section 46.5 (b)(7)]

**Learning Objectives:**

1. Understand the potential dangers and health problems associated with hazardous chemicals designated for mining work.
2. Review the standards for Hazard Communication (HazCom) programs and understand how HazCom ensures you are informed about chemical hazards and safety procedures.
3. Follow procedures to identify all chemicals present in a work area, determine which chemicals are hazardous, and how to take protective measures against identified hazards.
4. Properly locate and complete Material Safety Data Sheets (MSDS) for pertinent chemicals at a mine worksite.
5. Efficiently report hazards and unsafe working conditions to the proper authorities.

**Module Sections**

- 6.1 Introduction to Hazardous Chemicals
- 6.2 Identifying Hazardous Chemicals
- 6.3 HazCom Programs and Training
- 6.4 Chemical Determination and Documentation
- 6.5 Labels and Other Forms of Warning

## 6.1 INTRODUCTION TO HAZARDOUS CHEMICALS

This module will help you conduct work safely as you encounter hazardous chemicals at mine worksites.

You will learn how to:

1. Understand the potential dangers and health problems associated with hazardous chemicals designated for mining work.
2. Review the standards for Hazard Communication (HazCom) programs and understand how HazCom ensures you are informed about chemical hazards and safety procedures.
3. Follow procedures to identify all chemicals present in a work area, determine which chemicals are hazardous, and how to take protective measures against identified hazards.
4. Properly locate and complete Material Safety Data Sheets (MSDS) for pertinent chemicals at a mine worksite.
5. Efficiently report hazards and unsafe working conditions to the proper authorities.

## Hazardous Chemicals and Materials

You will likely encounter a range of hazardous chemicals and materials in the mining process. **Hazardous chemicals** and **hazardous materials** are terms often used interchangeably, but they have distinct meanings.

Hazardous chemicals refer specifically to substances that can pose risks to health or the environment due to their *physical* or *chemical* properties. Examples include toxic solvents, corrosive acids, or flammable liquids.

On the other hand, hazardous materials encompass a broader category that may include hazardous chemicals but also refers to *any* materials that can cause harm to people or the environment. This can include contaminated soil, asbestos in buildings, or waste materials from worksites.

## Hazardous Chemicals in Mining

Lubricants, solvents, epoxies, diesel fuel, gasoline, cyanide, mercury, silica, and many other chemicals are either brought to mining operations or produced from the mining process itself.

While these chemicals are fundamental to the mining process, they can also cause serious health problems such as:

- Sterility
- Cancer
- Burns
- Heart, kidney or lung disease

among other health problems. Additionally, these chemicals can cause fires and explosions, but they are also useful to *help* fight fires and control explosions.

Importantly, this module will to help inform you about what mine operators are required to do to protect your well-being and safety while working with these materials.

## Module Warmup

*Why Safely Using Hazardous Chemicals Matter?*

Unfortunately, you can develop both short-term and long-term health problems from chemical exposure. Long-term illnesses, for example, may occur years after an exposure when the



immediate relationship of illness to chemicals can be difficult to see. Understanding the standards around HazCom (which we will cover in this module), and your right to be informed about hazardous materials at your worksite, can help reduce chemical injuries and illnesses.

The rest of this module will prepare you to effectively identify, understand, and mitigate the risks associated with hazardous chemicals at your worksite. Additionally, you will learn about the required HazCom program that must inform every miner about chemical hazards, appropriate protective measures, and how to report hazardous conditions.

## 6.2: IDENTIFYING HAZARDOUS CHEMICALS

Identifying hazardous chemicals at mine worksites may or may not be part of your typical job responsibilities and tasks. Yet, if your mine worksite is like most mining operations, compliance to identify and properly document hazardous material is part of your responsibility.

While chemical names, properties and uses may seem complicated, compliance to identify and report potential problems with these chemicals is not. There are some basic steps to help you properly, and safely, identify and report hazardous chemicals at a mine worksite.

