

## INFORMATION SHEET

### Safe Storage and Labelling of Chemicals

#### 1. Introduction

This document provides basic guidance for the safe storage and labelling of chemicals. Access to laboratories and workshops containing hazardous chemicals must be secured, with access restricted and appropriate signage in place. For examples of signage see [Staff - H&S Intranet pages/ laboratory safety](#), [Student H&S Intranet pages/ laboratory safety](#).

#### 2. Labelling

- Whenever possible the original container should be used.
- All chemical containers must be clearly and correctly **labelled**:
  - Name of chemical or solution name (for mixtures extremely hazardous contents should be identified).
  - Concentration (where relevant).
  - Hazard symbols of chemical or of the final mixture – Utilising Globally Harmonized Symbols (<https://unece.org/transportdangerous-goods/ghs-pictograms>), to be able to identify hazards immediately.
  - Name of owner.
  - Date purchased/ generated.
  - Expiry date (if essential).
  - Reference number (Quartz reference).
- If there is a requirement to decant materials into a new container, it must be in a suitable container that is clearly labelled as above. There may be some situations where it is impractical to label a container (e.g. the use of very small vials). In cases like this a secondary container (e.g. a rack or tray) must be used which can be labelled accordingly.

### 3. Compatibility

Incompatible chemicals must be kept apart; this reduces the risk of hazardous chemical reactions and/ or fire. Refer to *Section 10 Reactivity and Stability* of the Safety Data Sheet for chemical specific information.

### 4. Storage

Buying an oversized storage cabinet can waste valuable space in the laboratory and does not allow for adequate segregation of incompatible substances. This should be considered when purchasing new cabinets. Larger cabinets can be purchased with segregated compartments. These are designed to providing safe, separate storage for a range of chemicals (e.g. acids, alkalis and flammables).

- **Storage cabinets:** Must be clearly labelled to indicate their contents.
- **Fume cupboards:** Are to be kept clear of materials and containers when these are not needed for ongoing operational work. Materials stored in fume cupboards disrupts the airflow making the fume cupboard less effective, this compromises the safety of the user. The storage of chemicals in fume cupboards (including chemical waste) can increase the risk of a spillage, contact between incompatible materials and the likelihood and severity of fire. For more information see [SOP-10101 Safe use of ducted fume cupboard](#) (staff) or [SOP-10101 Safe use of ducted fume cupboard](#) (student).
- **Hazardous chemicals:** Must be stored below shoulder height, where possible. Do not store chemical bottles on the floor, or stack chemicals on top of each other, any waste should be stored in an appropriate chemical cabinet prior to disposal.
- If chemicals are stored on high shelves, these shelves should be used for infrequently used chemicals and suitable access equipment should be provided.
- Central shelving on benches should have raised edges/ lips to prevent items being pushed off the other side.
- **Storage Outdoors:** It is important that materials are properly stored outside of Lab spaces and the guidelines here are fully followed. Large quantities of flammables and other materials should be stored where there is no risk of spillage into the environment and that a suitable chemical spill kit is available in the vicinity, they should also be banded or stored in a cabinet with sufficient drip tray volume to contain a leak.

## 5. Stock control

Staff/ students should only purchase the minimum quantity of chemicals required for their work; the disposal of unused chemical can cost significantly more than the perceived savings made when buying chemicals see [Top tips for laboratory purchasing](#).

Maintain good stock control, this means a regular review of what is being stored. be especially aware of time-sensitive compounds e.g. ethers once opened and exposed to the air can produce peroxides which are highly explosive.

## 6. Disposal

- Dispose of hazardous chemicals that are no longer required. For more information see:
  - [Chemical Waste store user procedure](#)
  - [Chemical waste disposal form](#)
  - [Chemical waste disposal label](#)
- When transporting waste to the chemical waste stores on each campus, ensure an appropriate trolley is available to ensure safe transportation i.e. wheels appropriate for the terrain and edge guarding.
- Quartzzy can be used to share unwanted chemicals within a campus. Please **do not** transfer dangerous goods between campuses.
- Consult [discharge to drain procedure](#).
- Remove chemicals from Quartzzy once you have disposed of it or used it.
- Individuals leaving the Univeristy are to follow the departure procedure, see [8-1-14 Departure and decontamination](#).

## 7. Housekeeping

- All newly purchased chemicals should have a [Chemical Risk Assessment Pre Purchase Form](#) (staff) or [Chemical Risk Assessment Pre Purchase Form](#) (students).
- Ensure an up to date safety data sheet is available for every hazardous substance stored, this includes new and existing chemicals. The SDS provides users with information about recommended storage requirements (section 7) and chemical incompatibility (section 10).

