# Hazardous Communication

Did you know that more than32 million workers work with and are potentially exposed to one or more chemical hazards in more than three million American workplaces.

- Did you know that there are over 650,000 existing hazardous chemical products, and new ones introduced every day.

- Considering this, this poses a serious problem for exposed workers and their employers.

- Exposure to chemicals may cause or add to many serious health effects such as burns, lung damage, central nervous system damage, liver and kidney damage, reproductive effects such as sterility and birth defects, and cancer.
- Many chemicals, because of their physical properties are also safety hazards and have the potential to cause fires and explosions and other serious accidents.



**The Hazard Communication Standard (HCS) is based on the simple idea that you have both a need and a "Right To Know" the hazards and identities of the chemicals you are exposed to when working.**

**You also need to know what protective measures are available to prevent harmful effects from occurring.**

The overview of the next content will prepare you to:

- Understand the purpose of the Hazard Communication Standard
- Recognize who is covered by the Hazard Communication Standard
- Know the four basic parts of the Hazard Communication Standard
- Identify physical and health hazards of chemicals
- List what items should be included in a hazardous chemical inventory
- Recognize what should be included in the written Hazard Communication Program
- Recognize the information contained in a materials safety data sheet (MSDS) and how it is used and maintained in the workplace
- Identify where and how hazard warning labels must be used
- List the elements of the Hazard Communications Standard training program

**The OSHA HazCom Standard is found in 29 CFR 1910.1200**

- Requires employers to find all of the potential hazards of materials in the workplace and to tell their employees about those hazards
- Makes sure that employers and employees know the hazards of chemicals they work with and how to protect themselves to reduce injury and illness due to hazardous chemicals
- Ensures that all hazards of all chemicals produced in or imported into the United States are examined, and that the requirements for hazard communications in the workplace are the same everywhere ion the country

**Who is covered by the standard?**

- General Industry
- Shipyards
- Marine Terminals
- Longshoring
- Construction

*The Standard covers chemical manufactures, importers, distributors, employers and employees exposed to or potentially exposed to chemical hazards*
*Office workers, who come across chemicals only in isolated instances, are not covered by the rule.*

**Employers Responsibilities:**

- Employers shall ensure that labels on incoming containers of hazardous chemicals are not removed or defaced.
- Employers shall maintain any material safety data sheets that are received with incoming shipments of hazardous chemicals, and ensure that they are readily accessible during each work shift to laboratory employees when they are in their work areas
- Employers shall make Personal Protection Equipment available for nuisance particulates or by-product particulates where the chemical manufacturer or importer cannot establish that the particulates do not pose any physical or health hazard.

**Definitions of Employer and Employee**

- "Employee" means a worker who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies. Workers such as office workers or bank tellers who encounter hazardous chemicals only in non-routine, isolated instances are not covered.
- "Employer" means a person engaged in a business where chemicals are either used, distributed, or are produced for use or distribution, including a contractor or subcontractor.

**The HazCom Standard covers four major areas:**

- Hazard determination or assessment
- The written program
- MSDS and Labels
- Training

**Chemical Hazards**

- Physical hazards such as flammability or explosive potential
    - Can cause serious accidents and injuries

- Health Hazards can affect a person's health
    - Either in the short term or the long term

- The HazCom Standard's purpose is to make you aware of all hazards of the chemicals you work with and how to protect yourself so you can do your job safely.
- The HazCom Standard also covers by-products of processes that alter a safe product into a chemical hazard.
- Preparation and distribution of material

**Physical Hazards**

- A chemical is a physical hazard if it is:
- A combustible liquid
- A Compresses gas
- Explosive
- Flammable
- An organic peroxide
- An oxidizer
- Pyrophoric (ignites spontaneously in air)
- Unstable (reactive)
- Water reactive

**Health Hazards**

A health hazard is any chemical that may produce Acute (short term) or Chronic (long-term) health effects in exposed employees.

