Imperial College London

ACTIVITY RISK ASSESSMENT

DEPARTMENT OF CHEMICAL ENGINEERING

Date	25/09/2016	**REFERENCE NUMBER (Set by DSO):**	

PLEASE NOTE: You will need the Risk Evaluation Matrix available on the Chemical Engineering Forms and Guidance page in order to complete Sections 8 to 11.

1. PERSON CARRYING OUT ASSESSMENT eg Supervisor, technician, academic, safety officer, PG student, UG student etc			
Name	Yanshen Zhu	**Position**	UG student
RAFT passed? *(Delete as appropriate)*	**No**	**Email**	Yan.zhu14@imperial.ac.uk

2. PERSON(S) CARRYING OUT THE WORK eg technician, academic, PG student, UG student etc			
Name	**Email**	**Position**	**Supervisor**
N/A	N/A	UG students	Dr. Umang Shah

3. ASSET UTILIZATION	
Asset(s) Used	**Attached Forms**
• Agilent HPLC 1100 series • Agilent ProStar and PrepStar System	Asset Registration Forms

4. DESCRIPTION OF ACTIVITY / TITLE OF EXPERIMENT -include storage, transport and disposal if relevant

Module: 2nd year knowledge laboratory
Sub-module: From analytical to preparative liquid chromatography
Brief description: Students conduct experiments with analytical and preparative chromatography systems.

5. LOCATION		
Campus	**Building**	**Room**
South Kensington	ACEX	102

6. HAZARD – indicate all that apply and give further details See guidance: http://www3.imperial.ac.uk/safety/subjects

The following have specific risk assessment requirements and have either a College and/or a department approval process
[ie Line manager/Academic Supervisor, Safety officer, Department Laser Safety Officer, Area Supervisor]
Put an x in all appropriate boxes and fill in the appropriate fields

Radioactivity or X-Rays **Isotope or source:**		**Check** with Department Radiation Protection Supervisor (DRPS) that this work is already approved and attend training. **If NOT already approved**, you or your supervisor will need to conduct a **RADIATION** risk assessment which will need approval (via your DRPS). See guidance, complete the form you find on this link: http://www3.imperial.ac.uk/safety/formsandchecklists/raforms1 and attach it with the current form. **Do not** begin work until you have received approval from the College Radiation Protection Team. ☐ **I have attended the relevant training (local and College)** ☐ **This work is approved and I attach the existing risk assessment**
Lasers		**Check** with Department Laser Safety Officer (DLSO) that this work is already approved and

Class of laser:		attend training.
		If NOT already approved, you or your supervisor will need to conduct a **LASER** risk assessment which will need approval from the DLSO. See guidance, complete the form available on the Chemical Engineering Forms and Guidance page and attach it with the current form. **Do not** begin work until you have received approval from the DLSO.
		I have attended the relevant training (local and College)
		This work is approved and I attach the existing risk assessment
Biological *(i.e.,soil, human/animal tissues, plants)*		**Check** with Department Biological Safety Officer that this work is already approved and attend training.
Type of material:		**If NOT already approved**, you or your supervisor will need to conduct a **BIOLOGICAL** risk assessment and you may need immunisation. **See guidance and use the form you find on this link, instead of the one you are currently completing:** http://www3.imperial.ac.uk/safety/formsandchecklists/raforms1
		I have attended the relevant training (local and College)
		This work is approved and I attach the existing risk assessment
Hazardous Substances		**Material/Chemical name(s) where known**
Chemicals & Solvents	x	Methanol, acetonitrile, water, hydrochloric acid, trifluoroacetic acid (TFA), sodium phosphate 0.1M buffer, DL-phenylalanine, DL-histidine, DL-tyrosine, DL-tryptophan, DL-glutamic acid, DL-lysine, aspartame
Dusts		**If NOT already approved**, you or your supervisor will need to conduct a **COSHH/DSEAR** risk assessment which will need approval from the DSO. See guidance, complete the form available on the Chemical Engineering Forms and Guidance page for all your chemicals and attach it with the current form. **Do not** begin work until you have received approval from the DLSO
Nanoparticles		
Fumes		
Flammable/ Explosive Subst		
Other *(specify below)*		
	x	**I have attended the relevant training (local and College)**
	x	**This work is approved and I attach the existing risk assessment**
Gases or Cryogenic substances		**Substance name(s)**
		If NOT already approved, you or your supervisor will need to conduct a **GAS / Cryogenics** risk assessment which will need approval from the DLSO. See guidance, complete form you find on this link: http://www3.imperial.ac.uk/safety/formsandchecklists/raforms1 before completing this form. **Do not** begin work until you have received approval from the DLSO and appropriate training.
		I have attended the relevant training (local and College)
		This work is approved and I attach the existing risk assessment
Machinery / mechanical		**Equipment name / type:**
		You will need to conduct a **MACHINERY** risk assessment and will require training in its use http://www3.imperial.ac.uk/safety/formsandchecklists/raforms1
		I have conducted / there is an existing risk assessment attached
Manual handling or Heavy lifting		**Will the work involve slings/hoists?**
		You will need to conduct a **MANUAL HANDLING or LOLER** risk assessment and may require training. See http://www3.imperial.ac.uk/OCCHEALTH/formsandchecklists and obtain advice/approval from the Department Safety Officer.
		I have conducted / there is an existing risk assessment attached
Work will be conducted		**Will the work be done in the field or hosted institution?**