- Do not overfill chemical containers; allow enough free head space (e.g. Winchesters only filled to the shoulder of bottle) to account for any expansion of the contents, preventing over pressurising of the container. Overfilling waste solvent bottles has resulted in Winchesters breaking in the waste store (particularly during hot weather).
- Never carry a bottle of chemicals by its top; carry Winchesters in carriers or baskets capable of providing proper support.
- Formal inspection of cabinets at set intervals. Report any damage or defects to responsible person for action.
- Chemical Risk Assessment template: [Chemical Risk Assessment form](#) (staff) or [Chemical Risk Assessment form](#) (student).

## 8. Types of Storage Cabinet Available

Cabinet Type	Requirements
Corrosives cabinets	<ul style="list-style-type: none"> <li>• These cabinets are made of materials resistant to corrosion and contain a tray to catch any leakage or spillage.</li> <li>• The spill tray should have a volume that is 110% of the largest container.</li> <li>• These cabinets should be lockable.</li> <li>• These may be ventilated cabinets.</li> </ul>
Flammable cabinets	<ul style="list-style-type: none"> <li>• These cabinets must be of metal construction and have a minimum fire resistance of 30 minutes, some are built to 60 minutes and 90 minutes standard.</li> <li>• These cabinets must be lockable.</li> <li>• They should contain a spill tray to catch any leakage or spillage. The spill tray should have a volume that is 110% of the largest container.</li> <li>• They should be located away from doors, fire evacuation routes and sources of heat.</li> <li>• All flammable cabinets with damaged doors e.g. not closing effectively, should be replaced.</li> <li>• Newly purchased cabinets must conform to BS EN 14470-1:2004 - Safety storage cabinets for flammable liquids.</li> <li>• These may be ventilated cabinets.</li> </ul>
Metal cabinet	<ul style="list-style-type: none"> <li>• These cabinets should contain a spill tray to catch any leakage or spillage.</li> <li>• The spill tray should have a volume that is 110% of the largest container.</li> <li>• These cabinets should be lockable.</li> </ul>

Ventilated cabinets	<ul style="list-style-type: none"> <li>• Ventilated cabinets may be free-standing with their own extract and filtration system or may be situated beneath a fume cupboard and attached to the fume cupboard duct*.</li> <li>• They should contain a tray to catch any leakage or spill.</li> <li>• Must be inspected and maintained in line with manufacturer's instructions (including replacement of filters if required).</li> </ul>
Fridges and freezers	<ul style="list-style-type: none"> <li>• If there is a need to store flammable materials the refrigerator must be intrinsically safe (of non-sparking design) to prevent ignition of the contents and clearly labelled as such.</li> <li>• Refrigerators used for the controlled temperature storage of chemicals must be dedicated and clearly labelled for that purpose and never used to store food or beverages that are for human consumption.</li> </ul>
General Storage	<ul style="list-style-type: none"> <li>• Dedicated shelving.</li> <li>• Out of direct sunlight.</li> <li>• If chemicals are stored on high shelves, these shelves should be used for infrequently used chemicals and suitable access equipment should be provided.</li> <li>• Liquid bottles should be stored below shoulder height.</li> <li>• Central shelving on benches should have raised edges/lips to prevent items being pushed off the other side.</li> </ul>
<p>* Cabinets exhausted to a fume cupboard should form part of the 14-month statutory inspection and be maintained in line with manufacturers recommendations</p>	

## 9. Chemical Compatibility

See table on next page for chemical compatibility.

Class	Dangerous Goods Symbol & Classification (SDS Section 14)	GHS Symbol & Hazard Code	Chemical Storage – Cabinet Type	Warning Sign (inc. suggested wording for Cabinet)	Description
		 <p>Chemicals with <b>only</b> a Health Hazard Symbol, or no GHS symbol at all.</p>	<b>General Storage</b>	None	<p><b>General storage</b></p> <p>Liquid bottles should be stored below shoulder height.</p> <p>If chemicals are stored on high shelves, these shelves should be used for infrequently used chemicals and suitable access equipment should be provided.</p>
<b>Class 3</b>	 <p><b>Flammable Liquids</b></p>	 <p><b>Flammable Liquids</b></p> <p>H224 Extremely flammable liquid and vapour. H225 Highly flammable liquid and vapour. H226 Flammable liquid and vapour.</p>	<b>Flammable cabinet</b>	 <p>Flammable Liquids</p>	<p><b>Flammable liquids</b></p> <p>These should be stored in a dedicated flammable cabinet, used for Class 3 chemicals (see SDS Section 14, flammable liquids) and aerosols.</p> <p>A maximum of 50 litres of extremely, highly flammable and those flammable liquids with a flashpoint below the maximum ambient temperature of work area may be kept in a laboratory/ workshop.</p> <p>No more than 250 litres for other flammable liquids with a higher flashpoint of up to 55°C may be stored in a laboratory/ workshop.</p>