Some examples are:

- Carcinogens (chemicals that may cause cancer)
- Toxic or highly toxic agents
- Reproductive or genetic toxins
- Corrosives
- Sensitizers
- Hepatotoxins (chemicals that cause liver damage)
- Nephrotoxins (chemicals that cause kidney damage)
- Neurotoxins (chemicals that cause damage to the nervous system)
- Agents that act on the lungs, skin, eyes, blood or mucous membranes

**Chemical Manufactures must:**

- Evaluate the hazards of the chemicals they manufacture
- Provide labels and material safety data sheets (MSDS's) when they ship those chemicals

**Importers and distributors of chemicals must:**

- Provide labels and MSDS's whenever they ship chemicals

**Hazardous Communication Responsibilities**

**Employers that use chemicals must:**

- Identify all the chemicals in the workplace (inventory)
- Prepare and implement a written hazard communication plan (the written program)
- Make sure that all containers in the workplace are properly labeled
- Make sure that there are current MSDS's for all hazardous chemicals in the workplace
- Provide training for the hazards in their workplace to their employees

**Hazardous Chemical Inventory**

**Employers must:**

- Identify and list all hazardous chemicals in their workplaces that employees could potentially be exposed to
- Consider chemicals in all forms, including liquids, solids, gases, vapors, fumes and mists
- Identify chemicals in containers, including pipes and consider chemicals generated in work operations, such as welding fumes, dusts and exhaust fumes

| **Solid Wastes** | **Liquid Wastes** | **Gas Wastes** |
|---|---|---|
| Particulate by-product | Gasoline | Propane Tank |
| | Rocket fuel sealed in drum | |
| | | |

**The Written Program**

The written program ensures that all employers receive the information they need to inform and train their employees and provides the necessary hazard information to employees
The program reflects what is happening in your workplace

The written plan must include all of the following:

- The hazardous chemicals present at the site
- Who is responsible for the various aspects of the program at your facility
- Where written material will be made available to employees

- How your facility will meet the requirements for
    - Labels and other forms of warning
    - Material Safety Data Sheets (MSDS's)

- Employee Information and trailing
    - How employees will be informed of the hazards on non-routine tasks.
    - The hazards associated with chemicals in unlabeled pipes

**MSDS's must be provided by the chemical manufacturer, importer or distributor with the first shipment and any time the information changes**



**They must be obtained for all hazardous chemicals in the workplace before they are used.**



**The MSDS describes:**

- Physical hazards, such as fire and explosion

- Health hazards, such as signs and symptoms of exposure

- Routes of exposure (how you can be exposed to the chemical)

- Common routes of exposure include skin contact and absorption, inhalation (breathing) or injection (swallowing)
- Precautions for safe handling and use

- Emergency and first aid procedures, and control measures to use when working with the chemical

**MSDS'S must be in English and include information regarding the specific chemical identity and the common names for it**

- They must also provide additional information including:
- Exposure controls and personal protective equipment
- Carcinogenicity (Cancer-causing ability) of the chemical
- The identification name-address-telephone number- of the organization responsible for preparing the sheet must be provided and the MSDS sheets must be readily accessible to employees in their work area.
- It is your responsibility to know exactly where MSDS Sheets are kept in your workplace below is an example for Ammonia

**Ammonia Solution, Strong**

**MSDS Number: A5472 --- *Effective Date: 10/04/00***

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**1. Product Identification**

**Synonyms:** Ammonia Aqueous; Aqua Ammonia; Ammonia TS
**CAS No.:** Not applicable to mixtures.
**Molecular Weight:** 58.179
**Chemical Formula:** $NH_3$
**Product Codes:** 5905, 9724, 9726

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**2. Composition/Information on Ingredients**

| Ingredient | CAS No | Percent | Hazardous |
|---|---|---|---|
| Ammonia | 7664-41-7 | 27 - 31% | Yes |
| Water | 7732-18-5 | 69 - 73% | No |

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**3. Hazards Identification**

**Emergency Overview**

**POISON! DANGER! CORROSIVE ALKALINE SOLUTION. CAUSES BURNS TO ANY AREA OF CONTACT. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN.**

**J.T. Baker SAF-T-DATA(tm)** Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 1 - Slight
Reactivity Rating: 2 - Moderate
Contact Rating: 3 - Severe (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: White Stripe (Store Separately)
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**Potential Health Effects**
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Ammonia is very alkaline and reacts corrosively with all body tissues.

