Safety in the Materials Department
People you should know

- DEPARTMENTAL SAFETY OFFICER: Andrew WATT
- AREA SAFETY OFFICER: Linda CURSON
- RADIATION PROTECTION /LASERS: Chris GROVENOR
- FACILITIES MANAGER: Les CHORLEY
- ELECTRICAL SAFETY TESTING: Ashley BROWN
- GLASS /WASTE DISPOSAL: Mimi NGUYEN
- ADMINISTRATOR: Charlotte SWEENEY
Some laboratory hazards

- CHEMICALS
- ELECTRICITY
- HIGHLY-FLAMMABLE SUBSTANCES
- IONISING RADIATION
- LASERS
- MACHINERY
- PRESSURE SYSTEMS
- SHARPS
- EXPLOSIVES
- PATHOGENS
- ALLERGENS (Occupational health matter)

The University has a policy about all these hazards see http://www.admin.ox.ac.uk/safety/
Your obligations

- Read the safety notes.
- Together with your supervisor, complete a risk assessment form. You must also be familiar with any relevant area and task specific risk assessments.
- Complete COSHH assessment before any use of hazardous substances.
- Attend radiation protection lecture(s) if you will be using X-ray sets or radioactive substances.
- Familiarise yourself with procedures in the event of a fire.
Risk assessment

- **Personal** risk assessment - obligatory for everyone.
- **Area** risk assessment - for the lab in which you work.
- **Task specific risk assessment** for hazardous procedures.
- **All** above risk assessments must be approved by the Departmental Safety Officer (Dr A Watt)
Personal risk assessment

- BEFORE YOU START WORK YOU SHOULD SIT DOWN WITH YOUR SUPERVISOR AND COMPLETE A RISK ASSESSMENT FORM.

- THE IDEA IS THAT YOU DISCUSS WITH YOUR SUPERVISOR ANY RISKS INVOLVED IN YOUR WORK, AND THE WORKING PRACTICES NECESSARY TO MINIMISE THOSE RISKS. IT MAY BE NECESSARY TO ARRANGE TRAINING.

- YOUR SIGNATURE ON THE FORM IMPLIES THAT YOU HAVE DISCUSSED AND UNDERSTOOD THE SAFETY ASPECTS OF YOUR WORK.
## Health and Safety Personal Registration and Risk Assessment Form

**Name (block capitals):**

---

**Date issued:**

---

This form must be completed by all new arrivals (employees, visitors, graduate students etc) in consultation with their supervisor, and returned within two weeks. The objective is to ensure proper assessment, guidance and training is provided for work undertaken and that new arrivals are made aware of Department procedures and rules. Forms should be reviewed annually but a new one may be submitted at any time to reflect changes in work type or risk category. Please read the footnotes for guidance on the risk categories involved. If you need further risk assessments / training you MUST contact the person(s) specified in the Departmental Statement of Safety Organisation as referred to in the table below. This must be done within two weeks of completing the form.

Please return form to Dr Andrew Watt, Departmental Safety Officer, at Begbroke.

---

### Will your work involve:

|          | Yes | No | If “Yes”, give details and refer to the relevant appendix in the Statement of Safety Organisation | Risk category | Relevant appendix in S. of S.O.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Radioactive isotopes</td>
<td></td>
<td></td>
<td></td>
<td>A &amp; J</td>
<td></td>
</tr>
<tr>
<td>X-ray machines</td>
<td></td>
<td></td>
<td></td>
<td>A &amp; J</td>
<td></td>
</tr>
<tr>
<td>Lasers</td>
<td></td>
<td></td>
<td></td>
<td>A &amp; J</td>
<td></td>
</tr>
<tr>
<td>Biological hazards</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Hazardous gases, chemicals or dust</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Workshop machinery</td>
<td></td>
<td></td>
<td></td>
<td>C &amp; H</td>
<td></td>
</tr>
<tr>
<td>Display screen equipment (more than 1hr/day)</td>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td></td>
</tr>
<tr>
<td>Manual handling / lifting heavy loads</td>
<td></td>
<td></td>
<td></td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>Electrical Work</td>
<td></td>
<td></td>
<td></td>
<td>A &amp; G</td>
<td></td>
</tr>
<tr>
<td>Liquid gases</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Gas cylinders</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Work out of the Department</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other significant risk (specify)</td>
<td></td>
<td></td>
<td>If yes, you MUST contact Dr Andrew Watt for further advice.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

### Risk Categories

1. **A.** Where work may not be undertaken without senior supervision;
2. **B.** Where work may not be started without advice from the Academic Supervisor. Advice should include the method of work and the safeguards to be used;
3. **C.** Where the risks are such that extra care must be observed, but where it is considered that the worker is adequately trained and competent in the procedures.

