Safety Guide in the lab

I. Hazard Information

A. Labeling

B. MSDS

II. Hazard Controls

III. Safety related facilities in the Lab

IV. Label for Chemical Wastes

V. Emergency Procedures

VI. Standard Treatments

I. Hazard Information

A. Labeling

What is hazardous chemical?

Health risk

-very toxic or toxic
-harmful
-corrosive
-cancer causing
-hazards to reproduction
-can cause non-heritable birth defects
-sensitizing

Fire and explosion hazards

-explosive
-oxidizing
-extremely flammable
-highly flammable
-flammable

A hazard to environment

Symbols and indications of danger

E		Explosive	Oxidizing		**O**
F		Highly flammable	Extremely flammable		**F+**
T		Toxic	Very toxic		**T+**
Xn		Harmful	Irritant		**Xi**
C		Corrosive	Dangerous environment		**N**

UN classification on Transport of Dangerous Goods
: List of class and Transportation Placards

- Class 1 – Explosives

  - Division 1.1 – Mass explosion hazard
  - Division 1.2 – Explosives with projection hazards
  - Division 1.3 – Explosives with predominantly a fire hazard
  - Division 1.4 – Explosives with no significant blast hazard
  - Division 1.5 – Insensitive explosives with a mass explosion hazard
  - Division 1.6 – Extremely inse ate

- Class 2 – Gases

  - Division 2.1 – Flammable gases
  - Division 2.2 – Non-flammable, non-toxic gases
  - Division 2.3 – Toxic gases

- Class 3 – Flammable liquids

Flammable liquids is not subdivided into hazard subdivisions.

- Class 4 – Flammable Solids

  - Division 4.1 – Flammable solids
  - Division 4.2 – Spontaneously combustible materials
  - Division 4.3 – Water reactive substances / substances that are dangerous when wet.

- Class 5 – Oxidizers / organic peroxides
  - Division 5.1 – Oxidizers
  - Division 5.2 – Organic peroxides

- Class 6 – Toxic and Infectious substances
  - Division 6.1 – Toxic Substances
  - Division 6.2 – Infectious Substances

- Class 7 – Radioactive Materials

- Class 8 – Corrosives

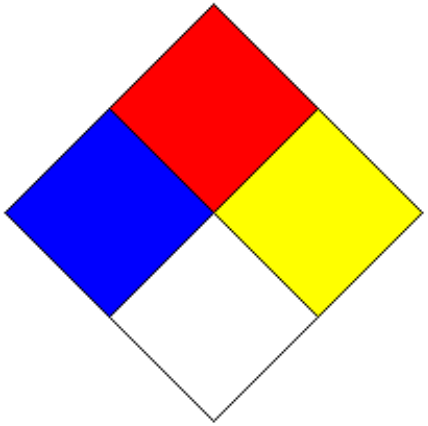
Corrosives is not divided in to hazard subdivisions.

NFPA - National Fire Protection Association - Fire Diamond

NFPA HAZARD LABELS

identify the degree of health hazard, flammability, reactivity, and specific hazards of chemicals.

