Health and Safety Services

UNIVERSITY OF GREENWICH

Using a Dynamic COSHH Risk Assessment Form

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1. Overview

To enable the University to demonstrate compliance with the Control of Substances Hazardous to Health Regulations 2002 (COSHH), the dynamic COSHH risk assessment form is to be used when you already have separate (simple) COSHH assessments for each of the substances used in the reaction. This form focuses on REACTION-SPECIFIC hazards by referencing existing COSHH assessments, avoiding duplication and concentrating on what happens when chemicals react together.

2. Definitions

"COSHH" - Control of Substances Hazardous to Health Regulations 2002
"HaSLO" – Health and Safety Local Officer
"RA" – Risk assessment
"SDS" – Safety data sheet. This should be provided by the relevant manufacturer or supplier. A copy must be obtained for all hazardous materials we use / hold.

3. Roles and Responsibilities

3.1. Managers / Principle Investigators / Supervisors

Are responsible for approving risk assessments, including COSHH risk assessments, for activities that take place within their area of control.

3.2. Health and Safety Team

Health and safety manager(s), HaSLO(s) and / or University Biological and Scientific Safety Advisor may be asked to provide technical guidance / comment upon whether the content of the risk assessment would be considered suitable and sufficient. They do not approve risk assessments.

3.3. All staff / students

Are responsible for checking that a COSHH risk assessment is in place before starting any activity that involves the use of COSHH items. They must also familiarise themselves with the content of any relevant COSHH (and general) RA's, including what control measures must be applied.

3.4. Researchers / Supervisors

Are responsible for ensuring COSHH RAs are in place for all hazardous substances used within their labs / areas of control, before those substances are used.

4. Guidance

A dynamic COSHH RA must be in place (and signed) before the work begins. It must be completed:

- Before EVERY new reaction
- Before EVERY different procedure
- When anything changes (scale, chemicals, conditions)

Rember to check the relevant SDS and COSHH RA's each time, as these do get updated – Don't underestimate familiar reactions. Doing something routinely / frequently does not automatically make it safe.

4.1. Procedure Type

Please tick ONE box in this section:

REPEAT: Select this if you have done this EXACT reaction before and have a previous assessment – add reference to where it is (date, file name / number, etc)

NEW: Select this is this is the first time you are doing this reaction

PUBLISHED / SoP: Select this if you are following a procedure from a journal, textbook or standard operating procedure – add the reference (e.g "Org. Synth. 2020, Vol 97, p.45" or "SoP-CHEM-012")

4.2. COSHH / DSEAR Compliance

Who is at risk - Tick as all that apply. Remember to consider occasional visitors to the lab, including maintenance staff and cleaners, as well as those who will routinely be present during the reaction / process. This affects what controls are needed.

Review by date - When to reassess. Usually 12 months. But may be sooner for novel/high-risk work, or immediately, if procedure changes.

Additional Requirements – Select all that apply

- **Exposure monitoring** - Tick if you need to measure airborne concentrations (substances with Workplace Exposure Limits from HSE EH40).
- **Health Surveillance -** Tick if workers require medical monitoring (e.g., carcinogens, respiratory sensitisers, as per SDS Section 8).
- **Ignition sources controlled** - For flammables, confirm hot surfaces have been removed, no flames, electrical equipment is safe and static discharges are controlled.
- **Incompatible materials** - What must be kept separate (flammables from oxidisers, acids from bases, etc.).

4.3. Chemicals Used

List all hazardous substances that are being used during the reaction / process. For each substance, list the:

- **Name of the chemical / substance**, as it appears on the relevant safety data sheet
- **Amount** – enter the total volume or weight of substance used during the reaction / process
- **Main hazards** – Enter the hazards as listed on the SDS / related simple COSHH RA (e.g. Highly flammable, toxic, corrosive, sensitiser, carcinogen, etc)
- **COSHH Ref** – Enter the reference number(s) for any related simple COSHH RA's
- **Routes of Exposure** – please tick all routes via which the substance can enter the body, as indicated on the SDS / simple RA (Inh = Inhalation, Skin = skin contact, Eye = Eye contact, Ing = Ingestion)

4.4. Reaction Hazards

Within this section, consider what happens when the substances react with each other. Tick all that apply on the list:

- **Exothermic** – tick if the reaction gives off heat, can boil solvents or can cause runaway
- **Gas evolution** – tick if the reaction releases gas(es), can cause pressure or flooding
- **Violent / Rapid** – tick if the reaction happens fast, can splash or overflow
- **Pyrophoric** – tick if the reaction / components can catch fire in air
- **High temp / Cryogenic** – tick if the reaction generates extreme temperatures.

4.5. Control Measures

Use this section to describe how the activity will be made as safe as possible.