away from the department	You may also need to conduct an **OFFSITE** risk assessment – See the link below: http://www3.imperial.ac.uk/safety/formsandchecklists/raforms1 Please obtain guidance/approval from the Department Safety Officer.

The following hazards have general risk assessment and local approval requirements ***(Put an x in all appropriate boxes and describe)***

[i.e. approval by Line manager/Academic Supervisor, Safety officer, Area Supervisor required]

Vacuum systems			Structural Failure		
Pressurised equipment	x	Liquid pressure inside the chromatography column can go up to 300 bar.	Trip hazards		
Electrical	x	All the chromatography machines have electrical parts that are completely shielded from human and liquids.	Working at height		
Extreme temperatures			Falling objects	x	The buffer bottles (normally 2.5 L Winchester bottles) are placed at the top of the chromatography machines.
Fire / radiant heat source			Work in confined spaces		
UV/IR/EMR	x	UV detectors are part of the chromatography machines. The detectors are completely shielded from humans.	Asbestos		
Noise			Heavy lifting		
Water			Hand tools		
Other ***(give details):***					

7. How does harm occur and who or what might be affected? ***(Put an x in all appropriate boxes and describe)***

[Eg staff could suffer severe burns due to contact with heat source, students could suffer eye damage from exposure to laser beam, equipment could be damaged by flooding/explosion/misuse etc]

Equipment could be damaged by flooding	**Tick all which apply:**	
Staff/students could slip if fluids are spilt	Staff / students	x
Staff / students could suffer burns due to contact with hot surfaces	Support staff	
Staff / students could suffer solvent fume inhalation	Cleaners, engineers	
Staff/students risk electrocution if electrical equipment is faulty	Equipment	x
Staff/students could get chemicals (methanol) onto the skin and into eyes or be ingested	Building	
Students/staff could suffer severe burns due to contact with heating fluid	Environment	
Students/staff could inhale or ingest methanol/sulphuric acid, or be contacted by it via skin or eyes		
Students/staff/equipment could be harmed by explosion of methanol vapour in air		

8. What would be the SEVERITY of the worst injury or harm if no controls in place? ***(Put an x in the appropriate box)***

Use the severity table in the Risk Evaluation Matrix

x	Minor (score 1)		Serious (Score 2)		Major (Score 3)		Fatality (Score 4)

9. How FREQUENTLY is the process being carried out? ***(Put an x in the appropriate box)***

	Several times a day	X	Daily		Once a week		Once a month		Every 6 months		Annually

Other *(give details)*:	*during the allotted undergraduate lab sessions

10. What is the <u>PROBABILITY</u> of injury or harm occurring? *(Put an x in the appropriate box)* *Use the probability table in the Risk Evaluation Matrix and consider any risk increasing factors (including frequency)*							
x	Very unlikely (score 1)		Unlikely (Score 2)		Possible (Score 3)		Likely (Score 4)