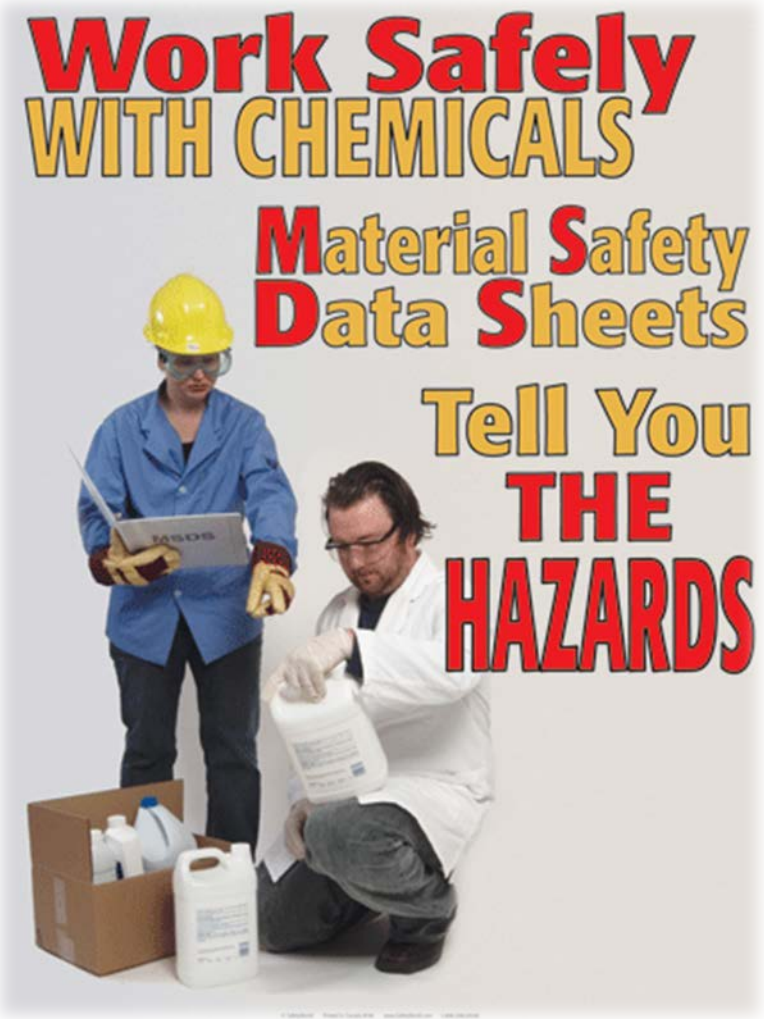
Colored squares can be numbered to the NFPA rating system of 0-4.

