**Reaction Risk Assessment Form Reaction Number:**

Below give a scheme for any reaction being carried out and write the full procedure including work-up, purification methods and full method for any analysis of qualitative tests to be carried out (*e.g.* chromatography, TLC, NMR, IR or test tube reactions). You must also give details of the procedure for any preparation of solutions you will need to carry out for the experiment (e.g. acid/base or TLC stain solutions, cold baths). Use the form below to assess the risks associated with **ALL** the reaction and process conditions (*e.g.* heating, cooling, vacuum), particular hazards (*e.g.* exotherm, gas evolution, flooding, asphyxiation, burns—hot or cold, explosion, needle stick injuries), quench procedures and waste disposal as well as the chemicals to be used, including your expected product, solvents and known by-products.

**Reaction details**

| Complete the following table for all reagents, solvents and materials used in the experiment (e.g. including drying agents, chromatography stationary phase etc.). | | | | | | **Chemical hazards and routes of exposure** | | | | | | | | | | |
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| Route of exposure: 1, Inhalation; 2, Skin/eye contact; 3, Swallowing | Carcinogen, teratogen, mutagen | Very toxic/toxic | Harmful/irritant | Explosive | Pyrophoric | Highly flammable/flammable | Oxidising | Corrosive | Lachrymator | Other (specify): |
| **Compound** | **FW** | **d (g/mL)** | **Quantity (g or ml)** | **mmols** | **Molar Equiv** |  | **1,2,3 for these columns** | | | **Use X for these columns** | | | | | |  |
| Cyclohexane | 84.16 | 0.779 |  |  |  |  |  | X | 2 |  |  | X |  |  |  |  |
| Dichloromethane | 84.93 | 1.325 |  |  |  |  |  |  | 1 3 |  |  |  |  |  |  |  |
| Dmso(r) | 78.13 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ethylene glycol | 62.07 | 1.113 |  |  |  |  |  |  | 3 |  |  |  |  |  |  |  |
| Methanol(r) | 32.04 | 0.79 |  |  |  |  |  | 1 2 3 |  |  |  | X |  |  |  |  |
| Ethanol(r) |  |  |  |  |  |  |  |  | 2 |  |  | X |  |  |  |  |
| 1-octanol | 130.23 | 0.8283 |  |  |  |  |  |  | X 2 |  |  |  |  |  |  |  |
| Toluene | 92.14 | 0.865 |  |  |  |  |  |  | X 2 |  |  | X |  |  |  |  |

