CHEMICAL SAFETY TRAINING

WVU Shared Research Facilities 2015

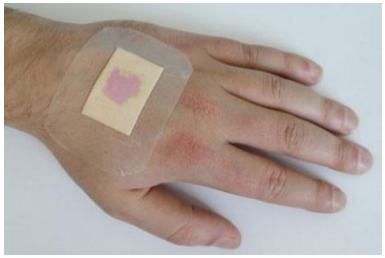
PERSONAL PROTECTIVEEQUIPMENT (PPE)

Why do you need it?

- Protect from chemicals entering the body

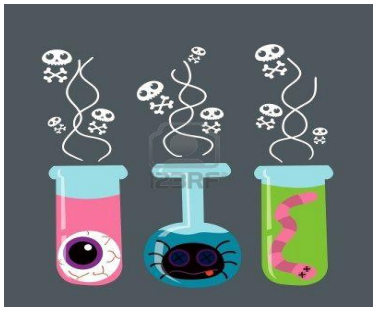
Ingestion

Injection



Skin Absorption

Inhalation



PPE - SAFETY GLASSES

- Made with metal/plastic safety frames
- Prescription glasses do not replace the need for safety glasses when experimentally required
- Used for moderate impact from particles, splash and vapor protection

PPE - FACE SHIELDS

- Full face protection
- Protects face from dusts and splashes or sprays of hazardous liquids
- Does not protect from impact hazards
- May need to wear safety glasses or goggles underneath

PPE - GLOVES

- Nitrile:
  - protects against solvents, harsh chemicals, fats and petroleum products and also provides excellent resistance to cuts and abrasions.
- Cleanroom Rubber Gloves (Butyl or Latex)
  - Protects against acids, bases, and strong solvents.
- Cryogenic:
  - protects against hazardous ultra-low temperatures and cryogenic burns
- Autoclave

EYEWASH & SHOWER STATIONS

- When using the eyewash:
  - The first few seconds after exposure are critical
  - Keep eyes open & rotate in all directions
  - Flush for 15 minutes
  - Bring SDS with you to the doctor (if there is time to retrieve it)

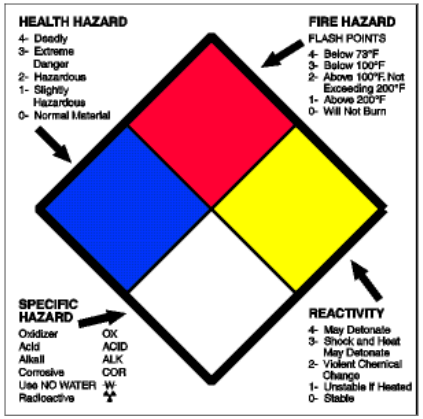
- When using the shower:
  - The first few seconds after exposure are critical
  - Was the affected area with copious quantities of water for at least 15 minutes
  - Remove contaminated clothing, jewelry and shoes (forget modesty)

PROVIDE ASSISTANCE

- If you see a user in the lab run to the eyewash station or shower, what do you do?
  - Make sure they are using the eyewash/safety shower properly.
  - Make sure they use the device for the allotted time.
  - Make sure they are okay, or call 911 for medical assistance.
  - Contact the facility manager.

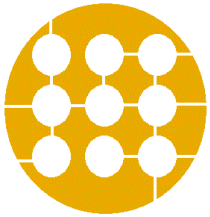
CHEMICAL STORAGE

- Chemicals must be stored in airtight sealed containers
- All chemicals must be properly labeled and approved before entry into any Shared Research Facility laboratory
- All chemicals must be stored appropriately according to their hazard code (see the diamond) and segregated by compatibility
- Keep flammables, acids and bases in separate closed cabinets
- Nitric Acid must be kept separate from other acids



CHEMICAL STORAGE

- Material Tracking Form
  - srf.wvu.edu> InfoCenter> Safety>
- Shared Research Facilities Labeling System:
  - green: acid
  - yellow: solvent
  - pink: photoresists
  - white: developer
  - orange: base
  - blue: biological



TOXIC CHEMICALS

- Carcinogens
  - Carcinogens are cancer causing compounds.
- Mutagens
  - Mutagens cause genetic mutations. These mutations can cause birth defects or may lead to cancer in the exposed person.
- Reproductive Toxins
  - Chemicals that have a negative effect on reproduction or the reproductive system. These include both chemicals that induce chromosomal damage (mutagens) and birth defects (teratogens/fetomutagens).

