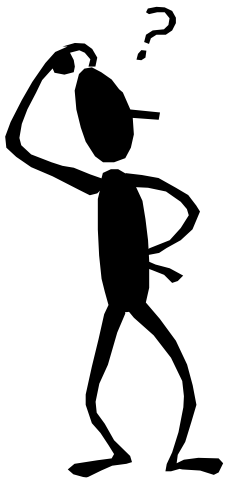
MARTZ BUS EST. 1908

Protecting Your Workers from Chemical Hazards



BUS industry SAFETY council

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Why Do I Need To Know..?

The materials you work with can present a risk to you if they are not handled properly.

This presentation gives you information on what these risks are and how to protect yourself from them.

29 CFR 1910.1200	**Hazard Communication**	**enacted 11/1983**
	included All industries	**8/1987**
29 CFR 1910.1200	**Appendix D – Safety Data Sheets**	**2012**
29 CFR 1910.1000	**Toxic/Hazardous Substances Z-Tables**	

Global Harmonization System of Classification & Labeling of Chemicals

Written Program

This document outlines the way in which the hazards of materials used in the facility are identified, communicated, and what steps can be taken to minimize the risk of working with them.

- **List of all hazardous chemicals present**
- **Chemical hazard information (labels, SDS)**
- **Responsible person(s)**

Hazard Determination

- Before you can be taught how to work safely with a material, it's hazards must first be identified.
- The chemical manufacturer provides us with this information.
- No material is used in facilities until this information is reviewed.
- Once reviewed, a determination is made as to whether the material is safe to use and what steps, (e.g., procedures or PPE) are needed.

Types of Hazardous Materials

Hazards can be broken into 4 broad categories:

- **Chemical**
- **Physical**
- **Biological**
- **Ergonomic**

*Biological (blood borne pathogens), and Ergonomic hazards are covered in dedicated training.

Chemical Hazards

Chemical hazards fall into two (2) categories depending on whether the effects of overexposure are immediate or develop over time.

- **Acute -** Short-term effects typically from a single overexposure.
- **Chronic -** Long-term effects from repeated exposures over a longer period of time.

Acute Chemical Hazards

- **Toxic -** can cause death at high exposure levels from ingestion, inhalation, or skin absorption.
- **Corrosive -** cause burns and tissue destruction. Two types: acids and caustics.
- **Irritant -** causes reversible inflammation to eyes, skin, lungs and mucous membranes.
- **Sensitizer -** causes allergic reactions upon single or repeated exposures. Can occur at levels below detection limits.

Chronic Chemical Hazards

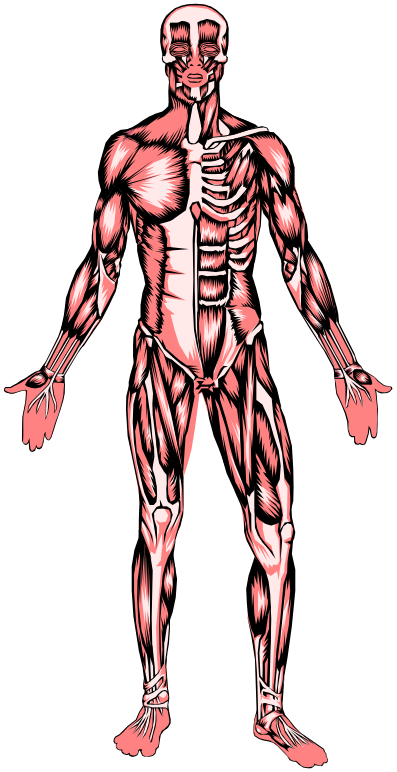
- **Carcinogens -** asbestos, formaldehyde, gasoline, cigarette smoke.
- **Reproductive Hazards -** lead, PCB's, vinyl chloride
- **Organ Toxins -** organic solvents, paint strippers, alcoholic beverages

HEALTH EFFECTS		EXPOSURE	EXAMPLE
ACUTE	Appears immediately or within short time following exposure, (minutes or hours); death possible from some hazardous substances	Typically sudden, short-term, high concentration	Headache, collapse or death from high levels of carbon monoxide
CHRONIC	Usually develops slowly, as long as 15-20 years or more	Continued or repeated for a prolonged period, usually years	Lung cancer from exposure to asbestos

Some chemicals can have both acute and chronic effects, e.g., carbon monoxide.

