UCL

DEPARTMENT OF ELECTRONIC AND ELECTRICAL ENGINEERING

EQUIPMENT SOP

Ensure you have a copy of the latest Manufacturers Data Sheets for the device/s,

Completed SOP should be kept locally in Red Safety Folder and made available to all persons working in the area.

SOP Title Soldering SMD using a Reflow oven	**Version** 1
Creation Date 08/04/2026	**Produced by** Mr Andrew Moss
Review Date 08/04/2027	**Approved By** Mr Gerald McBrearty

Purpose

The purpose of this document is to outline the safe procedures using soldering reflow ovens in the process of manufacturing electronic SMD circuits.

Scope

The procedure provides general instructions on how to solder components in a laboratory environment in a safe manner, using tools such as a reflow oven, flux, solder paste, microscope, light duty hand tools and fume extraction.

It does not cover the use of other specialised soldering tools or equipment such as a soldering iron, Infra-red station, etc.

Health and Safety precautions

Students are to be given clear and specific instructions in the proper safe handling and use of soldering equipment.

Constant vigilance is required on the part of staff where soldering takes place.

Soldering reflow ovens operate using mains electrical power (240V), electric shock can occur if equipment is damaged or poorly maintained.

Soldering equipment operates at a high temperature (up to 400°C), burns can result on contact to the skin if used incorrectly.

Potential consequences of soldering include. Thermal burns to the skin. Cuts to fingers.

Inhalation of toxic fumes. Ingestion/Absorption of chemical compounds and residues from solder paste, cleaning agents and flux.

PPE must be worn and hands must be washed after activity.

Materials

Cif reflow oven (V900320)
Gold-flow (GF-12GC)
Solder paste (GC10)
Bofa fume extraction (V250 – duel extract)
Bofa fume extraction (AD 350 – Single extract)
PPE (gloves, glasses, lab coat)
Cleaning solvent (IPA)
Hand tools (scalpel, fine tweezers, pliers)

Standard Operating Procedure

Before use ensure the area is clean, tidy and clear of any combustible items.
Visual checks must be made of the equipment for damage and has an approved/passed PAT label. (Report if damage found).

Using the Gold-flow reflow oven.

Turn on oven, set to run and turn on fume extract (40min preheat).

Prepare the workspace for soldering job. (prep components, take solder paste from fridge and ready hand tools).
Turn on fume extraction and site nozzle above work area.
Tape pcb to the soldering mat and align/tape mask in place.
Put on PPE. (Gloves, glasses and lab coat).
Apply solder paste with scrapper.
Place components, connectors, etc.

Using small CIF reflow oven. Turn on oven and select program depending on solder paste.

Insert populated PCB and close draw. Allow 30seconds to preheat then run the cycle (pressing button C).
Once oven states “END”, open oven and allow PCB to cool. Remove with tweezers/pliers. (Do not touch PCB it may be hot).

Using the Gold-flow reflow oven.

Lay populated PCB onto the moving bed.
Allow it to pass through the open and exit.
Remove PCB from moving bed with pliers/tweezers. (Do not touch PCB it may be hot).

Place PCB on soldering mat and allow to cool for 5minutes before using.
Turn of the reflow oven and allow to cool (do not leave unattended until cool).
Tidy the work area, return hand tools, dispose of waste and clean working area with IPA and paper towel, remove any solder paste residue and splats.
Any rosin flux residue left on the work piece is a minimum and level considered safe by manufacturer. IPA cleaner can be used to remove remnants.
Remove PPE and dispose of gloves.
Wash hands using soap and water.

Othe procedures that need consideration

Some hand tools used in this process are sharp such as scalpel blades which can cause cuts to the skin.
PPE must be used. Safety glasses and nitril gloves.
All solder and components are lead free.
Liquid flux is rosin free.
Solder paste contains Rosin when in use but is a no clean variant meaning rosin maybe present after use but at a safe minimal level for bare handling.
Solder paste must be allowed to rise to room temperate before use.
Solder paste should be store in the fridge to prolong its life.
Work should cease if user has breathing problems due to soldering vapours and seek medical attention.

Responsibilities

Technicians
Visually inspecting area and equipment.
Supplying information and guidance as required.
PAT Testing and maintaining equipment.
Keeping area tidy.
Replacing faulty parts.
Acting upon reported issues.
Booking external company for annual LEV inspections.
Maintain consumables such as solder, flux, PPE, cleaning products, etc

Students\other staff
Cleaning the area after use.
Responsible for using correct PPE and fume extraction.
Putting away used tools.
Reporting faulty equipment or issues.
Reporting and injuries such as burns/cuts.

Documents and References

Documents

- CIF Reflow oven (FT03). See equipment datasheet.
- Gold-flow Reflow oven (GF-12GC). See equipment datasheet.
- Solder Paste (GC10). See Safety folder – COSHH & Datasheet
- Flux (MF 300). See Safety folder – COSHH & Datasheet
- Bofa fume extraction (V250). See equipment datasheet.
- Bofa fume extraction (AD 350). See equipment datasheet.
- LEV and PAT test information. See safety folder.

References\Links

HSE solder/ing
https://www.hse.gov.uk/pubns/indg248.htm
https://www.hse.gov.uk/asthma/solderers.htm
HSE Electrical safety
https://www.hse.gov.uk/electricity/index.htm
UCL EEE performing soldering
https://intranet.ee.ucl.ac.uk/facilities/teaching-lab/cop_performing_soldering.docx
https://www.hse.gov.uk/pubns/indg248.htm
https://www.hse.gov.uk/asthma/solderers.htm
HSE Electrical safety
https://www.hse.gov.uk/asthma/solderers.htm
UCL EEE performing soldering
https://intranet.ee.ucl.ac.uk/facilities/teaching-lab/cop_performing_soldering.docx