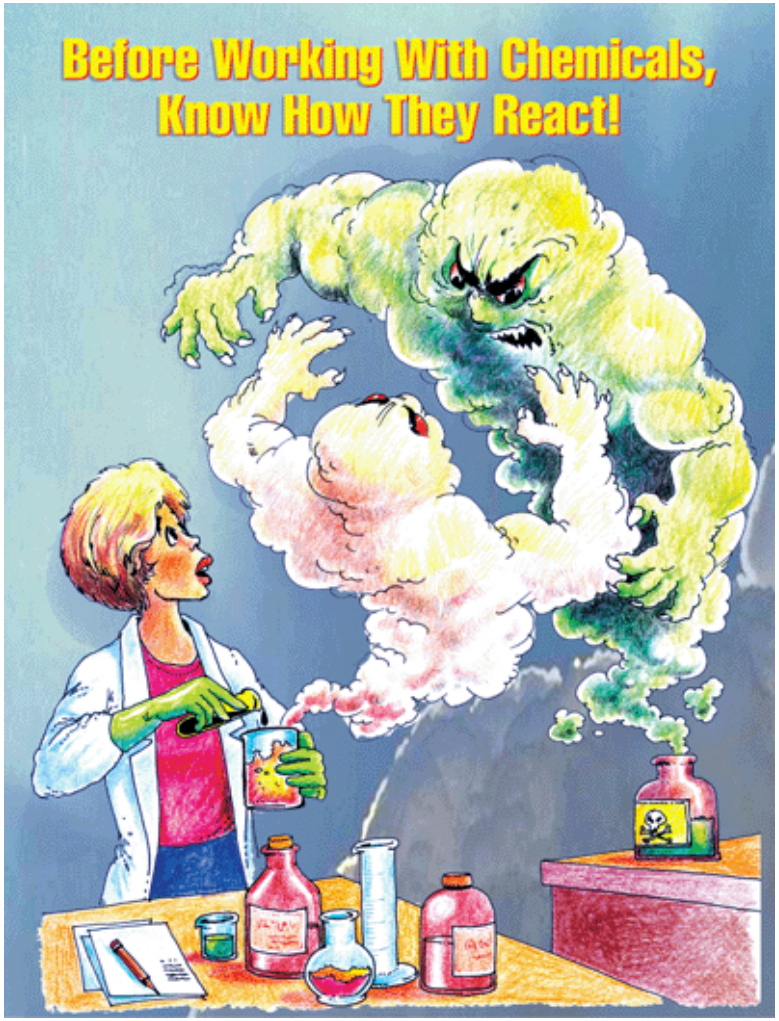


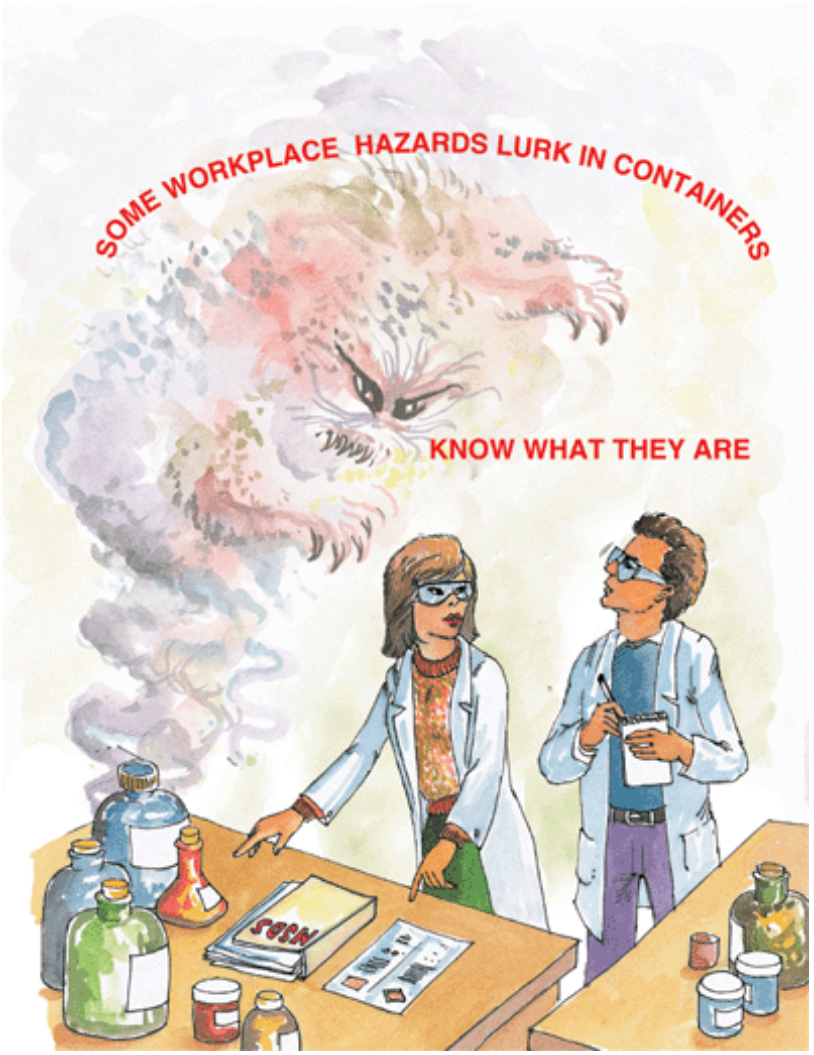
Fire Hazard - Red 4 Flash Point below 73 F 3 Flash Point below 100 F 2 Flash Point below 200 F 1 Flash Point above 200 F 0 Will not burn	Reactivity (Instability) - Yellow 4 May detonate 3 Shock and heat may detonate 2 Violent chemical change 1 Unstable if heated 0 Stable
HEALTH HAZARD - Blue 4 Deadly 3 Extreme Danger 2 Hazardous 1 Slightly Hazardous 0 Normal Material	Specific Hazard - White OX or OXY Oxidizer, W (with line through it)= Use no water, ACID=Acid, ALK=Alkali, COR=Corrosive

B. MSDS, Material Safety Data Sheets

1. Identification
2. Hazard(s) identification
3. Composition/information on ingredients
4. First-aid measures
5. Fire-fighting measures
6. Accidental release measures
7. Handling and storage
8. Exposure controls/personal protection
9. Physical and chemical properties
10. Stability and reactivity
11. Toxicological information
12. Ecological information
13. Disposal considerations
14. Transport information
15. Regulatory information
16. Other information