Tick all controls that apply on the list:

- **Fume hood** (ESSENTIAL for volatile/toxic chemicals)
- **Safety screen** (protects from splashes/breakage)
- **Small scale** (<10g keeps consequences small)
- **Temperature control** (e.g using a thermometer or cooling bath)
- **Slow addition** (prevents exotherms getting out of control)
- **Inert atmosphere** (for air/moisture sensitive reactions)
- **PPE: Safety glasses, lab coat, correct gloves** (check the SDS and / or manufacturers information; Specify the minimum standard)
- **Emergency quench ready** (know how to stop the reaction)

In addition to the above, please provide:

- **Brief description** - 2-3 sentences that describe what you are doing and the main safety concerns e.g.:
  "*Grignard reaction using magnesium and bromobenzene in ether. Exothermic with hydrogen gas evolution. Main concerns: flammable ether vapours and reactive Grignard reagent. Will use small scale, ice bath, and dropwise addition.*"
- **Quench method** - Describe how you will safely stop / destroy any reactive materials e.g. *"Quench Grignard with sat. NH_4Cl - SLOWLY, generates heat and gas"*
- **Emergency response –** Tick the boxes to confirm that all those involved know the location of any emergency equipment

4.6. Waste

Different waste types must not be mixed. Please select the waste stream that will apply once this reaction / process is complete:

- **Chlorinated –** solvents that contain chlorine e.g. dichloromethane, chloroform
- **Non-chlorinated –** other organic solvents e.g. acetone, ether, ethanol
- **Aqueous –** for water-based waste products
- **Heavy metal –** for materials that contain chromium, mercury, lead, etc

Waste containers must be clearly labelled to confirm which waste stream applies (See also Code of Practice for Hazardous Waste Disposal)

4.7. Risk assessment

Use the risk matrix to calculate the overall risk, based on the severity of any potential injury / harm and the likelihood that harm will occur.

Step 1 – Assess Severity (1 – 5)

Assign a score that represents the worst possible outcome with your controls in place:

5 – Catastrophic	Irreversible multiple injury or multiple deaths. Examples: explosion, major fire, releaser of highly toxic substance (HCN, phosgene)
4 - Major	Irreversible injury or death. Examples: severe chemical burns, significant inhalation injury, major fracture, death of one person
3 - Serious	Major reversible injury. Examples: Injuries requiring hospital treatment, moderate burns, eye irritation requiring treatment, temporary breathing difficulty
2 - Moderate	Minor reversible injury, needing first aid. Examples: minor cuts, brief skin irritation, momentary discomfort
1 - Minor	Insignificant injury. Examples: very minor irritation, no treatment needed

Step 2 – Assess Likelihood (1-5)

Assign a score that reflects how likely it is that the worst outcome will happen, with your controls in place

1 - Rare	Very unlikely during this work (<5% chance). Multiple control failures needed
2 - Unlikely	Could happen but not expected (5-20% chance)
3 - Possible	Might occur during the work (21-50% chance)
4 - Likely	Probably will happen at some point (51-90% chance)
5 - Almost Certain	Will almost definitely occur (>90% chance)

Step 3 – Calculate the residual risk score (1 – 25)

Residual risk = Likelihood x severity

E.g Likelihood 3 x Severity 2 = Residual risk score 6

Use this to determine the risk rating and justification

Residual Risk Score	Risk Rating	Action required
1 - 4	Low (Green)	Continue to monitor. Usually no further controls / action needed
5 – 12	Medium (Amber)	Review and reduce, where reasonably practicable. Scores below 9 are considered tolerable
15 - 25	**High (Red)**	Immediate action is required. Activity must be prohibited or severely restricted until controls are improved

Example: Working with a corrosive acid in a fume hood with PPE.

Severity = 3 (Serious - could cause burns needing treatment).

Likelihood = 2 (Unlikely – as multiple controls in place).

Risk Score = 3 × 2 = 6 = MEDIUM.

Justification = Eyewash is available, small quantities are used by an experienced operator, and a fume hood controls vapours.

4.8. Approval

This section must be completed by **both** the **researcher / person completing** the RA (to indicate you understand the controls and will follow the controls mentioned) and the **supervisor / line manager** (to confirm you are satisfied the assessment is adequate and you give 'management' approval for the work to proceed).

4.9. Related University documents:

- Code of Practice for Hazardous Waste Disposal
- Simple COSHH Risk Assessment form
- University arrangements for Control of Substances Hazardous to Health (COSHH)

5. Document History

Details of previous reviews are as follows:

Review Date	Reviewer	Summary of Review
02-Feb-26	Vikki Wood AD H&S Services	First revision

This document will be reviewed at least annually, hereafter.