---

**Declaration of Worker:** Where NO has been given as an answer, it is in the belief that the work I shall be doing will expose me to no significant hazards, the consequence of which could be avoided by taking the preventative or protective measures that have been offered to me. I make this declaration, having read the Departmental Statement of Safety Organisation, and I recognise that, in the case of uncertainty, my supervisor or the Departmental Safety Officer is available to offer advice. If YES has been given as an answer, I recognize that is my responsibility, where appropriate, to contact the person listed in the Statement of Safety Organisation or the Departmental Safety Officer, in cases of uncertainty, in order to organize the required risk assessments and training. This must be done within two weeks of completing the form.

**Name (print):**

---

**Room:**

---

**Status (e.g. visitor/post grad student/member of staff):**

---

**Signed:**

---

**Date:**

---

**Declaration of Academic Supervisor:** Having specialist knowledge in the field of work to be carried out by the applicant, I believe that he/she has properly declared the circumstances under which his/her work will be undertaken. I furthermore have indicated the category risk involved, and have named the person(s) who will immediately supervise work of Risk Category A. I will ensure the applicant completes all further risk assessments and/or training before the work commences.

I have also discussed procedures for the following in accordance with the Department’s Statement of Safety Organisation:

- [ ] Fire
- [ ] Entrance to hazardous areas
- [ ] Out of Hours Work
- [ ] Security/Lone Working
- [ ] Accident Reporting
- [ ] Waste Disposal
- [ ] Manual Handling
- [ ] Safety Training Courses
- [ ] Sources of Safety Information
- [ ] Use of Private Electrical Equipment
- [ ] Risk Assessment

(tick to indicate discussion has taken place).

**Name (print):**

---

**Date:**

---

**Signed:**

---

**Departmental Administrative record**

- **DSO Approval:**

**Signed:**

---

**Date:**

---

Date form received for central filing:
**Area risk assessment form**

<table>
<thead>
<tr>
<th>Assessment of:</th>
<th>Thallium Laboratory, Yarnton</th>
<th>Review Date: July 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessor Name:</td>
<td>Linda Curson</td>
<td>Signature:</td>
</tr>
<tr>
<td>Authorised by:</td>
<td>Dr. C.R.M. Grovenor</td>
<td>Date: 26/07/99</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazards</th>
<th>Who Might Be Harmed?</th>
<th>What Control Measures Are In Place?</th>
<th>What Further Action Is Required?</th>
</tr>
</thead>
<tbody>
<tr>
<td>General - covering all the hazards listed below</td>
<td>Staff</td>
<td>- lab kept locked when unoccupied</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post docs</td>
<td>- lone working is only permitted for low risk activities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Part 11 Students</td>
<td>- students receive Departmental lab. safety training</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Graduate students</td>
<td>- hazardous maintenance performed by competent persons</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Visiting students &amp; academics</td>
<td>(contractors or Departmental specialists)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cleaners</td>
<td>- training given to all new users before starting work</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contractors</td>
<td>- appropriate level of supervision given to all users</td>
<td></td>
</tr>
<tr>
<td>electricity</td>
<td>all lab. users</td>
<td>- cleaners only empty bins and clean floor: not allowed to touch apparatus &amp; warned of hazards.</td>
<td></td>
</tr>
<tr>
<td>gas cylinders</td>
<td>all lab. users</td>
<td>- entry to area controlled</td>
<td></td>
</tr>
<tr>
<td>hot work (use of furnaces)</td>
<td>all lab. users</td>
<td>- hazardous activities reduced so far as reasonably practical; briefed on residual hazards</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- portable equipment subject to regular test and inspection</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- electrical safety trip on electrical circuits</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- cylinders chained to prevent falling</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- furnaces filled and emptied at low temperature</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- cut out switches on furnaces to prevent over-heating</td>
<td></td>
</tr>
<tr>
<td>Hazards</td>
<td>Who Might Be Harmed?</td>
<td>What Control Measures Are In Place?</td>
<td>What Further Action Is Required?</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------</td>
<td>------------------------------------</td>
<td>----------------------------------</td>
</tr>
</tbody>
</table>
| general hazardous substances | all lab. users | - protective equipment supplied & used as necessary  
- COSHH assessments completed as necessary  
- minimal quantities of chemicals stored and used in laboratory |  |
| thallium oxide | all lab users | - thallium oxide powder stored in a locked, signed cupboard when not in use  
- COSHH assessment completed for thallium work  
- handling of the thallium oxide completed at a dedicated laminar flow cupboard  
- Laminar flow cupboard has annual COSHH compliance check, fitted with Heppa filters  
- Sealed crucible of thallium oxide compounds placed in sealed metal insert in furnace  
- furnace fumes extracted through three water traps and finally vented to a fume cupboard  
- thallium residue removed by trained operative from furnace insert door approx. twice a year working in a fume cupboard with protective gloves/sleeve protectors/mask.  
- cutting of solid state samples using a dedicated thallium saw in the laminar flow cupboard.  
- thallium working area clearly demarcated with yellow/black tape and warning notices  
- only authorised persons permitted to enter thallium area  
- waste disposal in accordance with university policy | - eye irrigation facilities required in lab |