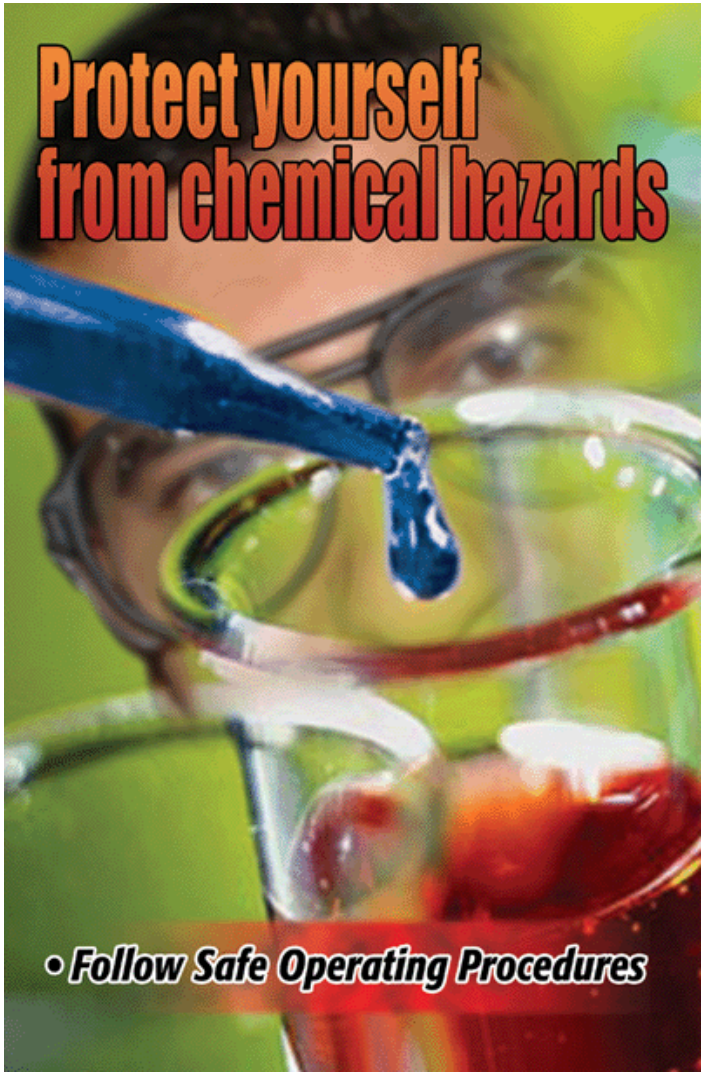

Before Working With Chemicals,
Know How They React!

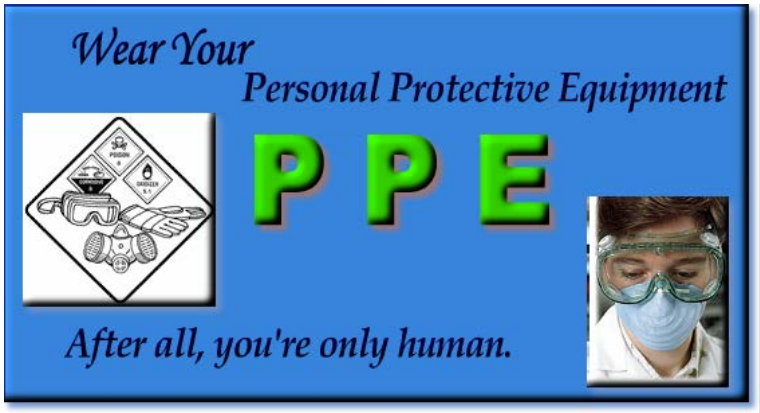

SOME WORKPLACE HAZARDS LURK IN CONTAINERS
KNOW WHAT THEY ARE
SDS


Learn safe handling procedures...
Before you use a chemical!
MR. SCIENCE GUYNHEY

II. Hazard Controls

PERSONAL PROTECTIVE EQUIPMENT


Protect yourself
from chemical hazards
• Follow Safe Operating Procedures


Wear Your
Personal Protective Equipment
P P E
After all, you're only human.

III. Safety related facilities in the Lab

You must Know their locations and Learn how to use them from your TA.