The effect a certain chemical has on the body depends on several factors:

- **The physical form of the chemical**
- **How the chemical enters the body**
- **The amount of chemical that enters the body - the dose**
- **The toxicity of the chemical**



Routes of Entry

For any of these hazards to be an issue, they must have a way to encounter or enter your body. These are called **routes of entry**. Some materials may be harmful if inhaled, but not if they get on your skin (asbestos). The primary routes of entry are:

- **Ingestion**
- **Injection**
- **Inhalation**
- **Absorption**

Chemicals can enter the body through:

- **inhalation** – **breathed in; inhalation is typically the most common way chemicals can enter the body in a work situation**

- **ingestion** – **accidental swallowing through eating, drinking, or smoking**

- **absorption** – **absorbed through contact with skin or eyes**

- **injection** – **chemical enters body when skin is punctured, usually through high pressure**

Physical Hazards

There are 3 main types of physical hazards:

- **Fire**
- **Sudden release of pressure**
- **Reactive**

Fire Hazards

The degree of hazard is determined, in part, by a material's ***flashpoint***, or the temperature at which the vapors will ignite.

- **Flammable -** flashpoint <199.4°F
- **Pyrophoric -** Ignite spontaneously in air below 130°F. (example - linseed oil)
- **Oxidizer -** can initiate or support combustion without an outside source of oxygen.

Martz Bus Flammable Storage Procedure

Flammable liquids must be stored and transported in approved and properly labeled containers. Only approved metal safety cans must be used for handling and use of flammable liquids in quantities greater than one gallon.

- **When 25 or more gallons of flammable liquids are stored, approved storage cabinets or tanks must be used. All applicable fire protection regulations must be complied with.**
- **Smoking, hot work or open flames are prohibited in flammable storage or transfer areas. These areas must be properly posted.**
- **Storage of flammable liquids outside of buildings must be separated from all structures by a minimum of 20'. No more than 1,100 gallons will be stored in any one area. Storage areas must be diked to contain spills and graded to divert spills away from structures and underground work areas.**
- **Flammable storage areas must be posted as "NO SMOKING" areas.**
- **These storage areas must be fenced or contained to prevent unauthorized entry.**
- **All inside storage areas for flammables must meet or exceed the fire resistance and protection requirements. No more than 60 gallons of flammable liquids must be stored in an indoor approved storage cabinet.**
- **All work areas must be kept free from debris and material that could possibly constitute a fire hazard. All work areas must be cleaned as necessary to prevent any accumulation materials and trash.**
- **All trash and scrap must be properly stored and/or disposed of, in accordance with all applicable federal, state and local laws.**

Sudden Release of Pressure

- **Explosive -** can explode or detonate with shock, pressure, or temperature change.

- **Compressed Gas -** can present both physical and health hazards.

Reactive Hazards

- **Organic peroxides** - Some chemicals decompose over time creating these materials which are sensitive to shock, pressure or temperature changes.

- **Water Reactive** - Produces flammable or toxic gases when in contact with water. (e.g., Sodium or Potassium metals)

- **Acid/Base** - the combination of these materials can generate heat and boiling increasing the chance of skin or eye contact.

Container Labeling

Designed to alert you to the hazards of a chemical.
Must include the following:

- **Product's chemical name**
- **Hazardous ingredients**
- **Hazard warnings**
- **Chemical manufacturers name and address**