**Inhalation:**
Corrosive. Extremely destructive to tissues of the mucous membranes and upper respiratory tract. Symptoms may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting. Inhalation may be fatal as a result of spasm inflammation and edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema.
**Ingestion:**
Corrosive. Swallowing can cause severe burns of the mouth, throat, and stomach, leading to death. Can cause sore throat, vomiting, diarrhea.
**Skin Contact:**
Dermal contact with alkaline corrosives may produce pain, redness, severe irritation or full thickness burns. May be absorbed through the skin with possible systemic effects.
**Eye Contact:**
Corrosive. Can cause blurred vision, redness, pain, severe tissue burns and eye damage. Eye exposure may result in temporary or permanent blindness.
**Chronic Exposure:**
Prolonged or repeated skin exposure may cause dermatitis. Prolonged or repeated exposure may cause eye, liver, kidney, or lung damage.
**Aggravation of Pre-existing Conditions:**
No information found.

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## 4. First Aid Measures

**Inhalation:**
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
**Ingestion:**
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
**Skin Contact:**
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.
**Eye Contact:**
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

**Note to Physician:**
DO NOT induce emesis, perform gastric lavage or attempt neutralization after ingestion. Dilution with milk or water may be of benefit. Endoscopic evaluation may be required.

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## 5. Fire Fighting Measures

**Fire:**
Autoignition temperature: 651C (1204F)
Flammable limits in air % by volume:
lel: 16; uel: 25
Not considered to be a fire hazard.
**Explosion:**
Gives off flammable vapors. Vapors may form explosive mixture with air. Closed containers exposed to heat may explode.
**Fire Extinguishing Media:**
Use any means suitable for extinguishing surrounding fire. Water spray may be used to keep fire exposed containers cool. Do not allow water runoff to enter sewers or waterways.
**Special Information:**
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full-face piece operated in the pressure demand or other positive pressure mode.

## 6. Accidental Release Measures

Approach release from upwind. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Carefully neutralize spill with dilute HCl. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Use water spray to cool, absorb, and disperse vapors. Do not use combustible materials, such as sawdust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker NEUTRACIT(R)-2 or BuCAIM(R) caustic neutralizers are recommended for spills of this product.

## 7. Handling and Storage

Store below 25C. Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

## 8. Exposure Controls/Personal Protection

**Airborne Exposure Limits:**
For Ammonia:
- OSHA Permissible Exposure Limit (PEL) -
50 ppm (TWA)
- ACGIH Threshold Limit Value (TLV)
25 ppm (TWA), 35 ppm (STEL).

**Ventilation System:**
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

**Personal Respirators (NIOSH Approved):**
If the exposure limit is exceeded, a full facepiece respirator with an ammonia/methylamine cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Skin Protection:**
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Eye Protection:**
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eyewash fountain and quick-drench facilities in work area.

## 9. Physical and Chemical Properties

**Appearance:**
Clear, colorless liquid.

**Odor:**
Intense, pungent, suffocating odor.

**Solubility:**
Complete (100%)

**Specific Gravity:**
ca. 0.90 @ 25C/25C

**pH:**
11.6 (1.0N)

**% Volatiles by volume @ 21C (70F):**
100

**Boiling Point:**
No information found.

**Melting Point:**

- 77C (-107F)
**Vapor Density (Air=1):**
0.59 (ammonia gas)
**Vapor Pressure (mm Hg):**
No information found.
**Evaporation Rate (BuAc=1):**
No information found.

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**10. Stability and Reactivity**

**Stability:**
Stable under ordinary conditions of use and storage.
**Hazardous Decomposition Products:**
Burning may produce ammonia, nitrogen oxides.
**Hazardous Polymerization:**
Will not occur.
**Incompatibilities:**
Ammonia (anhydrous) is incompatible with mercury, chlorine, calcium hypochlorite, hydrofluoric acid (anhydrous), bromine pentaflouride, chlorine trifluoride, chloroformates, strong acids, strong oxidizing agents, brass, zinc, aluminum, copper, bronze, most common metals and dimethyl sulfate. Corrosive to copper, zinc and many metal surfaces. Reacts with hypochlorite or other halogen sources to form explosive compounds that are sensitive to pressure or increases in temperature. Reaction with sulfuric acid or other strong mineral acids is exothermic; mixture becomes boiling hot.
**Conditions to Avoid:**
Heat, direct sunlight, incompatibles.

