



Laboratory Best Practice

Module 2



Health & Safety
Essentials

Registered charity number 207890

General chemical hazards

- Carry out a risk assessment before working with hazardous substances. For substances that are hazardous to health, carry out a 'Control of Substances Hazardous to Health (COSHH)¹ Assessment.
- Be fully aware of the hazards of the materials that you are handling, and how they should be stored, used and handled. Special requirements for this will be noted on the suppliers' Safety Data Sheet (SDS); ensure that you have the current version.

Highly hazardous or toxic chemicals

- Complete work in a controlled environment such as a fume cupboard when handling dangerous or hazardous substances⁴ (completing a reaction or distillation).
- Many compounds are unstable and can decompose rapidly. Examples are **inorganic** and **organic azides, chlorates and perchlorates**. Avoid grinding and drying operations with unstable compounds as they could detonate and cause an explosion.
- **Pyrophoric materials** (e.g. Grignard Reagents, lithium alkyls, metal hydrides) spontaneously combust on contact with air: take extreme care when handling these materials.
- **Alkali Metals** (e.g. **lithium, sodium, potassium**) react violently with water. Take care with their storage requirements. For any handling operation, ensure that the bench and all equipment needed is completely dry.
- Avoid adding water to a **concentrated acid**. Adding acid to water is an inherently safer process. Strong acids and alkalis will cause severe burns on the skin and eyes.
- Avoid using carcinogens; where possible substitute with a less hazardous material (this is a requirement of the COSHH regulations. The COSHH1 assessment for carcinogens must be carried out with special attention to detail to ensure that exposure is prevented or controlled to achieve a level as low as is reasonably practicable.

Handling

- Keep the maximum size of bench containers less than 500ml. This reduces the risk of spillage and consequence from an incident. It is also helpful to use a spill tray where possible to prevent the spread of the material.
- Keep all containers closed, and ensure that raw materials, products and any by-products or intermediates are properly handled, labeled, stored and disposed of correctly, as appropriate.
- Procedures should be in place for the safe dispensing and transport of materials using suitable carriers and containers.

Waste materials

- Follow local procedures for the disposal of your waste materials, so the correct disposal route can be used.
- **Aqueous Waste** in relatively *small* quantities will probably be covered by a trade effluent consent and can be poured down a drain. However, make sure that it is acceptable to use this disposal route for the waste (and that it will not cause any problems in the sewer system). In some cases, further treatment will be needed on the waste before it can be disposed of in the drain. Always check that it is acceptable to pour wastes down a drain. It is good practice to treat dilute heavy metal waste by precipitating the heavy metal cation out of solution and disposing of the resulting solid waste once dried.
- Store and collect **organic materials such as** flammable solvent wastes in separate, labeled containers according to type. Do not pour water immiscible materials down drains, and store chlorinated and non-chlorinated wastes separately. There may be incompatibilities with some substances; ensure that the materials you are disposing of are compatible if they are to be mixed together for disposal. For example, some materials are prone to polymerization and can lead to runaway reactions, which can cause fires and explosions.
- Do not dispose of mercury or cadmium compounds down the drain.
- Store **glass waste** safely in a robust container that is labeled specifically for glass waste, ready for ease of recycling.
- Dispose of **sharps** such as waste scalpel blades, syringes and needles in rigid containers designed for the purpose. Sharps must be disposed of by a licensed contractor.