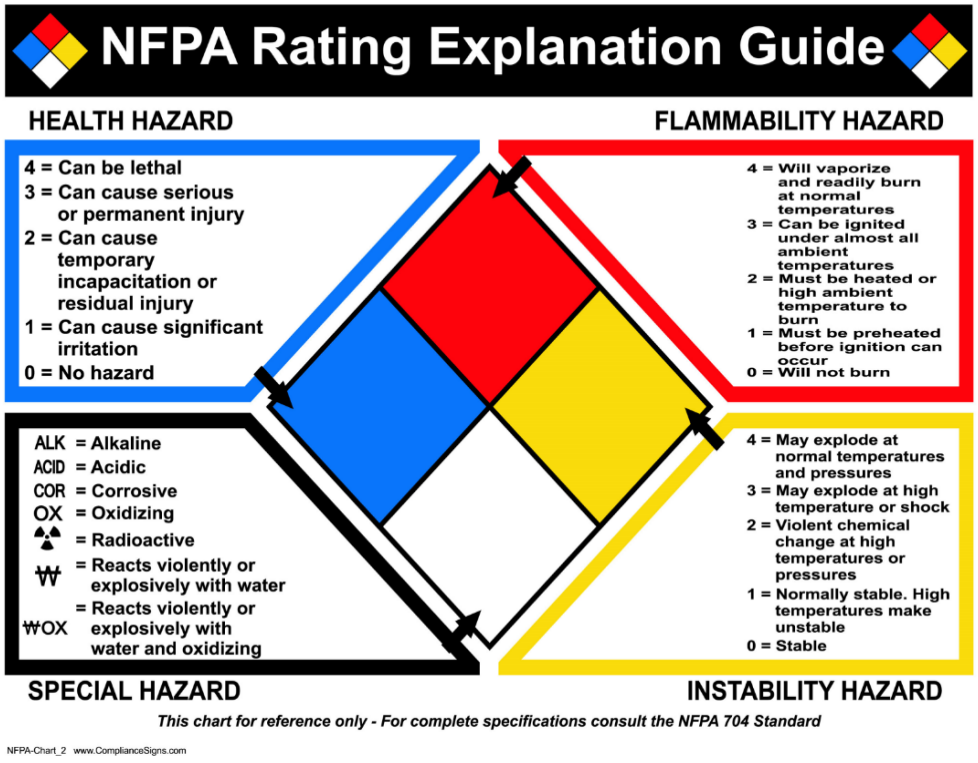
Labeling and Marking Systems

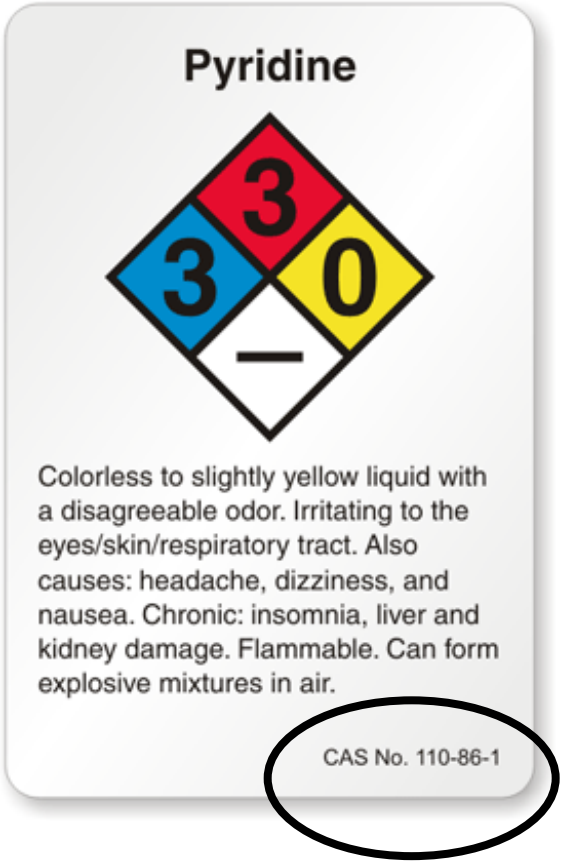
- **Never** remove a manufacturer's label from a chemical container.
- If it is illegible, it must be replaced with a legible label containing:
  - The identity appearing on the SDS,
  - A list of the hazardous ingredients,
  - The pertinent physical and health hazards, including the organs that would be affected, and
  - The manufacturer's name and address

Labeling and Marking Systems - HMIS Labels

- If you transfer a chemical into an unmarked container, label the container with both:
  - Product name as it is written on the SDS.
  - Hazard warnings.
    - Use of HMIS or NFPA label meets requirements

Workplace Labeling and Marking





Chemical Name	
HEALTH	0
FLAMMABILITY	0
PHYSICAL HAZARD	0
PERSONAL PROTECTION	0

Blue – Health Hazard

4 = Life-threatening, major or permanent damage may result from single or repeated overexposures
3 = Major injury likely unless prompt action is taken, and medical treatment is given.
2 = Temporary or minor injury may occur
1 = Irritation or minor reversible injury possible.
0 = No significant risk to health.

