

TITLE:

**Science Laboratory and Animal House SOP**

**Summary of Contents:**

In compliance with legislation and in line with the College's Health & Safety Policy and risk assessment process, this Standard Operating Procedure (SOP) provides science staff and students with guidance and procedures for working safely when in College laboratories or animal houses.

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**Responsible Owner(s):**

Head of School of Applied Science and Sport

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Previous Reference (for control purposes):

*005-03-2013: Sharps & Laboratory Glassware SOP*  
*009-03-2013: Laboratory Chemicals SOP*  
*007-03-2013: Autoclave Steriliser SOP*  
*008-03-2013: Electrical Laboratory Equipment SOP*  
*006-03-2013: Gas Laboratory Equipment SOP*  
*010-03-2013: Microbiological & Dissection Materials SOP*  
*004-03-2013: Animal House SOP*

## 1.0 Background

- 1.1 In compliance with legislation and in line with the College's Health & Safety Policy and risk assessment process, this Standard Operating Procedure (SOP) provides science staff and students with guidance and procedures for working safely in College laboratories and animal houses.
- 1.2 Although staff have day to day prime responsibility for safe working practices within the areas under their control, this does not preclude the responsibilities of all staff or students of their legal duties to safe working practices and a safe environment under the Health and Safety at Work Act.
- 1.3 Staff and students have a duty to take reasonable care of their own health and safety and that of others who may be affected by their acts or omissions at work. To this end, staff and students should correctly use all work items and procedures provided in accordance with their training and the instructions they receive.
- 1.4 This SOP acknowledges the College's duties under the Special Educational Needs and Disability Order (SENDO) 2005 and the Disability Discrimination Act 1995 (DDA) and the Disability Discrimination (NI) Order 2006 (DDO). However, where there is a conflict between the need to make reasonable adjustments and the duty of care, then Health and Safety will be the priority. [Link to SERC Learning Support](#)

## 2.0 Scope

- 2.1 The following procedural sections apply to all authorised science students and staff. Disciplinary action may be taken against staff or students failing to comply with procedures.

Section 5 [Sharps and Laboratory Glassware](#)

Section 6 [Laboratory Chemicals](#)

Section 7 [Autoclave Steriliser](#)

Section 8 [Electrical Laboratory Equipment](#)

Section 9 [Gas Laboratory Equipment](#)

Section 10 [Microbiological and Dissection Materials](#)

Section 11 [Animal House](#)

## 3.0 Communication Plan

These procedures will be communicated to all staff and students via the College intranet and also referred to during the induction process and training.

## 4.0 Review

These procedures will be reviewed (and updated if necessary) annually or sooner to reflect changes in legislation or circumstance.

## 5.0 Sharps and Laboratory Glassware

### 5.1 Training & Definition

- › **Authorised staff and students must adhere to CLEAPS procedure for the safe use and disposal of sharps and laboratory glassware.**
- › 'Sharps' include scalpels and razor blades, TLC spotting pipettes, capillary tubing, microscope slides/coverslips and general glassware.

### 5.2 Use

- › Sharps/glassware should be used as little as possible and always with the greatest care.
- › Students should NOT remove or replace scalpel blades. This should be carried out by a technician and blades should be removed with the correct safety tool.
- › Before use, all glassware should be checked to ensure that it is free from cracks, flaws or scratches that may cause it to fail in use.
- › Glass should be transported carefully and never in pockets.
- › Glass must never be stored on the floor.
- › Joints and stoppers: ground glass connections should be lubricated before assembling and disassembled immediately after use. Flasks or containers must not be stoppered when hot. If a stopper seizes, do not force it and it is extremely dangerous to reheat the container to remove it.
- › Never heat glassware suddenly or unevenly. If using a flame, always use a gauze mat.
- › Hot glass (which looks the same as cool glass) should be treated with care and placed where no one can accidentally come into contact with it before it has cooled.
- › After use, if not for disposal, sharp items must always be placed in a safe position/orientation so as to avoid possible accidental injury to others.