Warning and Mandatory Action signs

Safety Glasses

실험실 위험군 스티커

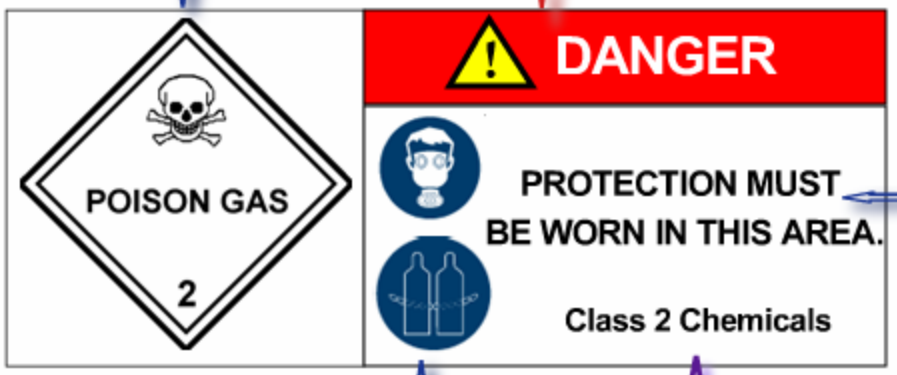
경고표시

:플래카드 및 경고표시
:(보관 또는 사용중인 위험물)

경고문구

:위험의 정도를 나타내는 문구

DANGER WARNING CAUTION



주요 의무사항 문구

주요 의무 사항 표지

:반드시 지킨다.

해당 위험군 분류

Warning Signs

Prohibition Signs

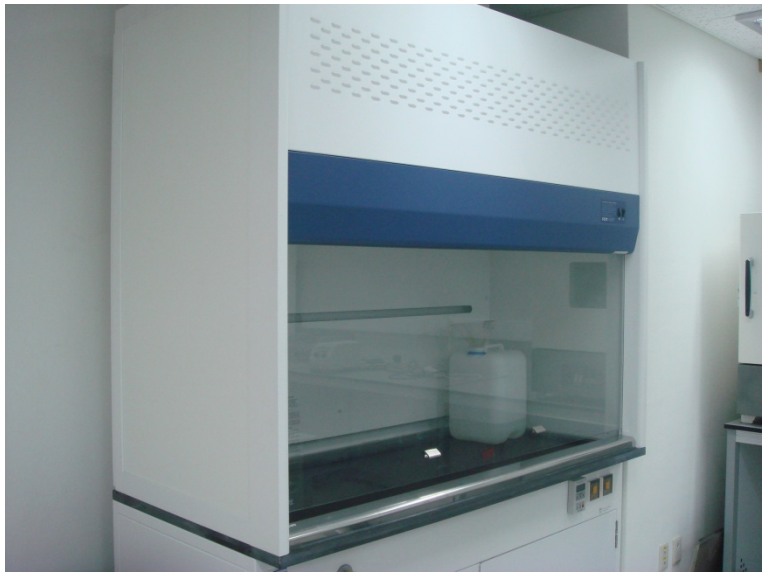
Mandatory Action Signs

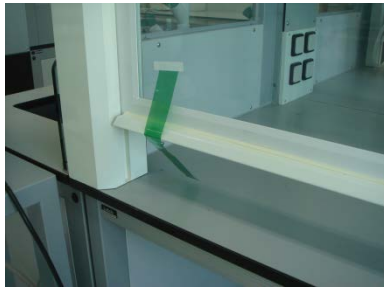
Emergency Fire Blanket

For small fires, a fire blanket is a safety device which is useful in the lab. These blankets can put out smaller fires before they have a chance to get bigger. Made of non-flammable materials, these are useful for fires which can't be put out with water. Fires which can be put out by a fire blanket include grease/oil fires and electrical fires. Never use water if you have a stove or pan catch fire – use a fire blanket instead of water. Even if someone's clothes catch fire, the fire blanket can be wrapped around them to put it out.