Risk controlled? Yes/No
Yes - assessment complete  
No - go to column 4

Risk controlled? Yes/No
Yes - assessment complete  
No, approach the ASO/DSO for further help
Task specific risk assessments for hazardous procedures and equipment

- Detailed operating procedures and safety protocols have been written for some particularly hazardous equipment (e.g. the processing equipment in High Bay at Begbroke, such as the DC caster and Osprey spray former).
- If you use such equipment you must become familiar with the safety protocols. Generally formal training will be required.
- Other particularly hazardous procedures may require more detailed assessments than filling out a standard risk assessment or COSHH form.
COSHH assessment

- **ALL** HAZARDOUS MATERIALS REQUIRE COSHH ASSESSMENT, BUT ONLY WHERE "NORMAL LABORATORY PRACTICE" IS INSUFFICIENT CONTROL IS A FORMAL WRITTEN ASSESSMENT NEEDED.

- **PRINCIPLES:**
  1. ASSESS THE RISK.
  2. SUBSTITUTE A LESS HAZARDOUS SUBSTANCE IF POSSIBLE.
  3. DEFINE THE CONTROL MEASURES.
     - Consider forms of control other than personal protective equipment. If PPE is used, it must be of the right specification.
     - Minimise quantities. Define storage and disposal arrangements.
     - Consider accident conditions, such as spills.
  4. MONITOR.
Department of Materials
University of Oxford

COSHH assessment form

University of Oxford COSHH Assessment Form

Read the notes on completion before attempting to fill in this form. If insufficient space is available under any section, use a separate piece of paper and attach it to the form.

<table>
<thead>
<tr>
<th>File ref:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Department:</th>
<th>Materials</th>
<th>Persons involved:</th>
<th>H. Ozgur Ozer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location of work:</td>
<td>Fume Cupboard ETB Building, 2nd Floor,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description of procedure:</td>
<td>Silicon samples are cleaned with cycles of oxide etch-regrowth using NH3:H2O2:H2O (1:1:3) and HF:H2O(1:10) solutions.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Substance used</th>
<th>Quantities used</th>
<th>Frequency of use</th>
<th>Hazards identified</th>
<th>Exposure route</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 % NH3 solution</td>
<td>25 ml</td>
<td>once in 2-3 weeks</td>
<td>corrosive</td>
<td></td>
</tr>
<tr>
<td>30 % H2O2 soln.</td>
<td>25 ml</td>
<td>once in 2-3 weeks</td>
<td>corrosive</td>
<td></td>
</tr>
<tr>
<td>40 % HF soln.</td>
<td>10 ml</td>
<td>once in 2-3 weeks</td>
<td>corrosive</td>
<td></td>
</tr>
</tbody>
</table>

Could a less hazardous substance (or form of the substance) be used instead?  
no

Justify not using it: This is a standard procedure to clean Silicon surfaces for SPM imaging.