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| **Repeat Experiment?** (This lab project only) **Previous assessment Reaction Number:** | | | | | | | | | | | | | | | | | | | | | | |
| **New Experiment:** Supervision Category (please tick one) | | | | | | | | | | **A** ✓ | | | | | **B** | | | **C** | | | | **D** |
| **Standard protocol followed?** (Please give a reference here if you are following/closely adapting a known literature method) | | | | | | | | | | | | | | | | | | | | | | |
| **Reaction conditions/processes and associated hazards**  Complete the table below with all reaction conditions (e.g. heating, cooling, vacuum) and associated physical hazards (e.g. exotherm, gas evolution, flooding, asphyxiation, burns—hot or cold, explosion, needle stick injuries). | | | | | | | | | | | | | | | | | | | | | | |
| **Reaction condition or process** | | | | | | | | **Physical hazards associated** | | | | | | | | | | | | | | |
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| **Control Measures**  (Please tick boxes) | | Safety glasses ✓ | | | | Lab coat ✓ | | | | | | | Fume hood | | | | | | Safety Screen | | | |
| Gloves (type): Nitrile ✓ Marigolds Red gloves Other | | | | | | | | | | | | | | | | | | | | |
| Scrubbing train (type): | | | | | | | | | | | | Other: | | | | | | | | |
| **Emergency procedures**  Are there any specific emergency procedures (e.g. first aid, decontamination or firefighting measures) necessary for this process? Add in emergency PXXX hazards from the SDSs used here.  **Cyclohexane**  P210 Keep away from heat, hot surfaces, sparks, open flames and  other ignition sources. No smoking.  P233 Keep container tightly closed.  P273 Avoid release to the environment.  P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.  P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated  clothing. Rinse skin with water.  P331 Do NOT induce vomiting.  **Dichloromethane**  P202 Do not handle until all safety precautions have been read and  understood.  P261 Avoid breathing mist or vapors.  P264 Wash skin thoroughly after handling.  P302 + P352 IF ON SKIN: Wash with plenty of water.  P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes.  Remove contact lenses, if present and easy to do. Continue  rinsing.  P308 + P313 IF exposed or concerned: Get medical advice/ attention.  **Dimethyl Sulfoxide**  **Ethanol**  P210 Keep away from heat, hot surfaces, sparks, open flames and  other ignition sources. No smoking.  P233 Keep container tightly closed.  P240 Ground and bond container and receiving equipment.  P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.  P242 Use non-sparking tools.  P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes.  Remove contact lenses, if present and easy to do. Continue  rinsing.  **Ethylene Glycol**  P260 Do not breathe mist or vapors.  P264 Wash skin thoroughly after handling.  P270 Do not eat, drink or smoke when using this product.  P301 + P312 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel  unwell.  P314 Get medical advice/ attention if you feel unwell.  P501 Dispose of contents/ container to an approved waste disposal  plant  **Methanol**  P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.  P304 + P340 + P311 IF INHALED: Remove person to fresh air and keep comfortable  for breathing. Call a POISON CENTER/ doctor.  **Octanol**  P264 Wash skin thoroughly after handling.  P273 Avoid release to the environment.  P280 Wear eye protection/ face protection.  P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes.  Remove contact lenses, if present and easy to do. Continue  rinsing.  P337 + P313 If eye irritation persists: Get medical advice/ attention.  P501 Dispose of contents/ container to an approved waste disposal  plant.  **Toluene**  P202 Do not handle until all safety precautions have been read and  understood.  P210 Keep away from heat, hot surfaces, sparks, open flames and  other ignition sources. No smoking.  P273 Avoid release to the environment.  P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.  P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated  clothing. Rinse skin with water.  P331 Do NOT induce vomiting | | | | | | | | | | | | | | | | | | | | | | |
| **Reaction and/or reagent quench**  (Give quench reagent and procedure and any possible hazards): | | | | | | | | | | | | | | | | | | | | | | |
| **Waste disposal**  Complete the table below to outline how all waste chemicals from this experiment will be disposed of (including reaction products). If special precautions are required (e.g. quenching before disposal) please describe details under ‘other’. | | | | | | | | | | | | | | | | | | | | | | |
| **List All reagents, products, and quench materials** | Chlorinated waste | | | Non-chlorinated waste | | | Silica waste | | | | | Aqueous  Metal waste | | | | Clinical waste | | | | Other/details | | |
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| **Overall risk rating** (select one rating) | **Risk Assessment Matrix** | | | | | | | | | | | | | | | | | | | | | |
| **SEVERITY** | | Fatality | | Medium | | | | High | | | | | | | | High | | | | Unacceptable | |
| RIDDOR | | Medium | | | | Medium | | | | | | | | High | | | | High | |
| Moderate injury | | Low | | | | Low | | | | | | | | Medium | | | | Medium | |
| Minor injury | | Insignificant | | | | Low | | | | | | | | Low | | | | Low | |
|  | | | | Unlikely | | | | Possible | | | | | | | | Probable | | | | Certain | |
| **LIKELIHOOD** | | | | | | | | | | | | | | | | | |
| **Justification for rating** (describe reasoning for risk rating) |  | | | | | | | | | | | | | | | | | | | | | |
| **Members of group:**  All members of the group must read and understand this risk assessment (including any comments from the lab supervisor/demonstrator given below) then sign to confirm you have done this before starting work in the lab. **You must not make any changes to the procedure stated without prior agreement with the supervisor which should be indicated in the comments box below**.  Signature:………………………………Name:………..……………………  Signature:………………………………Name:………..……………………  Signature:………………………………Name:………..……………………  Signature:………………………………Name:………..……………………  **Date:** | | | | | | | | | | | **Designated supervisor signature:**  **Date:** | | | | | | | | | | | |
| **Comments from lab supervisor** | | | | | | | | | | | | | | | | | | | | | | |
| If you receive comments, then please address them when writing your new risk assessment.  Mostly likely you will need a new risk assessment each week/every 10 hours of lab time.  Staff will not countersign a risk assessment that is covered with additions and amendments as this is not easy to refer to in an emergency. This will result in a yellow card as it being an unsafe lab practice. | | | | | | | | | | | | | | | | | | | | | | |