Safety Shower and Eye/Face Wash

Chemical Fume Hood





Chamber on the bench

Local Extractor Arm Hood

Fire Extinguisher

When it is time to use the extinguisher on a fire, Just remember PASS!
Pull – Aim – Squeeze – Sweep

-*Pull* the pin
-*Aim* the nozzle or hose at the base of the fire from the recommended safe distance
-*Squeeze* the operating lever to discharge the fire extinguishing agent.
-Starting at the recommended distance, *Sweep* the nozzle or hose from side until the fire out. Continue to discharge agent until extinguisher is empty. Move forward or around the fire area as the fire diminishes. Watch the area in case of re-ignition.

First-Aid Kits

● 구 성 용 품 (PD-201기준)

드 레 싱	위생&소독	의료용구 및 기타	밴데이징
외상패드	알콜스왑	아이스팩	관절밴드
면붕대	멸균물티슈	부목세트	손가락밴드
탄력붕대	식염수	의료가위(소)	표준밴드
멸균거즈		포셉	방수밴드
비접착패드		보온포	
반창고		응급처치 매뉴얼	
삼각건		약관리스티커	
멸균면봉		제품사용 가이드	
위생장갑		CPR마스크	

Cabinet and Response Carts for Safety Spill Control

In the event of a major spillage of corrosive or toxic material, the TA on duty must be informed at once. Do not attempt to clean up any major spillage before consulting the TA.

RIGHT TO KNOW: INFORMATION CENTER- MSDS

Gas Cylinder Bracket

A Safety Can for acetone

A Bottle for Distilled water

Mercury Spill Control kits

CONTAINS:
(270G) Amalgamation powder
(1) Vapor suppressor shaker bottle
(1) Waste collection bottle
(1) Chemical storage
(1) Disposal bag & twist tie

(250G) indicator power
Aspirator bottle (1)
Mixing tub with spatula (1)
Nitrile glove (1 pr.)
Wisk on pan (1)

Safety Storage Cabinets

Emergency Evacuation Routes

IV. Label for Chemical Wastes

Floor Glass Disposable Box

These boxes or designated plastic box are used to dispose of empty ampoules, broken glass, and empty vials, etc. The outer box is made from corrugated cardboard; the inner one is a 2-mil polypropylene bag. When the box is full, the safety cap is pulled into place and the entire unit is ready for disposal.

Don't dispose of the broken glass into a trash can in the lab.

CHEMICAL WASTE

1. ACCUMULATION START DATE:

2. GENERATOR INFORMATION

1) Department:
2) Room:
3) Name:
4) Extension Number (Lab):

3. WASTE INFORMATION

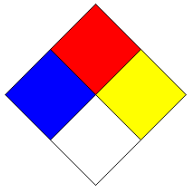
1) Amount in container: L or Kg
2) Physical State (√)
- ☐ Solid
- ☐ Liquid
  - Aqueous solution
    - ☐ Acid (pH ≒)
    - ☐ Neutral
    - ☐ Alkali (pH ≒)
  - Organic Solvent
    - ☐ Halogenated
    - ☐ Non-halogenated
- ☐ Solid/Liquid
- ☐ Gas

4. **TRANSPORTATION DATE:**

5. CONTENTS and % RANGE (Volume %)

(Write down full chemical names - no formulas or abbreviations.)

1) Chemical Name: _____
% Range : _____



(Check primary hazard)

☐Poisonous ☐Corrosive ☐Irritant ☐Explosive ☐Flammable ☐Oxidizing

(If a mixture, list ALL chemicals.)

2) Chemical Name: _____
% Range : _____

3) Chemical Name: _____
% Range : _____

4) Chemical Name: _____
% Range : _____

5) Chemical Name: _____
% Range : _____

6) Chemical Name: _____
% Range : _____

HANDLE WITH CARE!

CONTAINS HAZARDOUS OR TOXIC WASTES

V. Emergency Procedures: Fire

When a fire occurs, evaluate the type and extent of the fire. If it is a large fire, all personnel should evacuate. Control measures should only be taken for small isolated fires.

1. RACE

When a fire is discovered or suspected, do the following:

-**Rescue:** Rescue patients and warn those in the immediate area.
-**Alarm:** Sound the fire alarm by pulling the pull station. Do not use the telephone; the pull station is connected to the hospital operator and the fire station. Someone should stay by the pull station to direct fire fighters.
-**Contain:** Shut doors and windows to contain the fire. Clear exit ways.
-**Extinguish:** Put out the fire only if it is safe to do so. Evacuate the immediate area.