Red – Flammability Hazard

4 = Flammable gases, or very volatile flammable liquids with flash points below 73 °F (23 °C), and boiling points below 100 °F (38 °C). Materials may ignite spontaneously with air (Class IA).
3 = Materials capable of ignition under almost all normal temperature conditions. Includes flammable liquids with flash points below 73 °F (23 °C) and boiling points above 100 °F (38 °C), as well as liquids with flash points between 73 °F and 100 °F. (Classes IB & IC).
2 = Materials which must be moderately heated or exposed to high ambient temperatures before ignition will occur. Includes liquids having a flash point at or above 100 °F (38 °C) but below 200 °F (93 °C) (Classes II & IIIA).
1 = Materials that must be preheated before ignition will occur. Includes liquids, solids and semi solids having a flash point above 200 °F (93 °C) (Class IIIB).
0 = Materials that will not burn.

Orange – Physical Hazard

4 = Materials that are readily capable of explosive water reaction, detonation or explosive decomposition, polymerization, or self-reaction at normal temperature and pressure
3 = Materials that may form explosive mixtures with water and are capable of detonation or explosive reaction in the presence of a strong initiating source. Materials may polymerize, decompose, self-react, or undergo other chemical change at normal temperature and pressure with moderate risk of explosion
2 = Materials that are unstable and may undergo violent chemical changes at normal temperature and pressure with low risk for explosion. Materials may react violently with water or form peroxides upon exposure to air
1 = Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.
0 = Materials that are normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosives

White – Personal Protective Equipment

Respiratory Protection 29CFR 1910.134

Negative Pressure Respirators

Positive Pressure Respirators

3M Respirator Selection Guide - free

https://multimedia.3m.com/mws/media/639110O/3m-respirator-selection-guide.pdf?fn=Respirator%20Selection%20Guide%20Final

The **negative-pressure** categories are based on a combination of two factors:

•**Resistance to oily mists**. This is indicated by a letter (N, R or P). N-class filters are not resistant to oil. **R-class** filters are oil-resistant, but they may only be used against oily mists for up to eight hours. **P-class** filters are oil-proof; time-use limitations must be determined by the manufacturer. 3M recommends 40 hours of use or 30 days, whichever occurs first, for its P-class filters.

•**Filtration efficiency**. Filters will be rated 95, 99 or 100. This means when used properly, they are capable of filtering at least 95%, 99% or 99.97% of airborne particles.
For PAPR filters, there is single particulate filtration classification referred to as HEPA or HE. High Efficiency Particulate Air or HEPA filters provide at least 99.97% filtration for all particulates.

•For **gas and vapor cartridges**, NIOSH has a color-coding system to help you identify the correct equipment for your specific hazard. For example, some common colors are:
•**Organic vapors** from solvents, such as those in paints and thinners, require a cartridge with a **black** label.
•Cartridges approved for **acid gases**, include gasses such as chlorine, hydrogen sulfide and sulfur dioxide, have a **white** label.
•**Yellow**-labeled cartridges are approved for **both organic vapors and acid gases**.
•Cartridges approved for **ammonia or methylamine** have a **green** label.

Hand Protection 29 CFR 1910.138

OSHA Glove Selection Chart OSHA Personal Protective Equipment Table 4 - http://www.osha.gov/Publications/osha3151.pdf
Chemical and Liquid-Resistant Gloves Chemical-resistant gloves are made with different kinds of rubber: natural, butyl, neoprene, nitrile and fluorocarbon (viton); or various kinds of plastic: polyvinyl chloride (PVC), polyvinyl alcohol and polyethylene. These materials can be blended or laminated for better performance. Generally, the thicker the glove material, the greater the chemical resistance but thick gloves may impair grip and dexterity, having a negative impact on safety. Some examples of chemical-resistant gloves include:

