

# Soldering

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## Introduction

Soldering is used for making conductive connections in circuits and is used in engineering laboratories and workshops. It is used by academic and technical staff and by students.

If there is any doubt about soldering or the procedures to be followed please ask the appropriate person as indicated below.

- For academic and technical staff the appropriate line manager or head of department.
- For postgraduate research students the director of studies or member of the supervisory team responsible for the work.
- For undergraduate and taught postgraduate students the member of staff responsible for the class.
- For final year project students the project supervisor.

## Hazards

### Electrical Hazards

There is a hazard of electrocution if the mains supply cable to the soldering iron is damaged or becomes damaged accidentally during the soldering operation.

There is a hazard of electrocution if the soldering iron were to be used on a live circuit or component.

### Chemical Hazards

Ingestion of solder due to contact with the skin. There is a fume inhalation hazard even with rosin free solders that arises from the rosin free flux vapours given off during soldering.

### Burns

There are hazards of burns arising from; solder spurts, burning by the soldering iron, burning by hot wire or components burning by molten solder.

### Fire

The soldering iron is very hot and is therefore an ignition source.

## Risks

The people subject to risk are: staff and students working in the laboratory.

If uncontrolled the electrical and burn hazards are significant. Of these hazards, if uncontrolled, the risk of electrocution is high and the consequences severe. To minimise the risk, control measures and supervision are required.

If the procedure is followed the risk is assessed to be: Severity = Harmful, Likelihood = Highly Unlikely, giving an overall rating of a Tolerable Risk.

The correct use of control measures should be monitored by the academic staff and the technical staff as part of their responsibilities for teaching and laboratory preparation.

Students are also expected to be proactive in identifying any concerns or failures to follow correct procedures and report these to the academic and technical staff.

The overall control and supervision measures are:

- 1) Soldering must never be carried out on live circuits or components.
- 2) Soldering by students in classes must only be carried out in designated laboratories where the appropriate safety signage is posted.
- 3) Soldering must only be carried out by students working in class under supervision either by member of academic or technical staff. Procedures for soldering should be fully explained by staff responsible for laboratories where soldering takes place.
- 4) Academic, technical staff, postgraduate students and final year project students may need to carry out soldering in other areas of the School and are therefore exempt from the need to carry out work in designated areas. Good soldering practice and the control measures in the risk assessment should be followed. In the case of soldering by fourth year project students and by postgraduate research students, the project supervisor or director of studies should ensure that the students are aware of correct soldering technique and the risk assessment. Soldering irons must not be used wherever there is any possibility of flammable substances being ignited.
- 5) Technical and academic staff who may be present in the laboratories should draw to the attention of these students to any poor soldering practice if they observe it.
- 6) All persons carrying out soldering operations must wear safety glasses.
- 7) No member of staff academic or technical staff should carry out soldering or teach soldering if they are unaware of the risk assessment or if they are in doubt about the soldering procedures.
- 8) The soldering iron will be tested as part of the portable equipment testing procedures and should have a label on it to indicate that it has been recently tested. Care should be taken to check that the mains lead to it is not damaged prior to switching it on.
- 9) Earth leakage circuit breakers must be present between the mains supply and the soldering iron. These can either be built into the mains supply or as individual earth leakage circuit breakers on the supply to the soldering iron. If the soldering iron accidentally damages a supply cable to any other electrical equipment this should be switched off at the mains supply immediately and the damage reported to the technical staff so that the damage can be repaired.
- 10) Lead free rosin free solder is the only authorised type of solder no other solder must be used
- 11) If fume extraction is not available then soldering should only be carried out in the designated areas which are well ventilated
- 12) If a student has a medical condition that is likely to be made worse by soldering fumes the student should advise the member of staff responsible of the medical condition in confidence. Under these circumstances extraction must be used by the student and special arrangements to supervise the student should be made
- 13) After carrying out a soldering operation hands should be washed with soap and water to avoid ingestion. No food or drink must be consumed whilst carrying out a soldering operation.
- 14) In the event of injury occurring a first aider **MUST** be called. (Telephone Extension 2222), and the event reported in line with the School's procedures.

## **O**ccupational Health Screening

Occupational health screening can be arranged for staff both academic and technical and postgraduate research students if they are concerned about the effects of soldering and particularly if the programme of work they are involved in involves a long period of time soldering. This can be arranged by the appropriate line manager or Head of Department or supervisor.

It is not expected that the exposure of students to solder would be sufficient to require such screening but if a project supervisor were concerned about a student's exposure he or she should seek the advice of the Head of Department who could arrange this if necessary.