11. Overall Risk Assessment on the standard operating procedure			
Brief description of the procedure *[Include setting up if relevant]*	**What could go wrong?** *[Include the hazards identified above].*	**What controls are in place?** *[Are they effective and sufficient or are more required? Give details of how they are monitored / tested.]*	**Is risk <u>very high, high, medium or low</u>?** *Multiply severity by probability (See matrix)*
Prepare the amino acid sample with methanol, water and drops of hydrochloric acid.	Methanol and hydrochloric acid can be spilled, splashed and inhaled by the students.	Only handle methanol and hydrochloric acid in the fume cupboard. PPE must be worn at all times.	Medium
Preparation of buffer which contains 0.1 vol% trifluoroacetic acid	Trifluoroacetic acid can be spilled, splashed and inhaled by the users.	Buffer should be prepared by the graduate teaching assistant, who are more experienced with handling dangerous materials.	Low
Refill buffer bottles when empty or replace buffer bottles for running new methods.	Bottles can fall from the top of machines and hit someone's head.	Always use a ladder to change buffer bottles.	Low
Running experiments with the software	Buffer can run out, causing the column to dry up.	Always update the liquid volume inside the buffer bottles when switching or refilling buffer bottles.	Medium
	Air bubbles can get into the column if initial flushing is not done properly.	Always flush the lines with the buffer before pumping the buffers to the column.	Medium
	Liquid waste can flood the area if the waste line is not connected to the waste tank properly or the waste tank is full.	Always check that the waste line is connected to the waste tank properly and the waste tank has sufficient space before starting experiments.	Low
Please use the next section to describe any other things that could go wrong - which are not necessarily directly connected with the activity (Fail Modes), any controls in place, and the associated risk. IMPORTANT – if risk is high or medium and further controls are required, add these to the list of further precautions in Section 12			

12. Are any of the risks High or Medium?	**If NO,** please put an x in the box		and move onto the next section
If YES, please describe extra controls you have identified	Who has been asked to do this?	By what date?	
Using of methanol should be carried out in a fume cupboard and proper PPE must be worn.	Students who are preparing sample.	When preparing sample using methanol.	
Updating the liquid volume in each buffer bottle.	Updated by students and checked by graduate teaching assistant.	At the beginning of each day.	
Flushing buffer lines thoroughly before pumping buffer	Done by students and checked by	After switching buffer bottles	

into column.	graduate teaching assistant.	or topping up existing buffer bottles.

13. RESIDUAL RISKS - Once your additional control measures are in place, what are the overall residual risk levels? *(Delete as appropriate)*		
The overall residual risk to **persons** is : **Low**	The overall residual risk to **equipment / area** is : **Low**	The overall residual risk to the **environment** is : **Low**
If high or medium, give details:	If high or medium, give details:	If high or medium, give details:

14. EMERGENCY ACTIONS - if control measures fail or there is an unforeseen incident

For Campus emergency contact numbers, see http://www3.imperial.ac.uk/facilitiesmanagement/security/contacts/emergencycontacts

1) Stop the pumps with the software.
2) Shut down the entire machine.
3) Inform the laboratory supervisor.

15. MONITOR AND REVIEW ***(Put an x in all appropriate boxes)***

Controls should be monitored:	**x**	daily		weekly		monthly		6 monthly		Annually
Other ***(give details)*****:**	*during the allotted undergraduate lab sessions									
I will **REVIEW** this risk assessment at least:		every 6 months	**x**	every 12 months						
or immediately in the event of process / location change or incident or accident										

16. IS "LONE WORKING" outside department hours intended? ***(Delete as appropriate)*** **NO**

If yes, lone working is intended you must:

- Obtain appropriate permission from your HoD or line manager
- Introduce further controls to reduce the risk to one acceptable by your HoD/line manager - ie a buddy system, CCTV, web cam
- Once installed, check the further controls are effective

You must not:

- Start work until written approval has been given by the HOD or line manager
- Work outside the agreed limits of the work
- Work outside the agreed time scale.