Class	Dangerous Goods Symbol & Classification (SDS Section 14)	GHS Symbol & Hazard Code	Chemical Storage – Cabinet Type	Warning Sign (inc. suggested wording for Cabinet)	Description
		<b>NB</b> – some chemicals have a flammable GHS symbol, but are not classified as flammable liquids, they have different associated hazard statements to those above <b>e.g. H250</b> , these chemicals must not be stored with the flammable liquids - contact your H&S Lead for further advise).			<p>500ml working volume may be kept on open bench, then returned to the storage area overnight.</p> <p>Flammable liquids with <b>secondary hazards</b> (e.g. toxic/ corrosive) should be stored on a separate shelf <u>within the flammable cabinet</u>, in a secondary container or drip tray.</p> <p>Flammable liquids should be returned to the flammable cabinet immediately after use. Empty flammable containers should be stored in the same way as full containers until removed to the waste store.</p> <p>Flammable liquids must not be stored in refrigerators unless it is spark-proof and labelled.</p>
Class 4.1	 <p>Flammable solids</p>	 <p><b>Flammable Solids</b></p> <p>H228 Flammable solid. H206* Fire, blast projection hazard;</p>	<b>Flammable Cabinet</b>	 <p>Readily combustible</p>	<p><b>Flammable solids</b></p> <p>These should be stored in a dedicated flammable cabinet, used for Class 4.1 chemicals (see SDS Section 14). <b>Do not store with flammable liquids.</b></p> <p><b>Flammable solids (4.1)</b> These are readily combustible solids that can be ignited by brief contact with a source of ignition, or</p>

Class	Dangerous Goods Symbol & Classification (SDS Section 14)	GHS Symbol & Hazard Code	Chemical Storage – Cabinet Type	Warning Sign (inc. suggested wording for Cabinet)	Description
		<p>increased risk of explosion if desensitising agent is reduced. H207* Fire or projection hazard; increased risk of explosion if desensitising agent is reduced. H208* Fire hazard; increased risk of explosion if desensitising agent is reduced.</p>			<p>are sensitive to friction, and that will continue to burn after removal of the source of ignition.</p> <p><b>Solid desensitised explosives* (4.1B)</b> - contact the Scientific Safety Advisor prior to purchase for storage advice.</p> <p>These are explosive substances which are wetted, diluted, dissolved, or suspended with a phlegmatiser to suppress their explosive properties care must be taken that the phlegmatiser does not dry out during long term storage. Examples include picric acid, urea nitrate and 1- Hydroxybenzotriazole (Hobt).</p>
	 <p>Self-reactive substances and mixtures</p>	 <p>H242 Heating may cause fire.</p>			<p>These substances should be stored in a locked cabinet and regularly inspected for signs of drying (e.g. around bottle stoppers and caps and within the bottle) and the checks documented. Any leaks of spills should be dealt with immediately. Check expiry date.</p> <p><b>Self-reactive substances</b> may decompose with the evolution of heat and fumes at moderate temperatures. Examples include various azo compounds.</p>

Class	Dangerous Goods Symbol & Classification (SDS Section 14)	GHS Symbol & Hazard Code	Chemical Storage – Cabinet Type	Warning Sign (inc. suggested wording for Cabinet)	Description
Class 4.2	 Spontaneously combustible	 H250 Catches fire spontaneously if exposed to air.	Flammable cabinet	 Spontaneously combustible	<p>In small quantities these should be stored in a dedicated flammable cabinet, used for Class 4.2 and 4.3 chemicals (see SDS Section 14). <b>Do not store with flammable liquids.</b></p> <p><b>Pyrophoric solids and liquids</b> Pyrophoric (spontaneously combustible) substances have packaging that is designed to exclude air. If air enters a damaged package the substance may start to burn at room temperature or when gently heated. Examples include yellow phosphorus and some metal alkyls.</p> <p><b>Self-heating substances and mixtures</b> Oxidative self-heating substances may react with the air, and so raise the temperature to the point at which spontaneous combustion takes place. This is normally a slow process which can be controlled by restricting the pack size, limiting storage duration, monitoring temperatures or excluding air.</p>
	 Self-heating substances and mixtures	 H251 Self-heating: may catch fire. H252 Self-heating in large quantities; may catch fire.			
Class 4.3	 Dangerous when wet	 H250 Catches fire spontaneously if exposed to air.	Flammable cabinet	 Dangerous when wet	<p>In small quantities these should be stored in a dedicated flammable cabinet, used for Class 4.2 and 4.3 chemicals (see SDS Section 14). <b>Do not store with flammable liquids.</b></p>