CORROSIVE CHEMICALS

- Acids and bases are common corrosive chemicals
- Corrosive chemicals are capable of damaging skin, eyes and the respiratory system when inhaled
- The extent of skin damage depends on how long the corrosive is on the skin and how concentrated the corrosive is
- Wear appropriate PPE

CORROSIVE CHEMICALS

If you have been exposed to corrosives

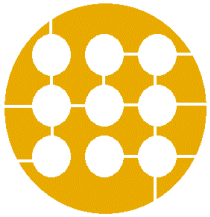
- Water (for splashes on the skin)

- Shower

- Eyewashes

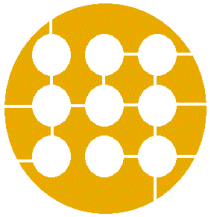
CHEMICALS - MIXING

- Always add acids to water, never add water to acids.
- Never mix solvents and acids.
- Use extreme caution if mixing acids and bases. Very few processes require a mix of the two, Piranha Bath.
- Check for appropriate chemical ratios. Improperly mixed chemicals may create dangerous reactions or dangerous fumes.
- Use the appropriate PPE and type of gloves for chemical usage



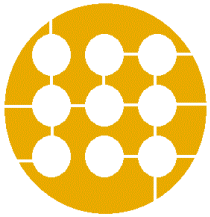
CHEMICALS – HOOD USAGE

- Always work inside a fume hood.
- Never place your head inside the fume hood.
- User should work in the back half of the hood or at arms length.
- Where sashes are present, keep them open less than 50%
- Never remove an open chemical vessel from the fume hood.
- Keep the work area inside the hood clean and free from obstructions.
- Always work in appropriate hood and use appropriate vessels.
- Never heat solvents in closed beakers.
- Do not store items in the hood.
- Do not leave unlabeled chemicals unattended in a hood.
- Always properly label beakers.



FLAMMABLE LIQUIDS / HAZARDOUS METALS

- Flammable Liquids
  - The vapor of a flammable liquid ignites and causes fire or explosion – not the liquid itself
- Hazardous Metals
  - Some metals can ignite and explode – magnesium, or dusts/filings of other metals such as aluminum
  - Some metals are almost non-toxic – iron, aluminum
  - Others are very toxic – lead, cadmium, mercury, beryllium



NATIONAL FIRE PROTECTION AGENCY

NFPA Concerns

- Proper storage of flammables
- What happens if there is a fire
- Unit (Fire Walls)
- Proper ventilation

Door Placards

- NFPA – 704 Posting
- Assign highest number contained inside room to the placards
- Emergency contacts listed on door

EMERGENCY GUIDE–HAZARD SIGNALS

HEALTH HAZARD*

4–DANGER: May be fatal on short exposure. Specialized protective equipment required.

3–WARNING: Corrosive or toxic. Avoid skin contact or inhalation.

2–WARNING: May be harmful if inhaled or absorbed.

1–CAUTION: May cause irritation.

0–No unusual hazard.

*Health hazard describes short-term contact or inhalation hazard only.

FIRE HAZARD

4–DANGER: Flammable gas or extremely flammable liquid.

3–WARNING: Flammable liquid flash point below 100°F.

2–CAUTION: Combustible liquid flash point of 100°F to 200°F.

1–Combustible if heated.

0–Not combustible.

REACTIVITY HAZARD

4–DANGER: Explosive material at room temperature.

3–DANGER: May be explosive if shocked, heated under confinement, or mixed with water.

2–WARNING: Unstable, or may react if mixed with water.

