

Engineering Physics/ C.E.D.T. Research Hazards Safety Report

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A) ELABORATION ON POTENTIAL HAZARDS

Radiation – Ultraviolet A and visible light source (laser or broadband illumination) (see section D)

Flammable materials – Acetone, Ethanol, Methanol (see section D)

Electrical – High Voltage Enclosed (laser sources, PMT, enclosed by manufacturer)

High Temperature – Soldering Gun (used to connect electrical wires with sold)

Potential Falling Objects – General (bookcases, boxes on a table, items on a shelf)

B) ROUTINE/STANDARD OPERATING PROCEDURES

Laboratory Protective Devices: (ex. gas/radiation monitors etc.) – NONE

Personal Protective Devices:

UVA light source – all visitors/users wear 190-532nm glasses when the light source is turned on.

Chemical Handling – Gloves, safety glasses, pipette, tweezers, etc.

Other Protective Procedures: (ex. dose badges, medical monitoring) - NONE

C) EMERGENCY PREPARATION

Types of accidents reasonably possible in the lab and their consequences:

Laser accidents – object falls into beam path confined to the optical table and redirects beam into eyes or onto skin

Sharp/Falling objects –exacto-knife, piled boxes, bookshelf

Chemical Spill – acetone, ethanol, or methanol

Emergency procedures to be used:

DIAL # 905-525-9140 ext. 88, the lab phone in ETB 431 is an external phone.

Laser - Dial # 88, immediate medical attention, eye damage is usually permanent

Sharp/Falling Objects - Dial # 88, no first aid available in ETB 431

Chemical Spill - follow MSDS, summary in section D

Emergency Devices/Materials Available:

Fire Extinguisher – There are 2 in the hallways of ETB 4rd floor: one across room 431 and one in front of room 435 for class A – paper/wood/garbage

Eye wash station – none in ETB 431, there is one in ETB 306, dial 88 from lab phone in ETB 431

First aid station – none in ETB 431, dial 88 from lab phone

D) DANGERS/EMERGENCY OF LASERS, CHEMICALS

Lasers

Lasers are fast pulsed, either diode or Nd: YAG with pulse energies from ~1-150 microjoules. Infrared and UV beams cannot be seen without a detector card or a fluorescent target. These beams can damage the eyes and possibly cause skin burns. Reflected beams off various surfaces are dangerous. ALWAYS know where the beams are going and block any unused or partially transmitted beams (ex. through some mirrors). It is the joint responsibility of the laser operator and individuals entering the laser operating area to ensure that proper eyewear has been selected for the wavelengths in use. Visitors must be accompanied by qualified laser personnel. All laser maintenance must be performed only by qualified laser personnel.

ACETONE 100%

Flashpoint: -19 °C Explosive Range: 2.6 Vol % to 13.0 Vol%,
Auto Ignition: +465 °C Vapour Pressure (@ 20°C): 247 hPa (185 mm Hg)

Hazard: Highly Flammable, eye irritant, dry skin

Note - vapours may cause drowsy/dizziness

SOP: impervious (ie. non-penetrating) gloves, safety glasses, protective work clothing

Disposal: dilute small amounts with water, large amounts require disposal permit

Note – no dangerous reactions known

Clean/Collect: Absorb with liquid binding material ex. Sand, sawdust, acid binders etc.

EMERGENCY:

Inhalation – fresh air, med. advice Eyes - rinse several min, and consult doctor

Skin Contact – soap and water Ingestion - seek immediate med. advice

ETHANOL 90% (methyl alcohol 5%, isopropyl alcohol 5%) “ethanol, anhydrous, denatured”

Flashpoint: +8 °C Explosive Range: 3.3 Vol % to 19.0 Vol%,
Auto Ignition: +362 °C Vapour Pressure (@ 20°C): 58.5 hPa (44 mm Hg)

METHANOL 100%

Flashpoint: +11 °C Explosive Range: 6.7 Vol % to 36 Vol%,
Auto Ignition: +385 °C Vapour Pressure (@ 20°C): 129 hPa (97 mm Hg)