Safe Method of Use for HSNO 3.1A – Flammable Liquids

A. Classification (A = Very High Hazard)

HSNO 3.1A Flammable Liquids are those liquids with a flashpoint of less than 23 degrees Celsius and an Initial Boiling Point of less than or equal to 35 degrees Celsius. Halogenated organic compounds generally have much higher flashpoints than unsubstituted compounds and do not pose the same level fire safety hazard although these compounds are likely to be toxic. The following safety rules apply to all Class 3.1A flammable liquids but you MUST consult Safety Data Sheets (SDS) for details specific to the substance in use.

B. Incompatibilities

- HSNO Class 3.1A Flammable Liquids ***shall not*** be stored with any HSNO Class 1, Class 2, Class 3.2, Class 4 or Class 5 substances
- HSNO Class 3.1 Flammable Liquids ***shall not*** be stored or used near any sources of ignition.

C. Storage

- HSNO Class 3.1A Flammable Liquids ***shall*** be stored in a flammable cabinet meeting AS1940 with sufficient secondary storage to retain at least 50% of the contents of the cabinet.
- No more than 20 litres of Class 3.1A flammable liquids ***shall*** be stored in any laboratory.
- Bulk solvents MUST always be stored in the solvent store (TTR007)
- Quantities of UN Class 3.1A Flammable liquids in the laboratory outside a flame-proof cabinet ***should*** be kept to a minimum
- Refrigerators used to store open containers of Class 3.1A flammable substances that have a flash point less than 15 ^{O}C ***shall*** be spark proofed (i.e. thermostats have been externally mounted and light fittings removed). The refrigerator ***shall*** be labelled as suitable for use with these substances.
- Containers of ready to use reagents containing 3.1A flammable solvents stored on benches or shelves ***should not*** exceed 1 litre in total. Anything in excess of this 1 litre limit ***should*** be stored in a flammable cabinet.

D. Storage - Limits on Storage Time

- Containers of flammable liquids ***shall*** be checked annually to ensure they are not leaking; the lids are vapour-tight and in good condition and labels are intact and legible.
- Opened bottles of ethers ***should not*** be stored for longer than 18 months, especially if they are not stabilised and the presence of peroxides has not been tested.

E. Storage of Ethers with Higher Flashpoints - Special Precautions

- Ethers that have been exposed to the atmosphere for any length of time almost invariably contain peroxides. Peroxides are hazardous because they are unstable and decompose violently at elevated temperatures.

F. Use of Class 3.1A Flammable Liquids

- The opening and decanting of HSNO Class 3.1A solvents ***shall*** be restricted to fume hoods or to areas where flammable vapours ***shall not*** accumulate and ventilation ***shall*** ensure that the concentration of flammable vapour does not exceed 10% of the lower explosive limit at any actual or potential ignition source.

- When pouring, decanting, or pumping any flammable liquid from one metal container to another, precautions to prevent the build-up of static should be taken.

  Note: Static can be generated by swirling, splashing, high flow rates, venturi effects, turbulence, cavitation or mircofiltration. Minimising these effects ***shall*** *reduce the static generated.*

  Due care ***should*** *be exercised when subjecting high purity flammable liquids (with low conductivities and a flash point of less than 10 degrees C above ambient temperature) to any process that generates static electricity. [Suggested values are 10 pico Siemens per metre for low flow rates. The potential for a fire or explosion is higher where there is a flammable atmosphere.]*

- Before pouring, decanting pumping or micro-filtering from a metal container into another metal container the containers **shall** be efficiently bonded together and connected to a common earth. The resistance between earth and any container ***shall not*** exceed 10 ohms

- The refilling or "topping up" of containers that contain, or have contained, flammable liquids, with a flash point less than 10 degrees C above ambient temperature ***shall***:

  i) be carried out in a fume cupboard; or

  ii) at the location of use flammable vapours ***shall not*** accumulate and local ventilation ***shall*** ensure that the concentration of flammable vapour does not exceed 10% of the LEL at any actual or potential ignition source.