What measures have you taken to control risk?

Engineering controls: Work will be carried out in a Fume Cupboard

PPE: Nitrile gloves, protective glasses and lab coat will be used.

Management measures: Fume cupboard checked regularly

Name and position of assessor:  
Dr. H. Ozgur Ozer, Academic visitor

Signature:

Name of supervisor (student work only):

Signature:
University of Oxford COSHH Assessment Form

Read the notes on completion before attempting to fill in this form.

If insufficient space is available under any section, use a separate piece of paper and attach it to the form.

Date: [ ]
Department: [Materials]
Persons involved: H. Ozgur Ozer

Location of work: Fume Cupboard
ETB Building, 2nd Floor,

Description of procedure:
Silicon samples are cleaned with cycles of oxide etch-regrowth using NH$_3$:H$_2$O$_2$:H$_2$O (1:1:3) and HF:H$_2$O (1:10) solutions.

<table>
<thead>
<tr>
<th>Substance used</th>
<th>Quantities used</th>
<th>Frequency of use</th>
<th>Hazards identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 % NH$_3$ solution</td>
<td>25 ml</td>
<td>once in 2-3 weeks</td>
<td>corrosive</td>
</tr>
<tr>
<td>30 % H$_2$O$_2$ soln.</td>
<td>25 ml</td>
<td>once in 2-3 weeks</td>
<td>corrosive</td>
</tr>
<tr>
<td>40 % HF soln.</td>
<td>10 ml</td>
<td></td>
<td>corrosive</td>
</tr>
</tbody>
</table>

Could a less hazardous substance (or form of the substance) be used instead? [ ]

Justify not using it: This is a standard procedure to clean Silicon surfaces for SPM imaging.

What measures have you taken to control risk?

Engineering controls: Work will be carried out in a Fume Cupboard

PPE: Nitrile gloves, protective glasses and lab coat will be used.

Management measures: Fume cupboard checked regularly

Checks on control measures:

Is health surveillance required? [ ]
Training requirements: The assessor has 8 years of experience on the described work.

Emergency procedures: In case of an HF problem: Rinse the area exposed to HF for a long enough time, and apply HF Antidote Gel as a first aid.

Waste disposal: Used chemicals are kept in appropriate bottles, which are then taken to the Dept. of Chemistry to be disposed properly.

Name and position of assessor:
Dr. H. Ozgur Ozer, Academic visitor

Name of supervisor (student work only):

Signature:

Signature:
Chemicals

- **LABELLING**
  - All chemicals should be clearly labelled.
  - Do not overwrite existing labels.
  - Use good quality labels, and protect them using sticky-backed plastic eg FABLON. Standard labels are available in stores.
  - Write your name and the date on the label.

- **STORAGE**
  - Do not mix acid and solvents in the same cupboard.
  - Use special chemical cupboard when possible.
**Disposal of waste, excess and unwanted chemicals**

- The current regulations do not permit the disposal of any chemicals via sinks (at the Parks Rd site – disposal of soluble chemicals via sinks is possible at Begbroke).

- **ALL** chemicals have to be disposed of through the University Safety Office and its licensed Contractor. (University Policy Statement UPS S5/11, available on the web)

- Full details of the Department’s waste disposal arrangements may be found in the local access section of the Department’s website, but are now described briefly.
DISPOSAL OF CLEAN BROKEN GLASS

- Cardboard boxes, for the disposal of CLEAN and non-recyclable glass waste, for example, broken pyrex beakers etc. are available from Stores. MUST BE CLEAN, remove/deface the labels.
- When the boxes are ready for disposal, they should be sealed (with tape), clearly marked as containing broken glass.
- They may then be dispose in recycling wheelie bin near the Holder Tower. They must not be put in ‘domestic waste’ bins.