### 5.3 Disposal

- › Sharps must NEVER be disposed of in the normal waste bin.
- › NOTIFY the tutor or technician immediately if glass is broken.
- › Broken glass must be washed clean before being immediately disposed of in the glass bin labelled and set aside for that purpose. When glass bins are full, the College caretaker should be called to have them removed.
- › Broken glass must never be left in sinks, on floors or work surfaces or in unsuitable containers e.g. plastic bags or cardboard boxes. A brush and dustpan should be used to clear up broken glass. Special care should be taken when clearing broken glass from a sink where water can make sharp edges invisible: tongs can be used to pick out pieces.
- › Other sharps, razor blades and scalpels must only be disposed of in the designated 'Sharps Bin' which is discarded by technicians when full.
- › Microscope slides and coverslips must be disposed of in proper containers and not in waste bins, left in sinks or on benches.

## 5.4 **Emergency Procedures**

- › Apart from very minor injuries, a First Aider should be called.
- › Cuts should be treated immediately. No attempt should be made to remove broken glass from wounds.
- › Follow procedures on individual COSHH assessments (eg eye wash using dedicated hose on sink).
- › In the event of serious injury, call an ambulance immediately.

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## 6.0 **Laboratory Chemicals**

This section provides science staff and students with guidance and procedures for storing and working with laboratory chemicals, in compliance with COSHH regulations.

### 6.1 **Essential**

- › **Authorised staff and students must adhere to CLEAPS procedures in the use of laboratory chemicals.**
- › **This document is not a definitive guide and in all cases the material safety data sheet [MSDS] for the substance must be referred to.**

### 6.2 **Handling Chemicals**

- › Technicians should follow guidance given in CLEAPSS and COSHH assessments and be aware of how to deal with chemical spills (see section 6.5).
- › Tutors should read the COSHH assessment to better understand the nature of the chemical and associated hazards. Unless completely familiar with the chemical or activity, staff are expected to check for the hazards and safe procedures before starting work. A table of incompatibility of commonly used chemicals is at [Appendix 1](#).
- › Wear appropriate PPE. Contact with many chemicals can lead to skin soreness and itching, rashes, blistering (dermatitis). Some can also damage the eyes. Throw away single use gloves every time they are taken off.
- › Staff should know where the nearest eye washes and spill kits are located. Small spill kits and/or neutralising agents with instructions, absorbents and personal protective equipment should be readily available to clean up minor spills. With very volatile solvents it is important to apply the absorbent asap to slow up the evaporation of the liquid and prevent it becoming airborne.
- › Always wash hands after handling chemicals.

### 6.3 **Chemical Storage**

- › Products containing chemicals must be stored securely in well ventilated, cool, dry, dark places, capable of keeping in spills.
- › Designated and clearly signed chemical storage containers or rooms must be kept securely locked.
- › **ONLY TRAINED AND AUTHORISED STAFF** are allowed access to chemical stores.

- › Refer to specific storage instructions on product MSDS.
- › Wear appropriate PPE.
- › Volatile and hazardous chemicals should be stored in a manner which will minimise the outcome of unplanned release.
- › Keep the following products apart:
  - solid and liquid products
  - flammable and non-flammable liquids
  - acids and alkalis
  - wastes
- › Store containers so their labels face forwards.
- › Store heavier items and corrosive chemicals on lower shelves.
- › Containers must be easy to pour from, don't dribble, and don't trap liquid in a rim.
- › Never store chemicals in open containers.
- › Never decant concentrate into an unlabelled container. Never reuse a concentrate container. Dispose of it safely or return it to the supplier.
- › Keep the storage area clean and well organised.

#### **6.4 Fume Cupboards**

- › Fume cupboard fans must be regularly maintained.
- › Fume cupboards should not be used for long-term chemical storage.
- › They must be kept tidy so as not to disrupt air flow.
- › The front sash must be kept closed as far as is comfortable and fully closed when not in use.
- › Heads must stay out of the fume cupboards whilst working.

#### **6.5 Chemical Splashes and Minor Spills**

##### **Immediate response:**

- › Identify what has been spilt and assess the risks to health and/or the environment.
- › If necessary, move people (including yourself) to a safe distance away from fumes etc.
- › Seal off the area to prevent further exposure of people.
- › Turn on the fume hood(s) and open windows, but close doors to prevent vapour spreading beyond.
- › Help any injured or exposed people and summon medical help if required (First Aider).