### Assessing and Documenting Chemicals: Hazard Determination

#### What is hazard determination?

Hazard determination is a process of assessing and documenting the chemical inventory of the chemicals present at your mine worksite. Your mine operator must identify all chemicals at your mine and determine if they can be a physical or health hazard.

**Physical Hazards:** Physical hazards can cause bodily injuries. The chemical may be a combustible liquid, a compressed gas, an organic peroxide, or an oxidizer. It may be flammable, explosive, unstable (reactive) or water-reactive. A physical hazard might include any exposure to excessive noise, elevated heat, or sources of radiation, such as X-rays, or radioactive materials.

**Health Hazards:** While physical hazards cause bodily damage, health hazards can cause illnesses. The effects of health hazards may be of acute, or short duration, where symptoms often appear immediately. Or, they can be chronic, of persistent duration, where symptoms usually appear after some time.

Hazardous chemicals at a mine worksite can cause significant health problems, *regardless* of whether they represent physical or health hazards.

### Absorption of Hazardous Chemicals

As cautious as you may be, there are a variety of ways hazardous materials can be absorbed into your body. This includes inhalation, absorption, ingestion, and combustion/explosion.

Some potential harms from absorbing these chemicals into your body are eye irritation, germ cell mutation, serious eye damage, skin corrosion, and skin irritation.

The best way to protect yourself from hazardous chemicals is to always wear your PPE and use your hazard determination process to classify the chemicals you encounter.

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## Hazard Classification

The term 'hazard classification' is used to identify and classify chemicals that are hazardous on their own, meaning they do not need to be exposed to external forces to be hazardous.

Hazard classification incorporates three steps below, which we will cover in more detail later in this section:

- **Step 1:** Identification of relevant data regarding the hazards of a chemical.
- **Step 2:** Subsequent review of those data to ascertain the hazards associated with the chemical.
- **Step 3:** Determination of whether the chemical will be classified as hazardous and the degree of hazard by using established standards or a MSDS, which your mine operator must make available to you.

*How do I know if a chemical is hazardous?*

Every chemical brought to a mine worksite and each chemical produced on mine property must be evaluated to determine if it is hazardous. 2

To determine if a chemical is hazardous, you can:

- Refer to the manufacturer label,  
**AND**
- Refer to your mine operator's HazCom procedures.

You now have a general understanding of the main steps to identify hazardous chemicals at a mine worksite. We will review the HazCom program in more detail in the rest of this module.

## 6.3 HAZCOM PROGRAMS AND TRAINING

You might hear the words ‘hazard communication’ and ‘HazCom’ used interchangeably; they are different!

In relation to your work as a miner, ‘hazard communication’ may refer to any information about any type of hazard at your mine. This is different from a HazCom program (often called HazCom for short).

### What is a HazCom Program?

**A HazCom Program**, as determined by the Code of Federal Regulations, Title 30, involves particular processes and procedures about documenting and informing you about specific known chemical hazards at a mine worksite or in mining operations. HazCom processes, in general, are meant to help:

- Identify and document chemicals used at a mine worksite
- Test and maintain records of these chemicals
- Inform and train you and other parties about these chemical hazards

#### *Who does a HazCom Program apply to?*

Every mine operator must establish and follow a written HazCom program. This program needs to be maintained for as long as there are hazardous chemicals present at a mine worksite. Also, mine operators must share relevant HazCom information with other on-site operators whose workers could potentially be affected by these chemicals.

#### *Do all operators follow a HazCom Program?*

HazCom applies to any operator producing or using a hazardous chemical to which a miner can be exposed:

- Under normal conditions of use
- In a foreseeable emergency

HazCom is based on two safety and health principles:

- **Principle 1:** Miners have a right to know about the chemicals to which they can be exposed.
- **Principle 2:** Mine operators must tell miners (and other workers) about the hazards associated with exposure, the methods they use to control exposure, and the safety measures to take if a miner is exposed.