- **Butyl** gloves are made of a synthetic rubber and protect against a wide variety of chemicals, such as peroxide, rocket fuels, highly corrosive acids (nitric acid, sulfuric acid, hydrofluoric acid and red-fuming nitric acid), strong bases, alcohols, aldehydes, ketones, esters and nitro compounds.
- **Natural (latex)** rubber gloves are comfortable to wear, which makes them a popular general-purpose glove. They feature outstanding tensile strength, elasticity and temperature resistance. In addition to resisting abrasions caused by grinding and polishing, these gloves protect workers' hands from most water solutions of acids, alkalis, salts and ketones. Latex gloves have caused allergic reactions in some individuals and may not be appropriate for all employees. Hypoallergenic gloves, glove liners and powderless gloves are possible alternatives for workers who are allergic to latex gloves.
- **Neoprene** gloves are made of synthetic rubber and offer good pliability, finger dexterity, high density and tear resistance. They protect against hydraulic fluids, gasoline, alcohols, organic acids and alkalis. They generally have chemical and wear resistance properties superior to those made of natural rubber.
- **Nitrile** gloves are made of a copolymer and provide protection from chlorinated solvents such as trichloroethylene and perchloroethylene. Although intended for jobs requiring dexterity and sensitivity, nitrile gloves stand up to heavy use even after prolonged exposure to substances that cause other gloves to deteriorate. They offer protection when working with oils, greases, acids, caustics and alcohols.

Global Harmonized System (GHS) was developed by the United Nations and adopted by the United States for shipping chemical containers (both domestically and internationally).

Labels on shipped containers are include six standard elements:

1. **Product Identifier** matching the product identifier on the safety data sheet
2. **Supplier Information** including name, address and phone number of responsible party
3. **Signal Word**, either “Danger” or “Warning” depending upon severity
4. **Pictogram(s)**, black hazard symbols on white background with red diamond borders that provide a quick visual reference of hazard information
5. **Hazard Statement(s)** that describe the nature of the hazard and/or its severity
6. **Precautionary Statement(s)** that provide important information on the safe handling, storage and disposal of the chemical

Example of Symbol, Signal Word and Hazard Statement

A2.10 **Pyrophoric solids** (see Chapter 2.10 for details)

Hazard category	Criteria	Hazard communication elements	
1	The solid ignites within 5 min of coming into contact with air	Symbol	
		Signal word	Danger
		Hazard statement	Catches fire spontaneously if exposed to air

- **Signal Word -** means a word used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label.
  - "Danger" is used for the more severe hazards.
  - “Warning" is used for the less severe.

GHS PICTOGRAMS

Explosive

Flammable

Oxidizing

Compressed Gas

Corrosive

Toxic

Harmful

Health Hazard

- Explosives
- Self-Reactives
- Organic Peroxides
- Ex-wife’s meatloaf

- Flammables
- Pyrophoric
- Self-Heating
- Emits Flammable Gas
- Self-Reactives
- Organic Peroxides

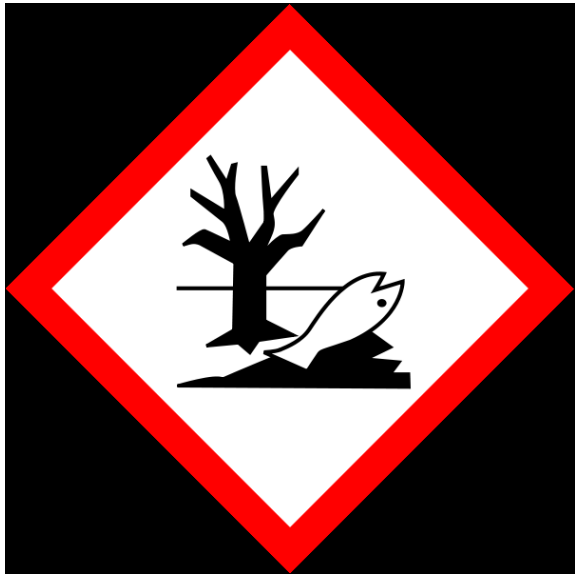
- Skin Corrosion/Burns
- Eye Damage
- Corrosive to Metals