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**11. Toxicological Information**

For Ammonia: LC50 inhalation rat 2000 ppm/4H. Investigated as a tumorigen and mutagen.

--------\Cancer Lists\----------

| Ingredient | ---NTP Carcinogen--- Known | Anticipated | IARC Category |
|---|---|---|---|
| Ammonia (7664-41-7) | No | No | None |
| Water (7732-18-5) | No | No | None |

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**12. Ecological Information**

**Environmental Fate:**
No information found.
**Environmental Toxicity:**
No information found.

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**13. Disposal Considerations**

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

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**14. Transport Information**

**Domestic (Land, D.O.T.)**
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**Proper Shipping Name:** AMMONIA SOLUTIONS (WITH 10-35% AMMONIA)
**Hazard Class:** 8
**UN/NA:** UN2672
Packing Group: III
**Information reported for product/size:** 360LB

**International (Water, I.M.O.)**
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**Proper Shipping Name:** AMMONIA SOLUTIONS
**Hazard Class:** 8
**UN/NA:** UN2672
Packing Group: III
**Information reported for product/size:** 360LB

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**15. Regulatory Information**

--------\Chemical Inventory Status - Part 1\---------------------------------

| Ingredient | TSCA | EC | Japan | Australia |
|---|---|---|---|---|
| Ammonia (7664-41-7) | Yes | Yes | Yes | Yes |
| Water (7732-18-5) | Yes | Yes | Yes | Yes |

--------\Chemical Inventory Status - Part 2\---------------------------------

| | | --Canada-- | | |
|---|---|---|---|---|
| Ingredient | Korea | DSL | NDSL | Phil. |
| Ammonia (7664-41-7) | Yes | Yes | No | Yes |
| Water (7732-18-5) | Yes | Yes | No | Yes |

--------\Federal, State & International Regulations - Part 1\----------------

| | -SARA 302- | | ------SARA 313------ | |
|---|---|---|---|---|
| Ingredient | RQ | TPQ | List | Chemical Catg. |
| Ammonia (7664-41-7) | 100 | 500 | Yes | No |
| Water (7732-18-5) | No | No | No | No |

--------\Federal, State & International Regulations - Part 2\----------------

| | | -RCRA- | -TSCA- |
|---|---|---|---|
| Ingredient | CERCLA | 261.33 | 8(d) |
| Ammonia (7664-41-7) | 100 | No | No |
| Water (7732-18-5) | No | No | No |

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Mixture / Liquid)

**Australian Hazchem Code:** 2P
**Poison Schedule:** S6
**WHMIS:**
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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**16. Other Information**

**NFPA Ratings:** Health: **3** Flammability: **1** Reactivity: **0**
**Label Hazard Warning:**
POISON! DANGER! CORROSIVE ALKALINE SOLUTION. CAUSES BURNS TO ANY AREA OF CONTACT. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN.
**Label Precautions:**
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor or mist.

Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
**Label First Aid:**
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.
**Product Use:**
Laboratory Reagent.
**Revision Information:**
No changes.
**Disclaimer:**
**********
**Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.**
**********
**Prepared by:** Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

**There is no specific required format for an MSDS - The regulations apply only to the information that must be included.**

**Many organizations have adopted the 16-section standard MSDS format from the American national Standards Institute (ANSI Z400.1)**

**This standard was also adopted by the International Standards Organization (ISO 11014)**
**If no MSDS has been received for a hazardous chemical, the employer must contact the supplier, manufacturer or importer to obtain on an maintain a record of the contact**

**Use the scroll bar to view all 16 sections of the MSDS for Ammonia above in blue letters.**

**Labels and Other Forms of Warning**

- Labels on products shipped by manufacturers, importers and distributers need to include:
- The identity of the material
- Appropriate hazard warnings
- The name and address of the producer or other responsibility party