HazCom, as an information and training standard, does not restrict chemical use, require controls, or set exposure limits, in and of itself. Rather it is meant to prepare miners and mine operators with the safeguards they need to understand the rules regarding communicating chemical hazards at a mine worksite.

## Written Hazard Communication Program Standards

Creating a written hazard communication program is often one of the initial steps your mine operator must take to meet MSHA requirements. Each mine operator must develop and implement a written HazCom program that includes how the HazCom standards are put into practice and must include several required elements such as how they:

- Identify and handle hazards
- Determine which chemicals are hazardous
- Ensure that all chemical containers are properly labeled with clear warnings and information
- Maintain Material Safety Data Sheets (MSDSs) about each chemical
- Train miners to understand chemical hazard risks and how to protect themselves

Ask your mine operator about how they manage these risks *before* you begin work! Additionally, MSHA requires your mine operator to update their written HazCom programs accordingly. Your mine operator must also provide you with information on how to access their written HazCom program, required MSDSs, and other related HazCom documentation.

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## HazCom Training

Your mine operator must provide you with initial, subsequent, or ongoing HazCom training based on various requirements stated in CFR Part 46 and Part 48.

Your mine operator must provide you with HazCom training whenever:

- You start a new mining *job task*
- A *new hazardous chemical* is introduced where you work
- There is significant *new information* from the manufacturer about a chemical present at your worksite



## HazCom Training Content

Your mine operator must provide you with a safety and health orientation that covers how their HazCom program is implemented at your particular mine worksite.

**Training Confirmation:** After completing the training, you will verify your attendance, receipt of any written HazCom materials, and that you understand the mine operator's HazCom policies. Your mine operator is required to keep your training records for two years.

The rest of this module will review the general required methods to identify, document, and communicate chemical hazards at your mine worksite.

## 6.4 CHEMICAL DETERMINATION AND DOCUMENTATION

### 'Chemicals' and HazCom

Remember that HazCom applies to any operator who manufactures, handles, or utilizes a hazardous chemical that miners could potentially be exposed to during regular operations or in a predictable emergency. **Chemical** refers to any element, chemical compound, or mixture of these.

HazCom, and its requirements to identify and document chemicals, then can cover:

- Liquids (such as diesel fuel)
- Solids (such as coal dust)
- Gases (such as NO<sub>2</sub> from blasting)

There are some differences between a chemical name and a common name that will be helpful to understand when you need to identify or document a chemical.

**Chemical name:** The scientific designation of a chemical in accordance with the nomenclature system of either the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS), or a name that will clearly identify the chemical for the purpose of conducting a hazard evaluation.

**Common name:** Any designation or identification, such as a code name, code number, trade name, brand name, or generic name, used to identify a chemical other than by its chemical name.

### Chemical Determination Guidelines

As you learned earlier, hazardous chemicals are part of several mining activities, or they can be produced by mining activities. Therefore, you must understand how to determine whether a chemical is hazardous or not and follow established and required procedures to document the chemical.

How you determine whether a material is hazardous or not first depends on whether a chemical is brought to, produced at, or mixed at a mine worksite.

**Chemicals Brought to the Mine:** When chemicals are brought to the mine, the first step to assess their hazard potential is to review their Material Safety Data Sheet (MSDS) or container label. Both documents should confirm whether the chemical poses physical or health hazard.

**Chemicals Produced at the Mine:** When chemicals are produced at the mine, your mine operator must determine if they pose physical or health hazards by thoroughly researching and reviewing all available evidence about the chemical.

**Chemicals Mixed at the Mine:** When chemicals are mixed at the mine, your mine operator must assess their hazard potential based on testing results or other available scientific evidence. If a chemical mixture that has not been tested is used at the mine, MSHA assumes it is hazardous.

The specific guidelines in the Identifying Hazardous Chemicals table (CFR 47, Subpart C, Table 47.21) gives specific procedures to aid you in your determination of whether a chemical is hazardous or not.