2. Evacuation

· When the alarm sounds everyone must evacuate.

· Know all possible exit routes from your building.

· Keep all exit routes clear and unobstructed; do not use hallways for storage.

· Learn where pull stations and fire extinguishers are.

· Fire drills are conducted quarterly. Documentation is to be completed and retained with this manual.

Types of fires

There are three common types of fires. The method of extinguishing the fire depends on the type of fire.

Class A

Class A fires involve wood, paper, plastics, and other solid combustible materials. ABC extinguishers are most effective against this type of fire, however, CO_2 may be used with small fires. CO_2 extinguishers may be ineffective for extinguishing Class A fires because they may not be able to displace enough oxygen to successfully put the fire out. Class A materials may smolder and reignite.

Class B

Class B refers to burning flammable liquids such as gasoline, oil, grease and acetone. Use ABC or CO_2 type extinguishers for these fires; do not use water. I f flammable liquids have spilled but not ignited, sand, activated charcoal, or another non-flammable absorbent may be used to contain the spill. Natural gas fires are also of Class B. They are extinguished by CO_2, but the gas must be shut off first.

Class C

Class C fires are fires involving electricity. Dry chemical extinguishers may be used, but CO_2 is the most effective. If possible, turn off the power source. The fire then becomes a Class A or B fire.

VI. Standard Treatments : Injuries

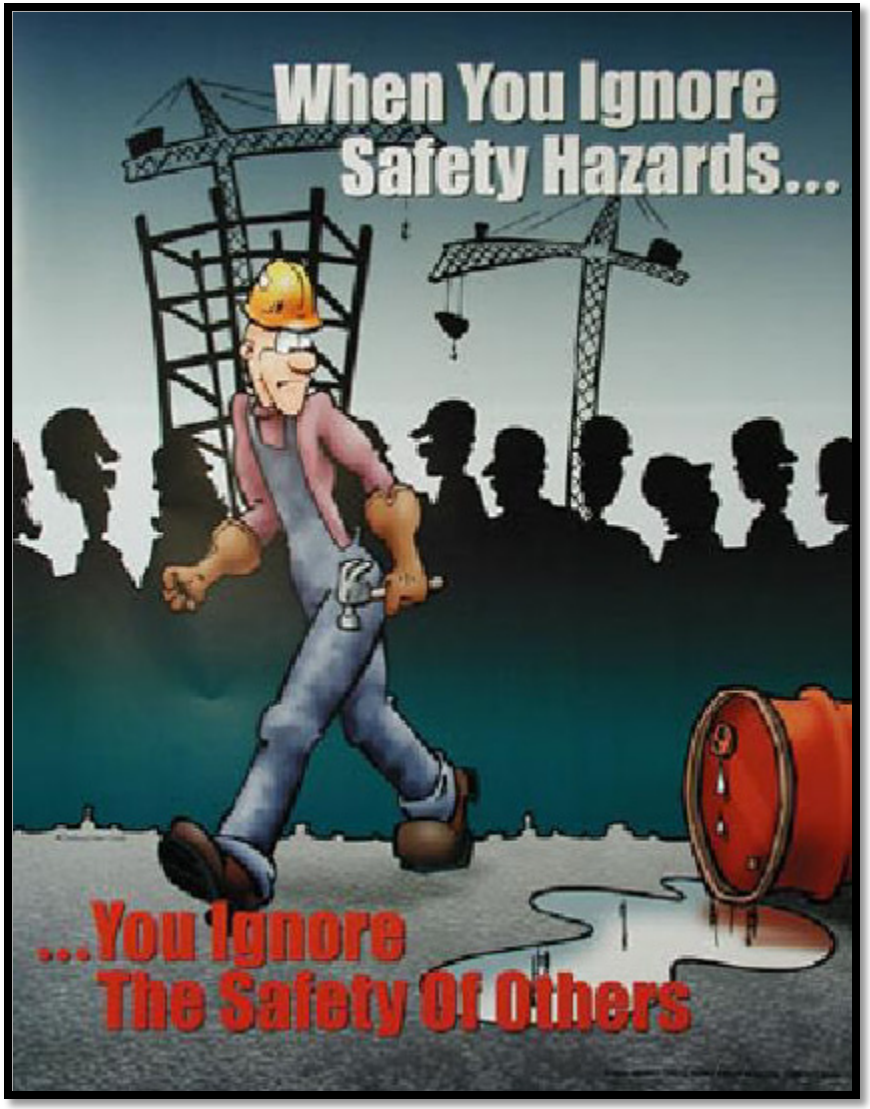
(a) **Splashes on the skin**. If you spill any toxic or corrosive material on yourself, you should wash it off immediately with copious quantities of water before seeking first aid treatment. Even a few seconds may save a serious burn; make sure you know where the emergency showers are. Removal of chemicals insoluble in water is facilitated by cleaning the contaminated skin area with soap. Remove all contaminated clothing.