##### **Cleaning up:**

- › Clear up spills immediately.
- › Wear suitable personal protective equipment to minimise exposure – eg eye protection, Lab coats, gloves (suitable grade and material for the substance being handled).
- › Assemble proper materials and equipment for the clean-up. Absorb liquids in granules. Scoop solids or absorbed liquids into a marked secure container. Always refer to individual MSDS for specific procedures.

## 7.0 Autoclave Steriliser

**Students are NOT permitted to use autoclave sterilisers. Only authorised and trained staff may use autoclaves. This training must be recorded.**

### 7.1 Maintenance and Repair of Autoclaves

- › Autoclaves designated for inactivating biological wastes must have a regular maintenance schedule including monitoring by a Service Engineer as recommended by the manufacturer – usually every 12 months.
- › Any faults with the autoclave should be reported immediately. Until it is repaired and tested, the autoclave must not be used.
- › Periodic efficiency tests should be carried out using autoclave indicator tape or capsules.

### 7.2 Preparing Items to be Sterilised

- › Materials to be autoclaved must be stored in an appropriate bag in the fridge.
- › Pyrex glassware is the only type of glassware that should be placed in an autoclave. Liquids should be placed in approved glassware with lids on but loosened to allow pressure to be released. Only liquids such as cell culture media and water should be placed in an autoclave.
- › Use autoclave bags for wrapping petri dishes and culture bottles for processing and seal with autoclave indicator tape.
- › When killing microbiological waste for disposal, ensure autoclave indicator tape is included.

### 7.3 Using the Autoclave

- › Laboratory coats should be worn.
- › Heat proof gloves and goggles should be worn to fill and empty autoclaves.
- › Safe manual handling techniques should be used when filling, emptying and moving the autoclave.
- › Do not overload the autoclave.
- › Check control panels before starting the autoclave.
- › Fill the bottom of the autoclave compartment with distilled water.
- › Close the lid and fully engage the locking screws.
- › Make sure the power switch is set to "on" and the steam supply valve is open.
- › Set the timer to the desired time. Fifteen to 20 minutes is usually sufficient to sterilize non-filled glassware and metal lab supplies.
- › The autoclave should never be left unattended while in use.

### 7.4 Removing Items

- › When the cycle is over, wait at least 15 minutes for pressure to drop.
- › Put on heavy duty heat and flame resistant lab gloves.
- › Carefully release the locking screws and raise the lid.
- › Have a stainless steel lab rack nearby to place the tubs on, as they will be very hot.

- › Carefully reach inside and remove items carefully, placing them on the rack to cool.

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## 8.0 Electrical Laboratory Equipment

**Authorised staff and students must adhere to CLEAPS in the use of electrical laboratory equipment.**

### 8.1 General Procedures

#### **Before Use**

- › Visually check equipment for faults before use. Never use equipment that has any loose, damaged or makeshift parts. Check leads for cuts, splits or other damage. Any defects must be reported to the tutor or technician immediately. Where guards are fitted, ensure they are in place.
- › Keep power cables in good condition, avoid dragging along the ground, and keep away from heat, sharp edges and moving parts.
- › The power plug must match the outlet - modifying plugs will increase the risk of electric shocks. Make sure the correct fuse rating is in the plug.
- › Electric equipment should be maintained and tested in accordance with manufacturer's instructions. Maintenance records should be up to date and available for inspection.
- › All electrical equipment should be regularly PAT tested by a qualified person.
- › Use the correct accessories intended for the equipment.
- › Avoid lifting items that are too heavy – two people can lift the item if necessary. Use a trolley to move items if not easily carried.
- › With battery operated equipment, recharge the battery only with the charger supplied by the manufacturer to avoid risk of fire. Keep battery packs away from metal objects that could make a connection between battery terminals and short the battery. Under abusive conditions the battery may eject liquid - avoid contact - battery liquid can cause irritation and burns.

#### **During Use**

- › Treat all electric equipment with respect: they have the potential to cause harm either to the person using them or to others around.
- › Follow any instructions and demonstrations given on the use of equipment as well as any manufacturer's instructions provided.
- › Make sure there is adequate light and ventilation to carry out the task safely.
- › Cover hair, tuck in loose or frayed clothing and remove gloves and jewellery. All of these can get caught in equipment with moving parts.
- › Always wear appropriate PPE to protect you from any specific hazards presented.
- › Pay attention and concentrate on the activity and safe use of the equipment - a momentary lapse in concentration can result in serious injury. Take care not to overreach and keep proper footing to avoid losing control.
- › Keep electrical equipment dry - water entering equipment will increase risk of electric shocks.