*Are any chemicals exempt from hazard determination under the HazCom program?*

**Yes.** Certain chemicals and products can be exempt from the hazard determination process of your mine operator's HazCom program because they are already regulated by other Federal agencies and appropriate exemption conditions are met. This includes cosmetics, tobacco products, wood, plus more. You should understand these exemptions and restrictions before you conduct your hazard determination.

**Hazardous waste:** If your mine produces or uses hazardous waste they must provide you with information about the chemical components of the waste, a description of its physical or health hazards, and specify appropriate protective measures.

While there are a few exemptions from the standard HazCom rule, remember that these chemicals can still cause physical or health problems if misused!

## Potential Exemptions from HazCom Rules

Consumer products may be exempt from HazCom. If you buy an ordinary consumer product, it's exempt from HazCom if:

- You use it as the manufacturer intended
- Your mine work does not expose you to it more often or for longer duration than ordinary consumer use

Additionally, certain articles or manufactured material goods may be exempt from HazCom, such as plastic and metal pipes, conveyor belts, repair steel, and tires. Even if they contain a hazardous chemical, articles are exempt if they:

- Release no more than insignificant amounts of a hazardous chemical
- Pose no physical or health risk to exposed miners

While no amount of hazardous chemicals is good for you, the National Institute for Occupational Safety and Health advises that the recommended exposure limit (REL) is 1 part per million (equivalent to 3.6 milligrams per cubic meter), which should not be surpassed within a 30-minute timeframe. [Table 47.11, subpart b, definitions].

## Personal Items

You don't need to include food, tobacco products, drugs, cosmetics, or other such personal items in either your hazard determination or your HazCom program. They are exempt if they are packaged and labeled for retail sale and intended for an individual miner's personal consumption or use.

*How do I know if a product I buy for my mine worksite is considered dangerous?*

If you are buying a product for use at a mine worksite, first, check the label and MSDS. They will state if it is hazardous. Then, ask:

- Can it cause harm?
- Can miners be exposed to that harm normally or in an emergency?

If both answers are "yes," it's hazardous under HazCom rules.

What if miners are exposed, but it's below the limit? That doesn't matter for HazCom. If it can harm miners under the right conditions, it is hazardous under HazCom rules.

## Is it Hazardous or Not?

In some instances, the choice of whether a chemical is hazardous or not is clear.

You have many tools at hand for proper chemical determination. When in doubt, consider exposure to be likely for any chemical at a mine worksite, and do your due diligence to explore the MSDS and your mine operator's HazCom rules.

## Proper Documentation and Material Safety Data Sheets

Your mine operator must maintain a comprehensive list of all hazardous chemicals known to be present at the mine. This list uses specific chemical names that allow easy cross-referencing between the list itself. The list must include:

- The labels on chemical containers
- Their respective Material Safety Data Sheets (MSDSs)

This process of chemical documentation ensures that everyone knows exactly which chemicals are present at a mine worksite and their associated risks.

## Material Safety Data Sheets

Part of a HazCom program is to prepare and maintain a Material Safety Data Sheet (MSDS). A chemical's MSDS provides all the information needed to understand the chemical. It serves as a reference document for anyone exposed at your mine. The MSDSs must be available to anyone, and quickly accessible in the event there is an emergency and you need to know what chemical compounds you are working with.

Your mine operator must maintain a current MSDS for every hazardous chemical that they either produce or use. No exceptions to this rule! They must also update the MSDS with new significant information about the chemical's hazards or safety measures within three months of learning about it.

### *What does a MSDS include?*

Each MSDS created by the mine operator must be clear, accurate, and written in English. The MSDS must contain information about the chemical for the following categories Identity, Properties, Physical Hazards, Health Hazards, Carcinogenicity, Exposure Limits, Safe Use, Control Measures, Emergency Information, and Date Prepared (or it must indicate if no information is available).