1–CAUTION: May react if heated or mixed with water.

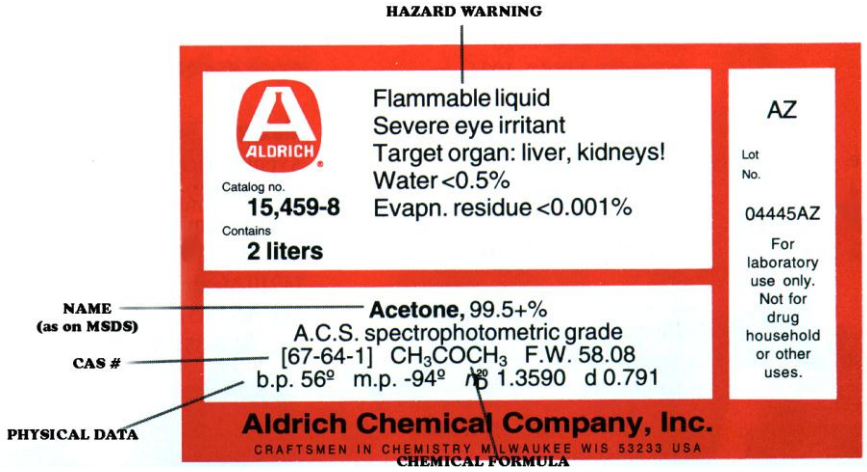
0–Stable. Not reactive when mixed with water.

Lab Safety Supply Inc.