(b) **Splashes in the eye**. If any chemicals splash into your eyes, you must wash them thoroughly with the eye baths provided. Familiarize yourself with their location and operation. Ensure that the eyelids are kept open so that the eyeball is thoroughly bathed during the treatment. All eye injuries from chemicals should be examined by a doctor.

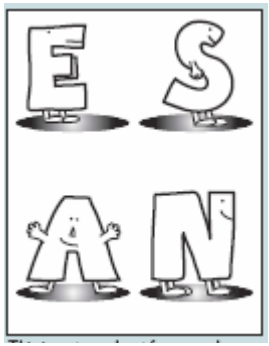
(c) **Inhalation accidents**. The casualty should be removed from the danger area into fresh air and his/her clothing loosened around the neck. Someone qualified in first aid must be summoned immediately.

(d) **Ingestion of poisonous chemicals**. If the ingestion is confined to the mouth wash out the mouth will copious quantities of water, ensuring that the mouth wash is not swallowed. If the chemical has been swallowed, consume about 250 cm^3 of water to dilute it in the stomach. Do not induce vomiting. Medical attention must be sought immediately in all cases.

(e) **Burns and cuts**. If you receive any burns or cut yourself or swallow any material which is at all toxic (virtually anything), seek first aid at once.


When You Ignore
Safety Hazards...
...You Ignore
The Safety Of Others

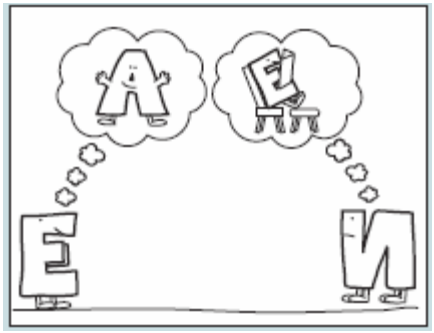
SAFETY AWARENESS
SAFETY INVOLVES EVERYONE…



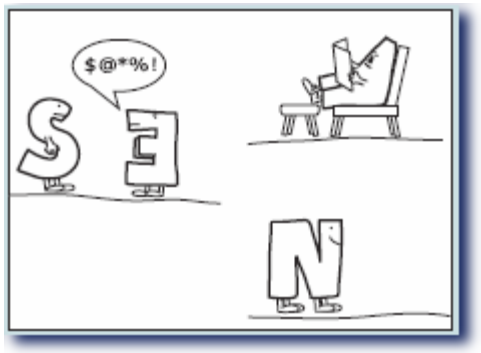
This is a story about four people named
EVERYBODY, SOMEBODY, ANYBODY, and
NOBODY.

There was important job to be done, and
EVERYBODY was sure that SOMEBODY would do it.
ANYBODY could have done it,
but NOBODY did it.

SOMEBODY got angry about it
because it was EVERYBODY's job.



EVERYBODY thought ANYBODY could do it,
but NOBODY realized that
EVERYBODY would not do it.



It ended up that EVERYBODY blamed SOMEBODY
when NOBODY did what ANYBODY could have done !

Your safety doesn't depend on LUCK!

It depends on YOU !