Even if lone working is *not* intended you must:

Obtain approval for this assessment from your line manager and register it with your Department Safety Officer

17. ACCESS CONTROLS – further considerations ***(Delete as appropriate)***	
a. Is access to the area where the work is conducted controlled by physical means (eg a code lock or swipe)?	**YES**
b. Is it possible for persons to gain immediate entry to the area in the event of a building (flood/fire) or health emergency?	**YES**
c. Would a power failure cause the lock to fail to safe so that persons could still exit or enter?	**YES**
If the answer to b or c is NO, then you may need further emergency procedures or remedial actions	
d. Does the area contain hazardous or sensitive items?	**YES**
If yes, the Lab/Workshop/Area manager should issue a laboratory Permit to work to Facilities Management personnel if they need to conduct repairs or maintenance. The door should be labelled with a College Access Control label (Red, Amber or Yellow) If labelled with a Red or Amber, the area must be licensed by and emergency access procedures sent to the Safety Department	

18. APPROVALS SECTION

SUPERVISOR / LINE MANAGER SIGN-OFF

I have read this risk assessment and agree that once all controls and emergency procedures are in place and operating correctly, the overall residual risk to:

Personnel from this activity is	LOW	☐	MEDIUM	☐	HIGH	☐
Equipment from this activity is	LOW	☐	MEDIUM	☐	HIGH	☐
Environment from this activity is	LOW	☐	MEDIUM	☐	HIGH	☐

Lone working is intended and I am satisfied that extra controls outlined in (16) to reduce this risk to LOW are in place ☐

Lone Work is permitted between the following dates: _____ until _____

Lone working is forbidden ☐

I have taken due consideration of foreseeable risks, and so far as reasonably practical have put appropriate controls in place. ☐

I have received appropriate training for this asset/procedure. ☐

Need to provide training record

Line Manager's signature: _____

Print name: **Date:**

HOD SIGN-OFF FOR HIGH RISK LONE WORK

I understand that the risk from this work is:

- HIGH and lone working outside normal hours is intended ☐
- I am satisfied that extra controls outlined in (16) to reduce this risk to LOW are in place ☐

HoD's signature: _____

Print name: _____ **Date:** _____

Finally:

• Please register a copy of this completed risk assessment with the **Department Safety Officer** (ce-safety-team@imperial.ac.uk) so they can add it to the Department Risk Register.

• Please ensure you have a **TRAINING RECORD** / authorised users list in the vicinity of this asset. A template is available on the Departmental Safety Forms pages.

• Please send your training records for any existing and new people to the departmental Safety Team. So that they can update the departmental Safety Database.

• You will need to keep a copy of the risk assessment with you during your experiments (in the lab)

• If you make any changes to the process or location which will increase the risk, you will need to review the risk assessment. Check with your supervisor or line manager.

Imperial College London

RISK ASSESSMENT FOR AN ACTIVITY INVOLVING THE USE OF HAZARDOUS CHEMICALS

as required under

the CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH REGULATIONS (COSHH)

and the

DANGEROUS SUBSTANCES AND EXPLOSIVE ATMOSPHERES REGULATIONS (DSEAR)

This form aids in assessing the hazards associated with the use of chemicals and the subsequent application of suitable controls. Guidance on completion of the form can be found in **Guidance Note 052: Risk Assessments for Hazardous Chemicals**
See: http://www3.imperial.ac.uk/safety/subjects/chemicalsafety
The sections below correspond approximately to the sections in the Guidance Note.

- The form does not address the risks associated with biological agents or ionising radiation – other Safety Department forms exist for this purpose.
- With respect to DSEAR, this form may be used to assess risks arising from small scale laboratory operations where hazard zoning is not usually applicable and the controls required largely mirror those of COSHH.
- This form is not suitable for assessing flammability and explosion risks arising from large scale operations (including pilot scale) where hazard zoning is necessary – this will require a more detailed assessment.

It is the responsibility of the person directing the research i.e. the Principal Investigator to ensure that risk assessments are carried out, remain valid and that the control measures identified are applied.