- › Allow the equipment to cool completely before storing.
- › Keep equipment clean and tidy. Never leave in such a way that they become a hazard.
- › Never use when tired or under the influence of drugs or alcohol.
- › Never play or mess about with tools or equipment.

**IN ADDITION TO THE GENERAL PROCEDURES** the following equipment-specific procedures should be followed:

## **8.2 Hot-Melt Glue Guns**

- › STUDENTS are NOT PERMITTED to use glue guns.
- › Only experienced STAFF are permitted to use glue guns.
- › Check there is a supply of suitable HMA glue sticks.
- › Turn on and pre-heat the melting element tip 5 minutes prior to using the glue gun.
- › Always wear safety glasses and leather gloves that are resistant to hot temperatures to protect against burns. Tie long hair back and avoid wearing loose sleeves or jewellery.
- › Keep fingers clear of the extremely hot tip and molten glue.
- › During use, keep the gun in a position where it will have no contact with objects that easily catch fire. It is best placed on a support stand with the nozzle facing down.
- › When placed on the support stand, place a material such as cardboard below the tip to help catch any molten glue that drips from the tip. The gun should never be placed on its side as the hot tip or molten HMA glue can cause a fire.
- › Avoid prolonged use. This could overheat the tip element causing it to fail.
- › If the element tip does not heat up efficiently, turn the glue gun off and report the fault it to the technician.
- › Never leave the glue gun tool unattended when still switched ON or when switched OFF but still HOT.
- › Turn off and wait until the tip element has completely cooled before storing the glue gun away correctly.

## **8.3 Hot Plates and Mantles**

- › Wear laboratory coat, safety glasses and disposable gloves. Tie long hair back and avoid wearing loose sleeves or jewellery.
- › Switch on the power; make sure the power light comes on.
- › Set the temperature controller to the required value or power setting.
- › Place a cleaned beaker or flask (containing your solution) on to the hot plate. Make sure the glassware has no cracks or chips in it and is dry on the bottom.
- › If the magnetic stirrer is to be used put a stirrer bar in at this point.
- › Do not over fill the beaker/flask this prevents spillage from it. A half to two thirds full is the maximum recommended.
- › Turn on the heating and stirring. Do not leave it unattended.



- › Take care when handling hot containers, use heat resistant gloves.
- › Switch off everything when finished. Make sure the hot plate has cooled down safely, place warning sticker for other laboratory users.

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## 9.0 Gas Laboratory Equipment

**Authorised staff and students adhere to CLEAPS in the procedure for using gas equipment in the laboratory.**

### 9.1 General Procedures

- › Mobile phones must be switched OFF in labs where the gas supply has been switched to live by the teacher
- › Long hair must be tied back.
- › If using 'wet look' hair products NEVER lean over flame.
- › Safety goggles must be worn.
- › Protruding goggle straps, loose clothing etc should be tucked in.
- › Flames should not be placed close to overhanging cupboards.
- › Remove all papers, notebooks, combustible materials and excess chemicals from the area.
- › Notify others in the laboratory that the burner will be in use.
- › Utilize a sparker/lighter with extended nozzle to ignite the burner. Never use a match to ignite a burner. Have the sparker/lighter available before turning on the gas.
- › Flammable liquids must not be used or dispensed while Bunsen burners or blow are alight in the room.
- › Ensure a CO2 fire extinguisher and fire blanket is close by.

**IN ADDITION TO THE GENERAL PROCEDURES** the following equipment-specific procedures should be followed:

### 9.2 Bunsen Burner

- › Place the Bunsen burner away from any overhead shelving, equipment or light fixtures by at least 30cm.
- › Inspect hose for cracks, holes, pinch points or any defect and ensure that the hose fits securely on the gas valve and the burner.
- › Replace all hoses found to have a defect before using.
- › Adjust the flame by turning the collar to regulate air flow and produce an appropriate flame for the experiment (typically a medium blue flame).
- › Do not leave open flames unattended and never leave the laboratory while the burner is on.
- › Shut off gas when its use is complete.
- › Allow the burner to cool before handling. Ensure that the main gas valve is off before leaving the laboratory.