Class	Dangerous Goods Symbol & Classification (SDS Section 14)	GHS Symbol & Hazard Code	Chemical Storage – Cabinet Type	Warning Sign (inc. suggested wording for Cabinet)	Description
	Dangerous when wet	H260 In contact with water releases flammable gases which may ignite spontaneously. H261 In contact with water releases flammable gases.			<b>Dangerous when wet</b> These substances react with water and evolve flammable gases. Fire involving or in the vicinity of such materials should obviously not be tackled with water.  Examples include calcium carbide, metal hydrides, powders of reactive metals such as magnesium or aluminium, and alkali metals such as sodium and potassium.
Class 5.1	 Oxidising Substances	 <b>Oxidiser</b> H270 May cause or intensify fire: oxidiser. H271 May cause fire or explosion: strong oxidiser. H272 May intensify fire; oxidiser.	<b>Corrosive cabinet</b>  DO NOT STORE in wooden cupboards	 Oxidiser	<b>Oxidiser</b>  These should be stored in a dedicated corrosive cabinet, used for Class 5.1 chemicals (see SDS Section 14).  These may be solid or liquid. Oxidisers may be very reactive and should be stored separately from other chemicals. Never store oxidisers with flammable liquids ( <i>their symbols look similar</i> ), reducing agents or near combustible materials (e.g. paper/cardboard). Some oxidisers are incompatible from each other and need to be stored apart, check the SDS.

Class	Dangerous Goods Symbol & Classification (SDS Section 14)	GHS Symbol & Hazard Code	Chemical Storage – Cabinet Type	Warning Sign (inc. suggested wording for Cabinet)	Description
Class 5.2	 <b>Organic peroxides</b>	 H241 Heating may cause a fire or <u>explosion</u> (store as explosive).  H242 Heating may cause a fire.	<b>Flammable cabinet</b>	 Organic peroxides	<p><b>Organic peroxides</b></p> <p>These should be stored in a dedicated flammable cabinet, used for Class 5.2 chemicals (see SDS Section 14).</p> <p>Organic peroxides are a particularly reactive type of oxidising substance. They may be solids, liquids or pastes, and have one or more of the following properties:</p> <ul style="list-style-type: none"> <li>• liable to explosive decomposition.</li> <li>• burn rapidly and intensely even in the absence of oxygen.</li> <li>• sensitive to impact or friction.</li> <li>• react dangerously with other substances</li> <li>• decompose at comparatively low temperatures and/or cause spontaneous ignition if spilt onto combustible material.</li> </ul> <p>Some organic peroxides may need to be marked with a subsidiary explosion risk label.</p> <p>Organic peroxides need to be stored separately from flammable, corrosive and toxic materials.</p>

Class	Dangerous Goods Symbol & Classification (SDS Section 14)	GHS Symbol & Hazard Code	Chemical Storage – Cabinet Type	Warning Sign (inc. suggested wording for Cabinet)	Description
Class 6.1		 <p>H340 May cause genetic defects. H341 Suspected of causing genetic defects. H350 May cause cancer. H351 Suspected of causing cancer. H360 May damage fertility or the unborn child. H361 Suspected of damaging fertility or the unborn child. H334 May cause allergy or asthma symptoms or breathing difficulties or inhaled.</p>		 <p>CMRs</p>	<p><b>Mutagens/ Category 1 Carcinogens and Respiratory Sensitizers</b></p> <p>These chemicals must be stored in a <b>locked</b> cabinet with access restricted to authorised, trained users. Where fumes or odours are evolved, they must be stored in cabinets with adequate <b>extraction ventilation</b>.</p> <p>A list of chemicals stored within the cabinet should be maintained. The quantities stored must be kept to a minimum.</p>