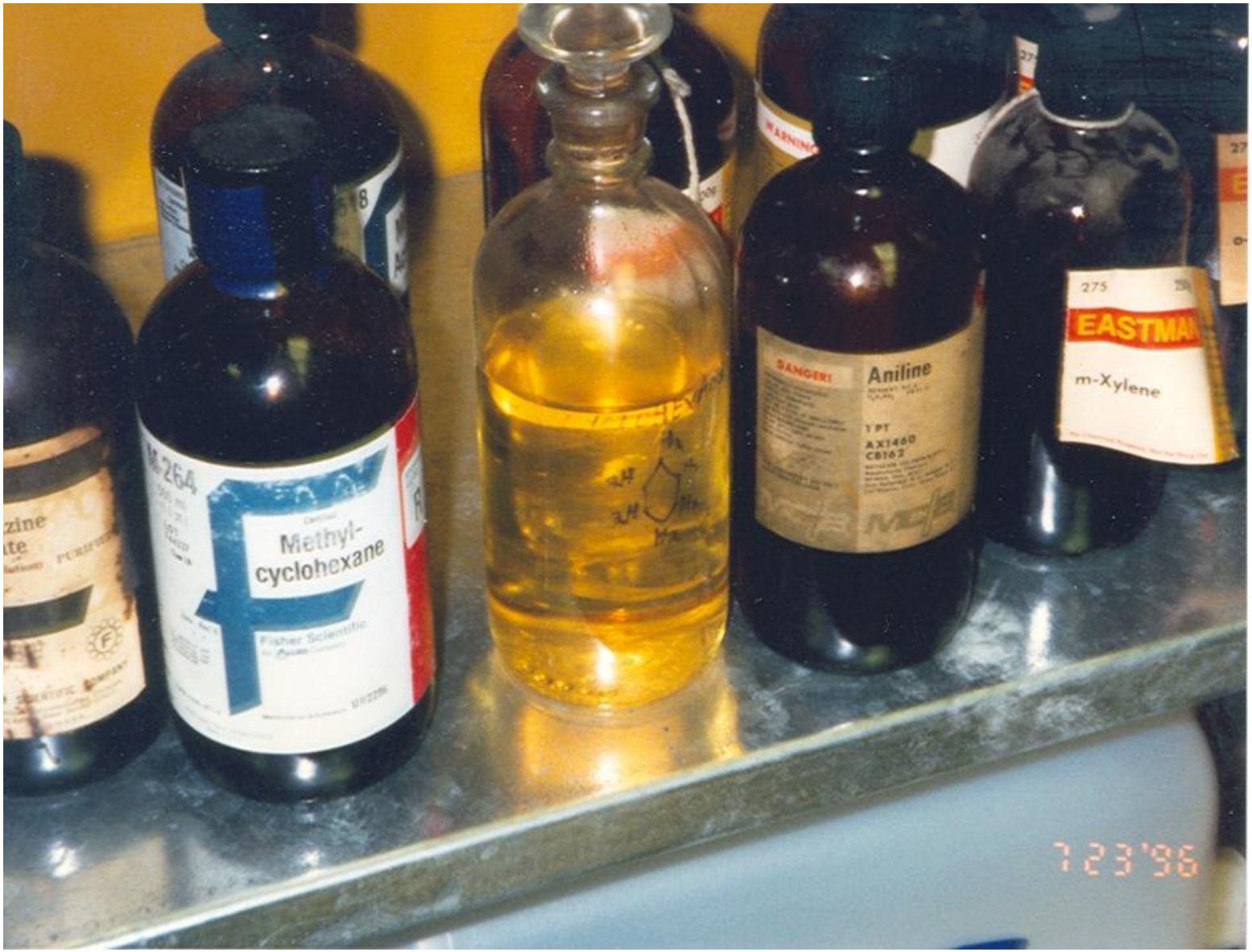
Reorder No. 610

LABELING: SHOULD INCLUDE

- Chemical's name
- Concentration
- Purity
- Hazards
- Date it was packaged
- Owner
- Date of receipt



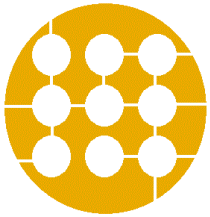
SRF Material Tracking Form
http://sharedresearchfacilities.wvu.edu/forms/srfForms.html


Methyl-
cyclohexane
Fisher Scientific
DANGER!
Aniline
m-Xylene
EASTMAN
7'23'96


Methanol
9073-05
J.T.Baker
Methanol
9073-05
J.T.Baker
AZ® 400K
DEVELOPER
AZ® 300 MIF
DEVELOPER

SDS – WHAT IS IT?

- Safety Data Sheet (SDS)
- Always comes with purchased chemicals
- Available on many internet sites
- SDS's & inventories are included in the Laboratory Chemical Hygiene Plan
- You are responsible to know the information on the SDS of chemicals you work with



SDS

ACETONE

1. Product Identification

Synonyms: Dimethylketone; 2-propanone; dimethylketal
CAS No.: 67-64-1
Molecular Weight: 58.08
Chemical Formula: (CH3)2CO

2. Composition/Information on Ingredients

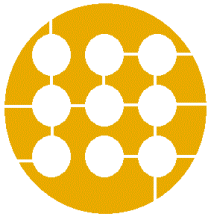
3. Hazards Identification

DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.

Health Rating: 2 - Moderate
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 0 - None
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

WASTE

- Most chemicals can not go down the drain.
- Waste must be captured in chemical waste jars.
- Labeling a waste jar: (best if original label), clearly marked waste, chemical name (no abbreviations or formulas), date bottle is full.
- Solid waste are items that are contaminated with a chemical. Example: pipette or cleanroom wipe. Place item in clearly in appropriate waste container.
- DO NOT THROW IN TRASH RECEPTICALS
- “Sharps” should be placed in proper sharps container.



CHEMICAL HYGIENE PLAN (CHP)

Reminder: you are required to read the CHP before use of the laboratory

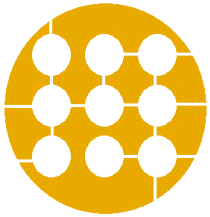
CHEMICAL SPILLS

Spills May Cause

- Fire
- Explosion
- Release of toxic vapors
- Contamination of water supplies
- Injury to self and neighboring laboratory workers

