Appendix 1 – Chemical Storage, Segregation and Labelling

Class	Dangerous Goods Symbol and Classification (SDS Section 14)	GHS Symbol and Hazard Codes (SDS Section 3)	Chemical Storage – Cabinet Type	Warning Sign (to be displayed on the cabinet, including suggested wording)	Description
	Not applicable	 Chemicals with the health hazard symbol or no GHS symbol.	**General storage / shelving**		**General storage** These chemicals can be stored on open shelves (out of direct sunlight) or in a labelled cabinet. Chemicals with the environmental hazard symbol may also be in general storage within a lab/workshop.
Class 3 – Flammable liquid	 **Class 3 Flammable Liquids**	 H224 Extremely flammable liquid and vapour. H225 Highly flammable liquid and vapour. H226 Flammable liquid and vapour.	**Fire resisting cabinet**		**Flammable liquids** These must be stored in a dedicated fire resisting cabinet, used for Class 3 flammable liquids only (see SDS Section 14). *Do not store other flammable materials in this cabinet, (e.g. any Class 4 Flammable solids, see below).* Flammable liquids must not be stored in refrigerators unless it is **spark-free** and labelled. A maximum of 50 litres of extremely, highly flammable and those flammable liquids with a flashpoint below the maximum ambient

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					temperature of work area may be kept in a laboratory/ workshop. No more than 250 litres for other flammable liquids with a higher flashpoint of up to 60°C may be stored in a laboratory/ workshop. Flammable liquids should be returned to the fire resisting cabinet immediately after use. 500ml working volume may be kept on open bench, then returned to the storage area overnight. Empty flammable containers should be stored in the same way as full containers until removed to the waste store. Flammable cabinets must be kept locked. Liquids that are flammable and toxic, must be stored in a fire resisting cabinet, where this is with other flammable liquids they should be in a secondary container or drip tray; refer to the SDS. Flammable liquids with an **energetic secondary hazard** (e.g. flammable and corrosive) must be stored in a separate fire resisting cabinet.

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			Fridge / freezer (Not spark free)		Flammable materials must not be stored in fridges and freezers unless they are spark free. Fridge and freezers that are not spark free, and are used to store chemicals, must be labelled “No flammable materials to be stored inside.” A lockable fridge / freezer is recommended.
Class 4 – Flammable solids* **4.1** Flammable solids	 **Class 4.1 Flammable solids**	 H228 Flammable solid. H206* Fire, blast projection hazard; increased risk of explosion if desensitizing agent is reduced. H207* Fire or projection hazard; increased risk of explosionif	**Fire-resisting cabinet**		**Flammable solids** These are readily combustible solids that can be ignited by brief contact with a source of ignition, or are sensitive to friction, and that will continue to burn after removal of the source of ignition. **Solid desensitised explosives*** Desensitised explosives are liquids or solids that were originally classified as explosives

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		desensitising agent is reduced. H208* Fire hazard; increased risk of explosion if desensitizing agent is reduced.			but have had their explosive properties suppressed by adding a desensitising agent, making them safer to handle and transport. Common examples include 2,4-Dinitrophenylhydrazine, 2,4-Dinitrophenol, 1-Hydroxybenzotriazole hydrate and Picric acid (Trinitrophenol, wetted). If the desensitising agent dries out, the chemical can become a Class 1 explosive. The manufacturer should provide information about the shelf-life and instructions on verifying desensitisation. Contact the health and Safety Team prior to purchase. 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. For further information see *Information Sheet – Safe use of desensitised explosives.* **Self-reactive substances.** These are thermally unstable liquid or solid substances
	 **Class 4.1** **Self-reactive substances and mixtures**	 H242 Heating may cause a fire.			

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					or mixtures liable to undergo a strong exothermic decomposition even without the participation of oxygen (air). Examples include various azo compounds.
Class 4 – Flammable solids **4.2** Sponteniously combustible solids	 **Class 4.2** **Pyrophoric liquids and solids**	 H250 Catches fire spontaneously if exposed to air.	**Fire resisting cabinet**	 Spontaneously combustible Danger: Explosive atmosphere	These chemicals are spontaneously combustible. In small quantities, these should be stored in a dedicated fire resisting cabinet, used for Class 4.2 chemical only (see SDS Section 14). **Do not store them with flammable liquids.** **Pyrophoric liquids and solids** A pyrophoric liquid or solid is a substance which, even in small quantities, is liable to ignite within 5 minutes of coming into contact with air. Pyrophoric 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. **Self-heating substances and mixtures** Oxidative self-heating substances may react with the air and so raise the temperature to the point at which spontaneous combustion
	 **Class 4.2** **Self-heating substances and mixtures**	 H251 Self-heating: may catch fire. H252 Self-heating in large quantities; may catch fire.			