All MSDS must be accessible in the area where you or fellow miners could be exposed to the chemical. Alternatively, your mine operator may store MSDSs centrally in a digital format, provided they are easily accessible to miners in case of an emergency.

### *Does a chemical still need an MSDS if it is brought to the mine?*

**Yes.** If a hazardous chemical is brought to the mine, your mine operator can use the MSDS provided by the manufacturer or supplier, create their own MSDS, or obtain one from another reliable source. But, you still must have a valid MSDS! Importantly, if your mine operator obtains an MSDS from the manufacturer, supplier, or another source, they are not accountable for its correctness. However, if you understand it to be inaccurate at any time, your mine operator must:

- Replace an outdated MSDS upon receiving an updated version
- Obtain an accurate MSDS promptly after discovering any inaccuracies

*What if the manufacturer updates the MSDS?*

If the manufacturer updates the MSDS, your mine operator should retain only the most current version. If the updated information significantly affects safety and health, your mine operator must inform you about these changes.

### **Chemical Byproducts and MSDS Disposal**

If a chemical hazard is a *byproduct* of mining, say your welding work releases a gas that is already accounted for in an MSDS, the operator is not required to create a new MSDS for this gas (chemical).

Your mine operator must keep an MSDS for each chemical as long as that chemical remains at the mine. Before disposing of an MSDS, your mine operator must inform you at least 3 months in advance. This notification can be given verbally, in writing, through a company newsletter, during a safety meeting, or by posting it on the mine bulletin board.

### **Trade Secrets and Hazardous Chemicals**

Mine operators may also keep the identity (including the name and other specific identification) of certain hazardous chemicals secret if they are classified as **trade secrets**.

Note that the existence of the chemical cannot be kept a secret, only its identity.

You now have an understanding of the required processes to identify and document hazardous chemicals at your mine worksite. Next, we will consider how to properly label these chemicals.

## 6.5 LABELS AND OTHER FORMS OF WARNING

To ensure that you are able to identify hazardous chemicals quickly, understand their risks, and make immediate safety decisions in the case of an emergency, it is important that you know how to properly label these substances.

A **label** under HazCom requirements is any written, printed, or graphic material displayed on or affixed to a container to identify its contents and convey other relevant information. The purpose of a label for hazardous chemicals is to provide immediate warnings about a chemical's most serious hazards.

Therefore, containers holding hazardous chemicals must be marked with the chemical's name and appropriate safety warnings.

*What information is needed on chemical labels?*

Labels must be clear, legible, accurate, in English, and convey the appropriate hazard information. They should include the chemical's identity, hazard warnings, target organs affected, and the name and address of a responsible party who can provide more information about the chemical if needed. Additional warnings in other languages or symbols can also be added to labels to help miners better understand the label. However, they must not *replace* the original label requirements.

### Chemical Label Examples

Let's take a look at some common chemical labels you may encounter on consumer products at a mine worksite. Note how chemical labels may vary in:

- Size
- Shape
- Color
- Text

Importantly, the labels serve as indicators of whether you might need to further consult the chemical's MSDS or related HazCom documents.





6.1: Burn hazards can be difficult to recognize initially; always be sure to check for posted warnings.



6.2: Each of these warnings must always be heeded when posted at any mine worksite.