- › When lighted Bunsen burners are not in use, air holes should be closed to give luminous flames.

### 9.3 **Butane/Propane Gas Blow Torch**

- › STUDENTS are NOT PERMITTED to use blow torches.
- › Only experienced staff should use blow torches and handle gas canisters.
- › Regularly inspect blow torches for damage
- › Special care should be taken not to cross-thread the canister when it is being attached.
- › Gas canisters should be detached and stored safely when not in use.

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## 10.0 **Microbiological and Dissection Materials**

**Authorised staff and students must adhere to CLEAPS in the procedures for safe working with microbiological and dissection materials.**

### 10.1 **Microbiological Material**

#### **Preparation**

- › Technicians should follow guidance on microbiology given by CLEAPSS.
- › Unless completely familiar with the procedures, staff are expected to check for hazards and safe procedures before starting work.
- › Laboratory doors and window should be closed to avoid draughts.
- › Hands should be washed and any cuts covered with waterproof dressings.
- › Lab coats should be worn.

#### **During Work**

- › Never eat, drink or take medications when working with microbiological material.
- › Avoid all hand to mouth operations eg chewing pens.
- › Follow the correct aseptic techniques when transferring organisms.
- › A container of disinfectant should be provide for disposal of used pipettes, spreaders etc.
- › Swab spillages with disinfectant immediately.
- › Do NOT isolate cultures from potentially dangerous sources such as human mucus, cuts etc.
- › Do NOT subculture unknown organisms – they may be pathogens.
- › Label cultures and seal for incubation. Unknown cultures should NEVER be opened.

#### **On Completion of Work**

- › Dispose of all contaminated equipment in disinfectant.
- › Swab the bench with disinfectant.
- › Remove lab coat and wash hands thoroughly before leaving.

- › Lab refrigerators should not be used to store food for human consumption.

### **Disposal of Microbiological Waste**

- › Living cultures or contaminated equipment should be made harmless by sterilisation before disposal. Plates and cultures should be autoclaved. They may then be safely disposed of with general waste.

## **10.2 Dissection Material**

- › Hands should be washed and any cuts covered with waterproof dressings.
- › Laboratory coats and gloves must be worn.
- › Only materials provided by a butcher and passed as fit for human consumption may be dissected. Dissection materials should be stored in sealed, labelled containers in the lab fridge until required for use – bearing in mind their safe storage time.
- › No eating or drinking and avoid all hand to mouth operations eg chewing pens.
- › Dissected material should be stored in sealed, labelled containers in the lab fridge before safe disposal at the end of the day.
- › Remove lab coat and ensure hands are washed thoroughly before leaving the laboratory.
- › Dissection instruments and containers should be cleaned and sterilised.

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## **11.0 Animal House**

**Authorised staff and students must be trained in the procedures for working in the Animal Houses. This training must be recorded.**

### **11.1 Accessing the Animal House**

- › Students are not permitted to enter the Animal House without the permission AND supervision of their lecturer.
- › Doors to Animal Houses must be kept closed except when entering or leaving.
- › NEVER open Animal House doors unless all animals are under control.

### **11.2 Personal Protective Clothing (PPE)**

- › Put on the necessary PPE on entering the Animal House (such as protective coats, disposable gloves, masks and eyewear).
- › PPE must be removed and disposed of in the correct waste containers. Re-usable clothing should be replaced in the correct storage location or discarded into laundry bag as directed. Masks should be the last item removed.

### **11.3 Animal Handling**

- › BEFORE being permitted to handle animals, staff and students must provide written evidence of an up-to-date tetanus toxoid immunisation.

- › Hayfever, asthma or 'animal related' allergy sufferers must inform the College and seek medical advice before entering the Animal House. Allergy sufferers must provide written evidence from a GP to show that they are not at risk when working in the Animal House.
- › Animals must not be handled or fed by students without permission and supervision of the lecturer in charge of the class.
- › Animal bites and scratches must be reported to the lecturer in charge of the class.
- › Avoid carrying animals in open stock cages between rooms. Transfer them to a clean, covered cage or box or use enclosed transport trolleys if available in the Animal House.
- › Keep work areas clean. All waste must be disposed of promptly and correctly into waste containers.
- › Students not behaving in a responsible manner will be excluded from the Animal House.