1. PERSON RESPONSIBLE FOR THIS WORK (THE PRINCIPAL INVESTIGATOR)			
Name:	Dr. Umang Shah	**Position:**	Senior Teaching Fellow & Teaching Lab Manager
Dept/Division:	Chemical Engineering	**Faculty:**	Engineering

2. PERSON CONDUCTING THIS ASSESSMENT			
Name	Yanshen Zhu	**Position:**	Undergraduate
Dept/Division	Chemical Engineering	**Date**	24/09/2016

3. THE ACTIVITY or PROCEDURE	
Title:	2nd year Knowledge Lab – From analytical to preparative liquid chromatography
Description (describe the procedure in detail or attach a Standard Operating Procedure):	
Students learn how to use analytical and preparative liquid chromatography over three weeks. [SOP attached]	

4. HAZARDS AND RISKS

4.1. HAZARD EVALUATION & RISK DETERMINATION

List each of the chemical substances used in the activity or procedure in the table below and use the matrix supplied in the guidance notes to determine the risk level for each one.

Multiply A x B x C to estimate the overall risk level: ≤ 8 Low; 9-12 Medium; ≥ 13 High

* If a chemical has more than one risk phrase, use the one(s) with the highest health hazard score - See Safety Data Sheet

**Workplace Exposure Limit (if one has been assigned - see safety data sheet) – usually in ppm for vapours or mg/m^3 for particulates.

*** When stating quantity, this should consider the quantity in the stock bottle as well as the quantity of the aliquots, since loss of containment from the entire stock bottle whilst removing aliquots may represent the greatest risk.

Substance	Route of Exposure *Put an x in all appropriate boxes*					Risk Phrase(s)* *Please list the number AND the risk phrase*	WEL**	A	B	C	A x B x C	
	Inhalation	Ingestion	Skin Contact	Penetration	Eye Splash			Health Hazard Score	Dustiness / Volatility Score	Overall Quantity Score***	Risk Level	
											Score	L/M/H
Methanol	x	x	x		X	- R 11 Highly flammable - R 23/24/25 Toxic by inhalation, in contact with skin and if swallowed - R39/23/24/25 Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.	200ppm TWA; 260mg/m3 TWA; 250ppm STEL; 325mg/m3 STEL;	3	2	3	18	H
Hydrochloric Acid	x	x	x		x	R34 Causes burns. R37 Irritating to respiratory system	5 ppm TWA; 8 mg/m3 TWA; 10 ppm STEL; 15 mg/m3 STEL;	2	1	1	2	L
Acetonitrile	x	x	x		x	R11 Highly flammable. R20/21/22 Harmful by inhalation, in contact with skin and if swallowed. R36 Irritating to eyes.	40 ppm TWA; 70 mg/m3 TWA; 60 ppm STEL; 102 mg/m3 STEL	2	2	3	12	M
Trifluoroacetic Acid		x	x		X	R20 Harmful by inhalation. R35 Causes severe burns. R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.	N/A	2	2	1	4	L
Sodium Phosphate 0.1M (pH = 7.0) Buffer		x	x		X	Not listed	N/A	1	2	2	4	L
DL-phenylalanine		x	x		x	Not listed	N/A	1	2	1	2	L
DL-histidine		x	x		x	Not listed	N/A	1	2	1	2	L
DL-tyrosine		x	x		x	R36/37/38 Irritating to eyes, respiratory system and skin.	N/A	2	2	1	4	L

DL-tryptophan		x	x		x	Not listed	N/A	1	2	1	2	L
DL-glutamic acid		X	X		x	Not listed	N/A	1	2	1	2	L
DL-lysine		x	x		X	H319 Causes serious eye irritation	N/A	1	2	1	2	L
Aspartame		x	x		x	Not listed	N/A	1	2	1	2	L

4.2. PROCESS FACTORS INFLUENCING THE RISK OF EXPOSURE

Are there any process factors that influence the route of exposure? (See Section 5.2.10) *(Put an x in all appropriate boxes)*:

x	Weighing	x	Pipetting		Filtering		Elevated Temperature
	Shaking / Mixing		Centrifugation		Use of Sharps		High Pressure

4.3. IDENTIFICATION OF THOSE AT RISK OF EXPOSURE

a) Are there any substances listed in this activity having the risk phrases R61, 63 or 64 i.e. those affecting women of child-bearing age? *(Delete as appropriate)*

NO **If 'Yes',** this risk assessment once completed, must be submitted to Occupational Health for review before work is carried out. *It is essential that OH are provided with details of quantities and information on how the substances are to be used to enable them to advise.*

b) Are there any substances listed in this activity having the risk phrases R42, 43, 45, 46, 47, 48, 49 AND have been determined to be in the high risk category using the matrix above? *(Delete as appropriate)*