**Label in containers of hazardous chemicals in the workplace must include:**

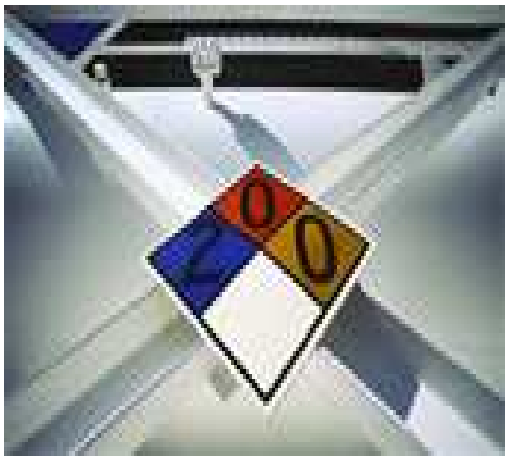
- The identity of the material
- All appropriate hazard warning such as "flammable or causes lung damage"
- Labels must be legible, in English and prominently displayed

There is no specific required format for industrial chemical labels - the regulations apply only to the information that must be included

Many organizations use the hazardous Industrial Chemicals Precautionary Labeling standard from the American National Standards institute (ANSI Z129.1)

## Common Rating Systems used in Labeling:

### NFPA Hazard Rating System




**Blue** is health
**Red** is Flammability
**Yellow** is instability (reactive hazards)
**White** is Special Hazards
**~~W~~** is water reactive
**OX** is Oxidizing Agents

The number range is **0-4**

**0** indicates no hazard and **4** indicates the highest hazard

**HMIS® - Hazardous materials Identification System**


The number rating system is similar to the NFPA ration system

- There can be a second box in the "health" row for a * which indicates chronic or long term affects.
- The number ranges are from 0-4 with 0 indicating little or no hazard to 4 being the highest hazard.
- The Reactivity row in the example above can be listed as Physical Hazard.
- The number in the box directly to the right of the description will indicate the level of severity.
- The Personal Protective Equipment section is designated by "letter" reference recommendation as described below.

**Letter PPE Recommendation**

**Common Rating System:**

A B C D E F G H I J K T M
N O P Q R S T U V W X Y Z

A - safety glasses
B - safety glasses and gloves
C - safety glasses, gloves apron
D - face shield, gloves, apron
E - safety glasses, gloves, dust respirator
F - safety glasses, gloves, apron, dust respirator
G - safety glasses, gloves, vapor respirator
H - splash goggles, gloves, apron, dust respirator
I - safety glasses, gloves, dust and vapor respirator
J - splash goggles, gloves, apron, dust and vapor respirator
K - airline hood/mask, gloves full suit, boots
N - splash goggles
O - face shield

P - gloves
Q - boots
R - apron
S - full suit
T - dust respirator
U - vapor respirator
W - dust and vapor respirator
X - consult supervisor or "Standard Operating Procedure"
Y - full face respirator
Z - airline hood/mask

## Information and Training

**Employees must be trained on the hazard communication program:**

- Before being assigned to work with a hazardous chemical they could be exposed to
- Whenever the hazard changes
- Whenever a new hazard is introduced into their work area

**Your employer must tell you about:**

- The requirements of the hazard communication rule
- Where hazardous chemicals are located in your workplace
    - ❖ Find out if you do not already know
- What the written program, hazardous chemical inventory and MSDS's are and where to find them

**The training you receive must include:**

- An explanation of the HazCom program, including information on labels, MSDS's and how to obtain and use available hazard information
- The physical and health hazards of chemicals in your work area
- What your can do to protect yourself from these hazards
    - ❖ For example, engineering controls, work practices, and the use of personnel protective equipment (PPE)
- How to detect the presence or release of a hazardous chemical
    - ❖ For example, by using monitoring devices, observation of smell
- You must check with your supervisor if you are not sure about any of the listed training items above.

**Overview of Content**

You have both a need and a right to know the hazards and identities of the chemicals you are exposed to when working.

**This training has provided**

- The purpose of the Hazard Communications Standard
- Who is covered by the Hazard Communication Standard
- Physical and health hazards of chemicals
- The hazardous chemical inventory
- The written hazard communication program
- Material safety data sheets and hazard warning labels
- The elements of the Hazard Communication Standard

**What you must find out:**

- Where hazardous chemicals are located in your work area
- The specific hazards of these chemicals
- Where the written hazard communication program is located
- Where to find the hazardous chemicals inventory list and the MSDS Sheets
- How to detect the presence or release of a hazardous chemical in the work area
- What you can do to protect yourself from these hazards