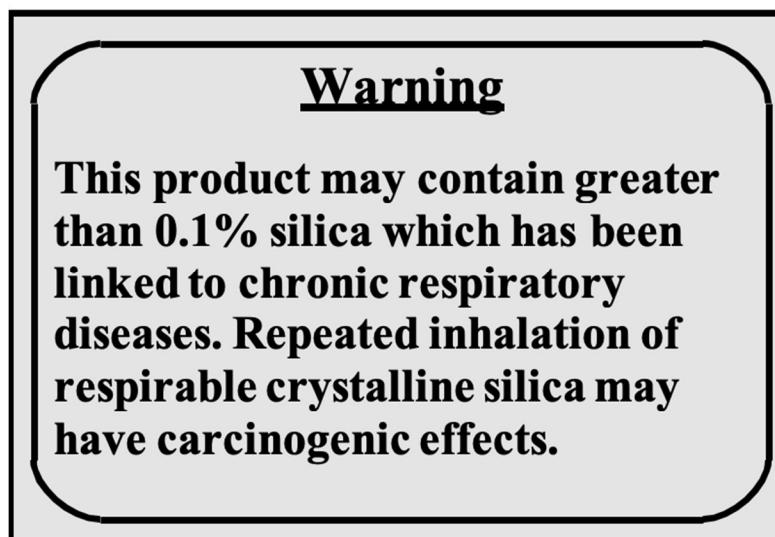
**WARNING**

Injurious to eyes. Use of tight-fitting goggles is recommended. Causes skin irritation. Gloves and protective clothing recommended. Avoid breathing dust. A NIOSH approved respirator is recommended. Avoid skin and eye contact with wet cement. Can cause burns.

**Portland cement contains in excess of .1% crystalline silica. Prolonged and repeated inhalation of crystalline silica can cause silicosis, a disabling and potentially fatal lung disease. Additionally, respirable crystalline silica has been designated as carcinogenic to humans.**

Avoid eye contact or prolonged contact with skin. Wash thoroughly after handling. In case of eye contact, flush with plenty of water for at least fifteen minutes. Consult a physician immediately. Keep out of the reach of children.

6.3: While chemical warnings may seem daunting to understand, it is important to read them thoroughly to understand what chemicals you are working with and how to best handle them. Failure to do so can and will result in injury, and even fatality.



6.4: Never ignore a chemical label; each carries specific information that may be the difference between life and death in a mining worksite.

*What does a label do?*

A label is the first source of information for miners about a chemical. It shows the chemical's name, its characteristics like flammability and reactivity, what protective gear to use, and any special precautions needed when working with it.

Any hazardous chemicals brought to the mine should already be labeled. If they are not, you should contact the manufacturer or supplier right away!

Additionally, your mine operator does not have to label a temporary, portable container under these conditions:

- The miner using the portable container knows the identity of the chemical, its hazards, and any protective measures needed
- Leaves the container empty at the end of the shift

If not, your operator must mark the temporary, portable container with at least the common name of its chemical contents.

**Temporary containers:** If a substance is moved from a labeled container into a portable, unlabeled container, and will be used by the person who transferred it, it does not need a label. Other miners can also use this unlabeled container if they are informed about its contents and hazards. However, if the material is not used up by the end of the shift, you must label it with at least the chemical's common name or return it to its original labeled container.

While MSHA does not require labeling for mine products that *leave* the property, your mine operator must provide a HazCom appropriate label if a customer asks for it. Alternatively, many mines include label information on weigh tickets as an alternative labeling method.

If you have **stationary containers** like bins, hoppers, or tanks holding hazardous chemicals, you can use suitable alternatives instead of labels. Mine operators may use:

- Signs
- Placards
- Process sheets
- Batch tickets
- Operating procedures

instead of labels for fixed process containers, given that these alternatives clearly identify the specific container, convey all required information similar to a label, and remain easily accessible to miners in the work area throughout every shift. Your mine operator will have established procedures for using these label alternatives. These alternatives must identify the container, provide the same information as a label, and be easily accessible to miners throughout each work shift.

**Materials produced from the mining process:** Containers of raw materials being mined or milled do not need labels if no hazardous chemicals are added.

*What if a label is damaged, incorrect, or out of date?*

If a label becomes illegible due to wear and tear, it must be replaced immediately during the same shift. You are not responsible for errors on labels provided by manufacturers or suppliers. However, if you receive updated label information, you must replace the existing label. Significant new information about your product must be reflected on the label within three months, and affected miners should be informed immediately.

**Remember.** You should never use chemicals from unlabeled containers unless they are temporary and portable, and you know what is inside! Ask your mine operator about their HazCom procedures before you work with any hazardous chemicals.