NO **If 'Yes',** this risk assessment once completed, must be submitted to Occupational Health for review before work is carried out. *It is essential that OH are provided with details of quantities and information on how the substances are to be used to enable them to advise.*

c) Are there any external factors that increase the risks associated with exposure to any of these substances e.g. contact lens wearing? *(Delete as appropriate)*

NO **If 'Yes'**, give details:

d) Are there any personnel other than laboratory workers who may be at risk from exposure? (e.g. maintenance workers, cleaners etc.) *(Delete as appropriate)*

NO **If 'Yes'**, give details

4.4. SUBSTANCES SUBJECT TO OTHER LEGISLATION

a) Are there any substances involved in this activity that are subject to either the Chemical Weapons Act or the Anti-terrorism, Crime and Security Act? *(Delete as appropriate)*

NO **If 'Yes'**, give details:

b) Are there any substances involved in this activity that are listed by the Home Office as drugs precursors? *(Delete as appropriate)*

NO **If 'Yes'**, give details:

c) Are there any substances involved in this activity that are defined as controlled drugs? *(Delete as appropriate)*

NO **If 'Yes'**, give details:

d) Are there any substances involved in this activity that are explosive, flammable or oxidising? (See Q2.2.2e) *(Delete as appropriate)*

YES **If 'Yes'**, give details: Methanol and acetonitrile are flammable and should be kept in chemical cupboard.

4.5. OTHER HAZARDS

Are there any other hazards involved with this activity? (e.g. pathogens, GMO's, ionising radiation etc.) If 'Yes' have these risks been assessed and any necessary approvals obtained? *(Delete as appropriate)*

NO **If 'Yes'**, give details and / or reference numbers of related documentation below

5. CONTROL MEASURES

5.1. PREVENTION OF EXPOSURE: Elimination, substitution and procedural change

a). Can any of the substances be eliminated from the process? *(Delete as appropriate)*

NO **Give details:**

b). Can any of the substances be substituted by a safer alternative or a safer form of the same substance? *(Delete as appropriate)*

NO **Give details:**

c). Can the method of work be changed so that the operation giving risk to exposure is no longer necessary? ***(Delete as appropriate)***

NO **Give details:**

d). Are measures in place to exclude non-essential personnel from the area? ***(Delete as appropriate)***

YES **Give details:** Access to the lab is controlled by swipe card and lab supervisors are present during normal working hours.

5.2. CONTROL OF EXPOSURE

5.2.1. Minimising quantities

Can the quantities of the substances stored, used and produced as waste be reduced? ***(Delete as appropriate)***

NO **If 'Yes'**, give details:

5.2.2. Containment and ventilation

a). Can some or all parts of the process be carried out on the open bench with good general ventilation? ***(Delete as appropriate)***

If additional containment such as drip trays are required, give details.

YES **If 'Yes'**, give details: The mixing of amino acids and aspartame in solvents can be done on open bench as long as the sample container is capped properly to prevent spillage.
Weighing amino acids and aspartame can be done on open bench.

b). Is a fume cupboard or other form of local exhaust ventilation required for any part of the process? ***(Delete as appropriate)***

NO **If 'Yes'**, give details:

c). Is the fume cupboard or other form of local exhaust ventilation subject to a maintenance regime? ***(Delete as appropriate)***

NO **If 'Yes'**, give date of last test and state who is responsible for organising maintenance below

d). Does any part of the process need to be totally enclosed e.g. inside a glove box? ***(Delete as appropriate)***

NO **If 'Yes'**, give details:

e). Do measures need to be taken to control sources of ignition? ***(Delete as appropriate)***

YES **If 'Yes'**, give details: Methanol and acetonitrile are flammable and hence the samples that contain these solvents should be kept away from direct heat source or ignition sources.

f). Is a chemical spill kit required? ***(Delete as appropriate)***

NO **If 'Yes'**, give details:

5.2.3. Storage and transportation

a). Storage: If relevant, outline the storage arrangements:

Toxic	Store sealed in a ventilated cabinet
Corrosive	Store in the separate acids cupboard
Flammable / Highly Flammable / Extremely Flammable	In a ventilated cabinet
Other	N/A

b). Transportation on site. Will any of these substances need to be transported to other parts of the building or other parts of the site? ***(Delete as appropriate)***