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					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.
Class 4 – Flammable solids 4.3 Dangerous when wet	 **Class 4.3 Dangerous when wet**	 H260 In contact with water releases flammable gases which may ignite spontaneously. H261 In contact with water releases flammable gases.	**Fire resisting cabinet**	  Dangerous when wet Danger: Explosive atmosphere	**Dangerous when wet.** In small quantities these should be stored in a dedicated fire resisting cabinet, used for Class 4.3 chemicals (see SDS Section 14). **Do not store them with flammable liquids.** Solid substances that emit a flammable gas when wet or react violently 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. Fire involving or in the vicinity of such materials should not be tackled with water.
Class 5 – Oxidising substances		 **Oxidiser**	**Corrosive cabinet**	 Oxidiser	**Oxidiser** These should be stored in a dedicated corrosive cabinet, used for Class 5.1 chemicals (see SDS Section 14). Do not store them in a wooden cupboard. Some oxidisers

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	Class 5.1 Oxidising Substance	H271 May cause fire or explosion: strong oxidiser. H272 May intensify fire; oxidiser.			are incompatible from each other and need to be stored apart, check the SDS (Section 10). 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 (*their symbols look similar*), reducing agents or near combustible materials (e.g. wood, paper/ cardboard).
Class 5 – Oxidising substances **5.2** – Organic peroxides	 **Class 5.2 Organic peroxides**	 H242 Heating may cause a fire.	**Fire resisting cabinet**		**Organic peroxides** These should be stored in a dedicated fire resisting cabinet, used for Class 5.2 chemicals (see SDS Section 14). Minimise the quantity stored and contact your H&S Lead. Some organic peroxides require temperature control. The manufacturer should provide information about the shelf-life and instructions on verifying desensitization, where applicable. 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:

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					• liable to explosive decomposition. • burn rapidly and intensely even in the absence of oxygen. • sensitive to impact or friction. • react dangerously with other substances. • decompose at comparatively low temperatures and/or cause spontaneous ignition if spilt onto combustible material. Organic peroxides must be stored separately from flammable, corrosive, and toxic materials.
Class 6 – Toxic substances	 **Class 6.1 Toxic substances**	 **H340 May cause genetic defects. H341 Suspected of causing genetic defects.**	**Metal cabinet**		**Mutagens, carcinogens, toxic for reproduction and asthmagens.** These chemicals must be stored in a **locked** cabinet with access restricted to authorised, trained users. Where fumes or odours can be evolved, they must be stored in cabinets with adequate **extraction ventilation**. The quantities stored must be kept to a minimum.

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		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 if inhaled.**			Where, due to space constraints, CMRs and asthmagens are stored in a toxic cabinet a CMR and asthmagen sign must also be displayed.
Class 6 – Toxic substances	 **Class 6.1** **Toxic substances**	 **H300 Fatal if swallowed.** **H310 Fatal in contact with skin.**	**Metal cabinet** **Ventilated cabinet**		**Toxic substances/ Serious health hazard** These are substances which if inhaled, ingested or absorbed through the skin may cause serious adverse health effects. In the event of fire, there may be a failure of many containers due to the effects of flame and heat, as well as posing an immediate threat to anybody in the vicinity, e.g.

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		H330 Fatal if inhaled. H301 Toxic if swallowed. H311 Toxic in contact with skin. H331 Toxic if inhaled.  H370 Causes damage to organs. H371 May cause damage to organs. H372 Causes damage to organs through prolonged or repeated exposure. H373 May cause damage to organs through prolonged or repeated exposure.		 Toxic, halogenated	firefighters. The toxic substance can also be spread large distances in the plume of smoke, or it may be washed into watercourses by firefighting operations. **Non-flammable, halogenated solvents** Do not store with flammable liquids or other organic liquids as violent reactions may occur with some solvents. Halogenated and non-halogenate waste is also kept apart.

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		H304 May be fatal if swallowed and enters airways. H305 May be harmful if swallowed and enters airways.			
Class 8 – Corrosive substances	 Class 8 Corrosive material	 **Corrosive** H290 May be corrosive to metals. H314 Causes severe skin burns and eye damage. H318 Causes serious eye damage.	**Corrosive cabinet, lockable with a bund**	 Corrosive (inorganic acid)  Corrosive (organic acid)	**Corrosive substances** 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., incompatible chemicals, unsuitable packaging, metals (including shelving that is not corrosion resistant). Corrosive cabinets must be bunded. Corrosive liquids must not be stored above shoulder height.

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					**Corrosive (inorganic acids) and Corrosive (organic acids), have a pH less than 7.** 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. *Nitric acid* is corrosive, toxic, and an oxidiser, it must be stored in a secondary container if it is stored with other inorganic acids. Hydrofluoric acid (HF) is corrosive and toxic, it must be stored in a dedicated, locked corrosive cabinet, with access restricted to users who are trained in the safe handling of HF. HF must never be stored in metal or glass containers. Hexafluorine/ calcium gluconate gel must be readily available in all areas where HF is stored or used.
					**Corrosive (base/alkali) have a pH greater than 7.** Separate storage cabinets are required to separate alkalis/bases from acids, since any accidental mixing of the concentrated materials may generate large quantities of heat and fumes.

***Class 4 materials.** This class contain materials with a variety of hazards and physical properties. Some are low melting point solids, or solids which are kept under a protective layer of inert liquid or gas. In Class 4 – there are 3 main class divisions, see below (4.1, 4.2 and 4.3), each division is stored apart. You should obtain advice on each substance from the supplier. There may be special requirements for safe storage e.g. temperature limitations, sensitivity to impact, friction, impurities, or water. Some require wetting, to ensure that they do not dry out. Some have a short expiry date (from receipt and/or opening), these chemicals must be safely disposed of before they expire; this expiry date must be written onto the bottle. Care must be taken to ensure that they are not accidentally stored with flammable liquids.