#### **11.4 Hygiene**

- › NEVER eat, drink or take medications when in the Animal House.
- › ALWAYS wash your hands, even if you have worn gloves, on leaving the Animal House.

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## Incompatibility Table of Commonly used Laboratory Chemicals

NB This is not an exhaustive list

Chemical	<i>Incompatible with</i>
Acetic acid	Chromic acid, nitric acid, hydroxyl compounds, ethylene glycol, perchloric acid, peroxides, permanganates
Acetylene	Chlorine, bromine, copper, fluorine, silver, mercury
Acetone	Concentrated nitric acid and sulphuric acid mixtures
Alkali and alkaline earth metals	Water, carbon tetrachloride or other chlorinated hydrocarbons, carbon dioxide, halogens
Ammonia (anhydrous)	Mercury(e.g., in manometers), chlorine, calcium hypochlorite, iodine, bromine, hydrofluoric acid (anhydrous)
Ammonium nitrate	Acids, powdered metals, flammable liquids, chlorates, nitrites, sulphur, finely divided organic combustible materials
Aniline	Nitric acid, hydrogen peroxide
Arsenical materials	Any reducing agent
Azides	Acids
Bromine	See chlorine
Calcium oxide	Water
Carbon (activated)	Calcium hypochlorite, all oxidizing agents
Chlorates	Ammonium salts, acids, powdered metals, sulphur, finely divided organic or combustible materials
Chromic acid and chromium trioxide	Acetic acid, naphthalene, camphor, glycerol. Alcohol, flammable liquids in general
Chlorine	Ammonia, acetylene, butadiene, butane, methane, propane (or other petroleum gases), hydrogen, sodium carbide, benzene, finely divided metals, turpentine
Chlorine dioxide	Ammonia, methane, phosphine, hydrogen sulphide
Copper	Acetylene, hydrogen peroxide
Cumene hydroperoxide	Acids (organic and inorganic)
Cyanides	acids

<b>Chemical</b>	<b><i>Incompatible with</i></b>
Flammable liquids	Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens
Fluorine	All other chemicals
Hydrocarbons (such as butane, propane, benzene)	Fluorine, chlorine, bromine, chromic acid, sodium peroxide
Hydrocyanic acid	Nitric acid, alkali
Hydrofluoric acid (anhydrous)	Ammonia (aqueous or anhydrous)
Hydrogen sulphide	Fuming nitric acid, oxidizing gases
Hypochlorites	Acids, activated carbon
Iodine	Acetylene, ammonia (aqueous or anhydrous), hydrogen
Mercury	Acetylene, fulminic acid, ammonia
Nitrates	Acids
Nitric acid (concentrated)	Acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulphide, flammable liquids and gases, copper, brass, any heavy metals
Nitrites	Acids
Nitroparaffins	Inorganic bases, amines
Oxalic acid	Silver, mercury
Oxygen	Oils, grease, hydrogen, flammable liquids, solids, and gases
Perchloric acid	Acetic acid, anhydride, bismuth and its alloys, alcohols, paper, wood, grease, oils
Peroxides, organic	Acids (organic or mineral), avoid friction, store cold
Phosphorus (white)	Air, oxygen, alkalies, reducing agents
Potassium chlorate	Sulphuric and other acids
Potassium perchlorate (see also chlorates)	Sulphuric and other acids
Potassium permanganate	Glycerol, ethylene glycol, benzaldehyde, sulphuric acid
Selenides	Reducing agents

<b>Chemical</b>	<b><i>Incompatible with</i></b>
Silver	Acetylene, oxalic acid, tartaric acid, ammonium compounds, fulminic acid
Sodium	Carbon tetrachloride, carbon dioxide, water
Sodium nitrite	Ammonium nitrate and other ammonium salts
Sodium peroxide	Ethyl and methyl alcohol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerin, ethylene glycol, ethyl acetate, methyl acetate, furfural
Sulphides	Acids
Sulphuric acid	Potassium chlorate, potassium perchlorate, potassium permanganate (similar compounds of light metal, such as sodium, lithium)
Tellurides	Reducing agents

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