- Acute Toxicity (fatal or toxic)

- Irritant (skin and eye)
- Skin Sensitizer
- Acute Toxicity
- Narcotic Effects
- Respiratory Tract Irritant
- Hazardous to Ozone Layer (Non-Mandatory)

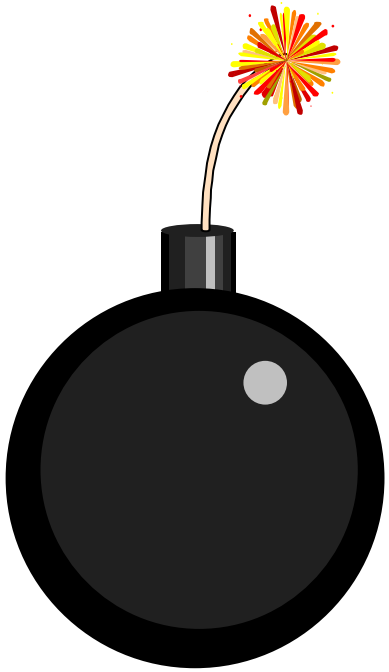
- Carcinogen
- Mutagenicity
- Reproductive Toxicity
- Respiratory Sensitizer
- Target Organ Toxicity
- Aspiration Toxicity

- Aquatic Toxicity
  - (Non-Mandatory)



?Unlabeled Container?

Never Assume!



Contact your Supervisor, General Manager or any Safety Team member.

Safety Data Sheet

Chemical identification

- must be supplied and

- it must contain the following:

Safety Data Sheet

- **Name of chemical on container**

  (chemical or common)

  (e.g., formalin = formaldehyde)

- **Manufacturer**

  name, address, phone number

  emergency phone number (24-hour access)

Safety Data Sheet

- **Hazardous ingredients**
  - **1% hazardous component**
  - **0.1% carcinogen**
- **Safe exposure limits (PEL, TLV)**
- **Physical Information**

odor	**vapor pressure**
appearance	**vapor density**
boiling point	**specific gravity**

The U.S. Code of Federal Regulations **29 CFR 1910.151** states:
“Where the eyes or body of any person may be exposed to injurious or corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use.

ANSI Z358.1-2014
Eye and Eye/Face Wash Fixtures

- Valve mechanism opens in one second or less; it stays open until manually closed.
- Supply with flushing fluid, ("potable water, preserved water, preserved buffered saline solution or other medically acceptable solution…”)
- Locate 10 seconds or 55' from contaminants or hazardous materials. Locate on the same plane as hazard and free of obstructions.
- Must resist corrosion in the presence of flushing fluid.
- Protect eye and eye/face wash heads from contaminants.
- Flow Rates: Eyewash unit delivers a minimum of .4 GPM (1.5 L-MIN) for 15 minutes. Eye/face wash unit delivers a minimum of 3.0 GPM (11 L-MIN) for 15 minutes.
- Use a flow meter to test flow rate; use a test gauge to test flow pattern.
- Environmental conditions often require freeze or scald protection equipment.

Required to be free of obstructions a minimum of 6" (152 mm) from the outside of the eye or eye/face wash spray heads.

Weekly Activations:
Compliant fixtures release a continuous flow of tepid flushing fluid for a minimum of 15 minutes.
Units should be flushed weekly.

Safety Data Sheet

- **Fire & Explosion information**

  flash point, fire fighting activities

- **Health Hazards**

  symptoms of overexposure - acute, chronic
  entry into body
  carcinogenic
  first aid/emergency procedures

Safety Data Sheet

- **Chemical reaction**
  - **conditions (temperatures)**
  - **other materials - cause & effects**
- **Spills & Thrills**
  - **PPE**
  - **Clean up method**
  - **Disposal of material**
- **Special precautions**

Safety Data Sheet

Location of SDS (24 hrs/7 days)

Who to call if you detect a release or spill

Employee Training

Training on this subject is to be conducted at the following times:

- **<u>Before</u> having the potential for exposure.**
- **When a new hazard is introduced into the workplace.**
- **When a job transfer exposes a person to a new hazard**
- **When new information about a chemical is discovered.**