• Clean recyclable glass - MUST BE CLEAN, remove/deface the labels, then dispose in recycling wheelie bin near the Holder Tower.
Electrical safety

- ALL PORTABLE ELECTRICAL EQUIPMENT MUST HAVE A CURRENT TEST CERTIFICATE.
- NON-STANDARD NEW EQUIPMENT MUST BE TESTED BY THE ELECTRICAL SAFETY-TESTING TECHNICIAN (ASHLEY BROWN) BEFORE BEING PUT INTO USE. ARRANGE FOR STANDARD EQUIPMENT TO BE TESTED AS SOON AS POSSIBLE AFTER PURCHASE.
- REPORT FAULTS TO THE ELECTRONIC WORKSHOP. DO NOT ATTEMPT TO MAKE REPAIRS YOURSELF.
- ALL HOME-BUILT EQUIPMENT MUST CONFORM TO CURRENT SAFETY STANDARDS. YOU MUST CONSULT an ELECTRONICS WORKSHOP AT THE DESIGN STAGE AND THE EQUIPMENT MUST BE TESTED BEFORE BEING PUT INTO USE. PROTOTYPE EQUIPMENT MUST BE SAFE AT ALL STAGES UNDER ALL CONDITIONS.
Unattended operation forms

DEPARTMENT OF MATERIALS
UNATTENDED OPERATION OF EQUIPMENT
AUTHORIZATION DOCUMENT

Description of equipment:

Location of equipment (building, room no.):

Special Notes (hazards and precautions):

Dates on which equipment is to be left running (start and final dates):

Start:

Final:

IN EMERGENCY CONTACT:

Name:
Address:
Telephone:

Name:
Address:
Telephone:

TO SWITCH OFF:

Electricity

Water

Gas (including cylinders)

Person responsible:

Authorised by Departmental Safety Officer:

Signed:                                                    Date:
Fire

IF A FIRE BREAKS OUT:
- THE MAIN CONSIDERATION IS TO GET EVERYONE OUT SAFELY.
- RAISE THE ALARM AND FOLLOW THE EVACUATION PROCEDURE.
- IF THERE IS TIME, CLOSE WINDOWS AND DOORS, AND SWITCH OFF ELECTRICAL APPLIANCES.
- GO TO THE ASSEMBLY POINT.

MEANS OF ESCAPE:
- FAMILIARISE YOURSELF WITH ESCAPE ROUTES.
- DO NOT WEDGE OPEN OR OBSTRUCT FIRE DOORS.
- DO NOT USE LIFTS.

RAISING THE ALARM:
- BREAK THE GLASS OF A FIRE ALARM CALL POINT - AT ALL EXITS.
- DIAL 999
Preventing fire

PREVENTION OF FIRE:

- GOOD HOUSEKEEPING.
- MINIMUM QUANTITIES OF FLAMMABLE LIQUIDS, PROPERLY STORED.
- AVOID OVERLOADING ELECTRICAL WIRING.
- KEEP EQUIPMENT CLEAN AND WELL VENTILATED.
A majority of accidents within the University arise from one of these two causes:

**MANUAL HANDLING**

An assessment is required before you attempt a manual handling operation (Les will advise).

**SHARPS**

Take care! Use a proper sharps container for disposal.
If an accident (or dangerous incident) occurs...

- If necessary, render first-aid or summon a first-aider.
- Call ambulance by dialling 999
- Afterwards, fill in an accident or incident report (available in Hume-Rothery and Christian Building receptions).
**First aid**

- All researchers who wish to work out-of-hours should take a basic first-aid course.
- Paula Topping is the first-aid co-ordinator.
- There are several other qualified first-aiders and their names and contact numbers are to be found at all first-aid stations.
Security

- Lock office doors whenever they are unoccupied. Most outside doors are permanently locked.

- Call University Security (899999 - 24 hours) if you see something suspicious. You can also contact the police by dialling 999 from any phone.

- Security will accompany workers to their mode of transport if requested (the number is posted at all telephones).
Begbroke Bus

- Do not take CHEMICALS or BULKY EQUIPMENT
- Order direct to Begbroke
- If there is something you need email notices@materials.ox.ac.uk
Questions.
Questions.
MatLab and LabView

- Met in 1\textsuperscript{st} year
- Refresher course plus extended.
- Problem Surgery
- Matlab Week 0 Mon & Tues
- LabView Week 4 Thurs & Fri