What to do to Avoid

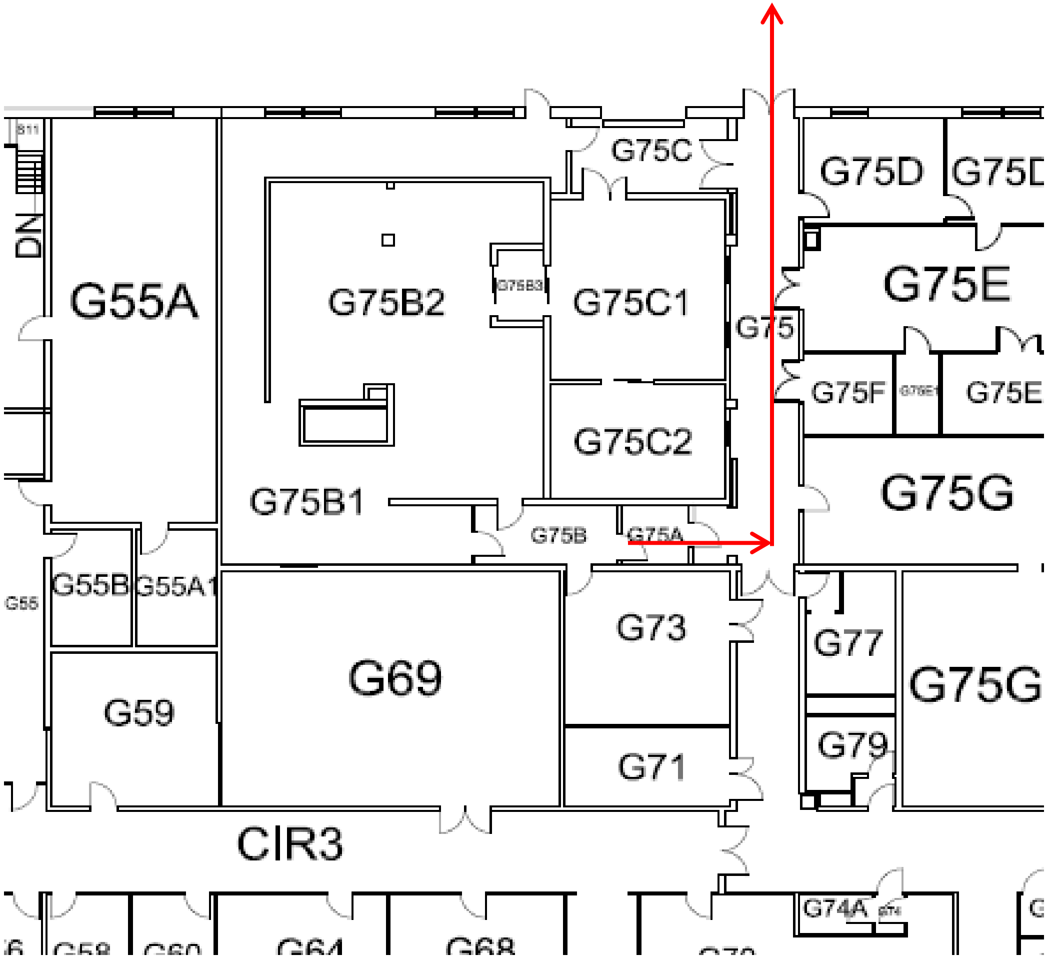
- Know the substance
- Read Labels and MSDS
- Use Protective Equipment
- Inspect Chemical Containers & Beakers
- Be conscious of any hazards present



SMALL SPILLS VS. LARGE SPILLS

- In case of large spills → EVACUATE
- In case of small spills, you can use a "spill kit".
- After proper cleaning and containment of the spill contact the lab manager.
- Do not throw away the spill kit. Leave it for the lab manager to properly dispose of.

EVACUATION



G75C
G75D
G55A
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G75C2
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G75A
G55B
G55A1
G55
G73
G77
G69
G75G
G59
G79
G71
CIR3
G74A

BE SMART, BE SAFE

- Notify other users of unsafe practices before they hurt themselves or others.
- Contact a facility manager if there is a dangerous situation
- Don’t be afraid to ask for help