Class	Dangerous Goods Symbol & Classification (SDS Section 14)	GHS Symbol & Hazard Code	Chemical Storage – Cabinet Type	Warning Sign (inc. suggested wording for Cabinet)	Description
		H304 May be fatal if swallowed and enters airways. H305 May be harmful if swallowed and enters airways.			
Class 8		 <b>Corrosive</b>	<b>Corrosive cabinet</b>	 <b>Corrosive</b> (Inorganic acid)	<b>Corrosives</b>  These should be stored in a dedicated corrosive cabinet, used for Class 8 chemicals (see SDS Section 14). Inorganic acids, organic acids and bases must be in separate cabinets.
			<b>Corrosive cabinet</b>	 <b>Corrosive</b> (Organic acid)	<b>Corrosive (inorganic acid)/ Corrosive (organic acid), pH less than 7.</b>  Hazardous substances may be classified as corrosive because they burn the skin on contact or burn the mucous membranes of the respiratory tract by inhalation. Corrosive substances can cause serious eye damage.  Corrosive substances will react with incompatible materials e.g., unsuitable packaging or metals (including shelving that is not corrosion resistant).

Class	Dangerous Goods Symbol & Classification (SDS Section 14)	GHS Symbol & Hazard Code	Chemical Storage – Cabinet Type	Warning Sign (inc. suggested wording for Cabinet)	Description
					<p>Leaking corrosive substances may damage the packaging of other dangerous substances, thus creating further leaks.</p> <p>Corrosive liquids must not be stored above shoulder height. Separate storage cabinets are required to separate inorganic and organic acids; there is a risk of violent reactions if some inorganic and organic acids are stored together.</p> <p><i>Nitric acid</i> is both corrosive and an oxidiser, it may be stored in the Corrosive (inorganic acid) cabinet inside a secondary container.</p> <p><i>Hydrofluoric acid</i> must always be stored in a <u>dedicated</u>, locked cabinet, with access restricted to users who are trained in the safe handling of HF. Label: Pictograms T, C – “Corrosive (Hydrofluoric acid)”.</p>
			Corrosive cabinet	 <p>Corrosive (Alkalis and bases)</p>	<p><b>Corrosive (base), pH of greater than 7.</b></p> <p>Even although these materials are marked with a corrosive label, as are acids, they must be stored separately from acids since any accidental mixing of the concentrated materials will generate large quantities of heat and fumes.</p>

**Regulated and High Hazard Chemicals** - Please contact the Scientific Safety Advisor prior to purchase.

There are chemicals that require more stringent controls (including additional storage requirements) due to potentially significant health or safety effects and/or regulatory requirements. These include:

- Class 1 explosives and Class 4 desensitised explosives\* ([Explosives Regulations 2014](#))
- Chemicals listed in Schedules 1 and 2 of the [Chemical Weapons Convention](#) (CWC)
- Controlled drugs ([Misuse of Drugs Act 1971](#), [Misuse of Drugs Regulations 2001](#))
- Drug precursors, Schedule 1. <https://www.gov.uk/government/publications/precursor-chemicals-wallchart-for-domestic-licensing>
- Schedule 1 Poisons [https://www.legislation.gov.uk/ukxi/1982/218/pdfs/ukxi\\_19820218\\_en.pdf](https://www.legislation.gov.uk/ukxi/1982/218/pdfs/ukxi_19820218_en.pdf)

## 10. Compatibility Chart

		Flammable Solids				Oxidising Substances		Corrosive Substances			
		Flammable liquids	Readily combustible	Spontaneously combustible	Dangerous when wet	Oxidising substances	Organic peroxides	Toxic substances	Organic acids	Inorganic acids	Bases
Flammable Solids	Flammable liquids	Green	Yellow	Red	Red	Red	Red	Red	Yellow	Yellow	Yellow
	Readily combustible	Yellow	Green	Yellow	Yellow	Red	Red	Red	Yellow	Yellow	Yellow
	Spontaneously combustible	Red	Yellow	Green	Yellow	Red	Red	Red	Yellow	Yellow	Yellow
	Dangerous when wet	Red	Yellow	Yellow	Green	Red	Red	Red	Yellow	Yellow	Yellow
Oxidising Substances	Oxidising substances	Red	Red	Red	Red	Green	Red	Red	Yellow	Yellow	Yellow
	Organic peroxides	Red	Red	Red	Red	Red	Green	Red	Yellow	Yellow	Yellow

	Toxic substances	Red	Red	Red	Red	Red	Red	Green	Red	Red	Red
Corrosive Substances	Organic acids	Amber	Amber	Amber	Amber	Amber	Amber	Red	Green	Red	Red
	Inorganic acids	Amber	Amber	Amber	Amber	Amber	Amber	Red	Red	Green	Red
	Bases	Amber	Amber	Amber	Amber	Amber	Amber	Red	Red	Red	Green

**Legend:**

Red - Do not store together.

Amber - Able to be stored together but separate storage preferable.

Green - Can be stored together.