NO **If 'Yes'**, give details of how containment will be assured below

c). Transportation off site: Will any of these substances need to be transported to other sites? ***(Delete as appropriate)***

NO **If 'Yes'**, give : **Name of other site:**
Substance and quantity:
Method of transport proposed:

Containment precautions:

5.2.4. Personal protective equipment (PPE) ***(Put an x in all appropriate boxes and specify)***

x	**Gloves**	**Type:**	Nitrile as required
x	**Eye/face protection**	**Type:**	Safety glasses at all times
x	**Clothing**	**Type:**	Lab coats at all times
	Respiratory protection	**Type:**	

State which parts of the process PPE is required for (e.g. experimental process or in emergencies only):

During general experimentation eye protection and clothing are required, whilst oven gloves are required for taking sample readings

5.2.5. Waste disposal

Outline the disposal route for each substance or derivative ***(Put an x in all appropriate boxes and specify)***

Substance	Drain	Specialist waste contractor	Other (specify)
Methanol		x	
Hydrochloric Acid		x	
Acetonitrile		x	
Trifluoroacetic Acid		x	
Sodium Phosphate 0.1M (pH = 7.0) Buffer		x	
DL-phenylalanine		x	
DL-histidine		x	
DL-tyrosine		x	
DL-tryptophan		x	
DL-glutamic acid		x	
DL-lysine		x	
Aspartame		x	

5.2.6. Hygiene measures

Describe the hygiene measures in place for work involving these substances e.g. handwash facilities, laundering of protective clothing, storage of personal clothing, prohibition of eating and drinking etc.

No eating or drinking in the lab, safety specs and lab coats are compulsory, hand and eye wash facilities are available, personal items are stored in lockers outside the lab.

5.2.7. Monitoring

Is monitoring necessary to validate the efficacy of control measures for any of these substances? ***(Delete as appropriate)***

NO **Give details:**

5.2.8. Information, instruction and training / supervision

Describe the information, instruction, training and supervision requirements for those working with these substances (include details of record keeping)

All undergraduate students are provided with an SOP and are shown how to handle the chemicals prior to beginning the experiment.

Students are required to consider the hazards associated with the experimental procedure and a lab demonstrator will evaluate their competency before they begin any experimental work.

5.2.9. Lone working

Is lone working permitted for this activity?

NO **If 'Yes'**, detail any specific conditions if relevant below

5.2.10. Additional controls

Are there any additional controls required in relation to the process factors identified in Section 4.2 that are not covered anywhere else?

Process factor	Identified route of exposure	Description of how exposure is controlled
Weighing		
Pipetting		
Filtering		
Elevated temperature		
Shaking / Mixing		
Centrifugation		
Use of Sharps		
High Pressure		
Other		

5.3. EMERGENCY PROCEDURES

Note: Do not cut and paste information on emergency procedures and first aid from the MSDS – it must reflect procedures that are available within the local area (laboratory, building or campus concerned) and be proportional to the extent of exposure anticipated.

5.3.1. Spillage or release

Describe the procedures in place for a spillage / release:

a) Within the laboratory but outside any primary containment facility such as a fume cupboard:

Use personal protective equipment. Avoid dust formation. Ensure adequate ventilation. Evacuate personnel to safe areas as required. Avoid breathing dust. Contain spillage, then collect with absorbent material/shovel and place in container for disposal.

b) Within a fume cupboard (if relevant):

N/A

c) Outside the laboratory e.g. en route to another part of the building / site:

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas as required. Avoid breathing dust. Contain spillage, then collect with absorbent material/shovel and place in container for disposal.

5.3.2. First aid

Describe the procedures in place for accidental exposure to any of these substances.

If inhaled

If breathed in, move person into fresh air. If not breathing give artificial respiration – consult a physician as required.

In case of skin contact

Wash off with soap and plenty of water. Take victim immediately to hospital – consult a physician as required.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes – consult a physician as required.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water – consult a physician as required.

Finally:

Please register a copy of this completed COSHH form with the **Department Safety Officer** (ce-safety-team@imperial.ac.uk) so they can add it to the Department Risk Register.