- Minimal quantities of solvent ***should*** be kept in the laboratory at any one time.

- Ensure that these solvents are always returned to a flammable cabinet after use.

- Sources of ignition should be kept well away from the area in which these solvents are being used.

- Ethers ***should*** NEVER be distilled to dryness.

- Where opening and pouring operations cannot be carried out in a fume cupboard and the laboratory is well ventilated, the duration that any container of Class 3.1A flammable liquid is opened ***shall not*** exceed 10 mins and the volume ***should not*** exceed:

i) 1500 ml decanted volume of any flammable liquid with a flashpoint less than or equal to 10 degrees C above ambient temperature; or

ii) 5000 ml decanted volume of any flammable liquid with a flashpoint greater than 10 degrees C above ambient temperature.

- For any Class 3.1A flammable liquid being used, or being held in small containers in the laboratory and is available for use, the following information ***shall*** be provided:

i) the identity of the substance; and

ii) the concentration, if applicable and

iii) for *approved* hazardous substances a label stating "Highly flammable liquid" or a UN class 3 label. For *all unapproved* hazardous substances, a brief warning of the hazardous properties must be provided, if such information is available. This information can be provided by use of a United Nations (UN) or Globally Harmonized System (GHS) pictogram or written warning. This warning must be available to the person using the substance within 10 seconds, be durable and readily understood.

iv) Date and name of user/owner

G. Personal Protective Equipment (PPE) for Handling HSNO 3.1A Flammable Liquids

- The primary barrier ***shall*** be the use of a tested and certified fume hood to extract solvent vapours away from laboratory worker thus reducing the chance of fire and explosion and reducing the possibility of exposure to toxic solvents.

- Safety glasses ***shall*** be worn when handling these compounds.

- Care ***should*** be taken to ensure gloves of appropriate material are used when handling organic solvents - always consult MSDS for correct type of gloves.

H. Toxicity of UN Class 3 Flammable Goods

The high vapour pressure of commonly used solvents means that the most likely pathway of absorption is inhalation, but dermal absorption can also occur. Excessive exposure may increase risk of chronic long term health problems such as sensitisation, dermatitis and cancer. Compounds dissolved in these solvents shall often be absorbed by the skin much more freely, penetrating the body's first line of defence. Consult MSDS sheets for details specific to the compound in use.

I. Disposal

- HSNO Class 3.1A flammable liquids ***shall only*** be disposed of via the chemical waste room (TTR007). Refer to information on the SBS resources page for information on appropriate containers and labelling for waste solvents. If in doubt, contact your lab manager for specific instructions.

- Keep chlorinated/halogenated solvents separate from non-chlorinated/halogenated solvents to facilitate distillation and recycling.

J. Spills

- **Minor spills** – ***shall*** be cleaned up immediately using the spill kits present in the laboratory

- Extinguish all sources of ignition
- Use correct gloves
- Use absorbent material in spill kits to wipe up solvent – wiping from outside of spill toward centre
- Place used absorbent material in impermeable/airtight container made of material suitable to contain the hazardous waste.
- Inform Laboratory Manager and arrange for immediate disposal.
- If a staff member fill out an incident/accident report. If a student, ask your supervisor or lab manager to fill out the online incident/accident report on your behalf.

- **Major spills** –

- Extinguish all sources of ignition and clear area immediately.
- If required provide first-aid to any affected individuals.
- Close all doors to laboratory and prevent re-entry until 'all-clear' is given
- Call fire brigade and campus care immediately.
- Inform Laboratory Manager and/or arrange for MSDS to be made available to emergency services.
- Prepare to evacuate building

K. Emergency Contacts

In an emergency

- Call Campus Security on 8888 (0800 842 8888) or (04) 463 9999 giving location and substance details
- For emergency services call: 111