

FUME CUPBOARDS AND LOCAL EXHAUST VENTILATION (LEV)

1. LEV is an extract ventilation system that takes dusts, mists, gases, vapour or fumes out of the air so that they can't be breathed in. The requirements for LEV are determined by the COSHH regulations. Properly designed LEV will:

- Collect the air that contains the contaminants.
- Make sure they are contained and taken away from people.
- Clean the air (if necessary) and get rid of the contaminants safely.

LEV equipment must be inspected and maintained in accordance with statutory regulations.

2. Fume Cupboards

Fume cupboards are intended to contain harmful or toxic substances and protect the person using fume cupboard and other users of the laboratory. The cupboard will do this effectively only if:

- It is used in the correct manner.
- It is regularly maintained.



2.1 Use of a Fume Cupboards

Fume cupboards should be used only for experimental work and not as storage areas. Use for storage will clutter the usable area and interfere with the airflow within the cupboard and will increase the likelihood of harmful substances being released from the cupboard into the laboratory. If there were to be an accident, the presence of stored chemicals in the cupboard would increase the risks.

Do not undertake a procedure in a fume cupboard that is cluttered or appears to be used as a store. It is the user's responsibility to make sure that the fume cupboard they are using is free from clutter.

Do not set up equipment close to the front edge of the fume cupboard. This will increase the likelihood of turbulent flow in the air stream being drawn in at the front of the cupboard. Turbulent flow can result in 'eddies' in the air stream with a consequently greater risk of harmful substances being released into the laboratory. As a general guide, equipment should be set back at least 150mm from the plane of the sash.

Equipment should not be put so far back that the operator has to put their head in the fume cupboard to operate the equipment.

Avoid rapid movements in front of and within the fume cupboard. Any sudden movement is liable to disturb the airflow and allow harmful substances to escape.

If electrical equipment is being used, ensure minimum length of cable and protect from chemical erosion.

Fume cupboards are not designed for work with micro-organisms. Biological Safety Cabinets must be used for work with hazardous micro-organisms.

Where fume cupboards are fitted with monitors that continuously monitor the air flow, an alarm will activate if the air-flow drops. If this occurs, lower the sash to see if this restores necessary airflow. If the alarm continues to activate, stop all chemical work, pull the sash down as low as it will go and alert the Local Safety Coordinator or a technician.

2.2 Maintenance of Fume Cupboards

The best designed and engineered installation will cease to perform effectively if not maintained on a regular basis. It is a legal requirement that all fume cupboards are maintained and that their performance is measured at least every 14 months. Inspection and maintenance is carried out in accordance with British Standard.

Maintenance of the fume cupboards is arranged by Estates however the School is responsible for ensuring that:

- Fume cupboards are inspected and maintained.
- Records are kept of inspection and maintenance and certificates provided by maintenance contractors are recorded on each fume cupboard.
- Face velocities are recorded on the cupboards. (Face velocity is the speed at which air is drawn in through the open sash of the fume cupboard; this will change depending on the height of the sash.)
- Any fume cupboard which is not inspected on schedule or which fails its inspection is taken out of use.
- A label recording the date of the last inspection should be prominent on the outside of the fume cupboard.
- Users keep fume cupboards clear from clutter and, where necessary, carry out a thorough wash-down of the interior of the fume cupboard. This will be monitored during regular safety inspections.

Every 12 months contractors arranged by Estates will:

- Check the condition of services to the fume cupboard and the functioning of any alarms and controls.
- Carry out a face velocity test and record the face velocity and the date of measurement on a label on the outside of the fume cupboard.
- Carry out a detailed check on the condition of the fan.
- Check the stability and condition of the discharge stack.
- Check and clean duct work as is necessary.
- Check that the make-up air into the laboratory is satisfactory.
- Label with Green pass or Red fail (as in example).
- Provide a certificate of inspection.

LEV HOOD TEST RESULTS	
DATE: _____	PASSED
LEV Point: _____	_____
Next Test: _____	_____

LEV HOOD TEST RESULTS	
FAILED	
LEV Point: _____	_____
DATE: _____	_____

If the fume cupboard fails the inspection it must be taken out of service until repaired and re-tested.

2.3 'Failed' or 'Do Not Use' Signs

Whenever a fume cupboard is marked with a 'Do Not Use' sign, under no circumstances should the fume cupboard be turned on or anything placed in the fume cupboard. Maintenance of the fume extraction system may be underway and use of the cupboard will expose the maintenance worker to hazardous gases or fumes.

3. Laminar Flow Cabinet

Laminar flow cabinets are designed to provide a sterile environment for sample handling. They do not provide user protection and should therefore not be confused with Biological Safety Cabinets.



A Laminar Flow Cabinet are typically open fronted. If in doubt check with the Local Safety Coordinator or Technician.

4. Welding Fume Extraction

For welding operations there is new scientific evidence that exposure to all welding fumes can potentially cause lung cancer. New regulations require that:

- Exposure to any welding fume released is adequately controlled using engineering controls (LEV).
- That suitable controls are provided for all welding activities, irrelevant of duration. This includes welding outdoors.
- Where engineering controls alone cannot control exposure, then adequate and suitable Respiratory Protective Equipment (RPE) should be provided to control risk from any residual fume.
- All engineering controls are correctly used, suitably maintained and are subject to thorough examination and test where required.
- Make sure any RPE is subject to an RPE programme. An RPE programme encapsulates all the elements of RPE use you need to ensure that your RPE is effective in protecting the wearer.

Welding on University premises is normally limited to a very few activities in workshop. In some instances, welding is undertaken by technicians in the laboratory when carrying out repairs or manufacture. External contractors may also be engaged in welding activities which will be controlled by Estates.

Both fixed and portable fume extraction systems must be used at all times and be properly maintained. Filters should be changed in accordance with manufactures recommendations taking in to account the usage. The responsibility for the maintenance and the replacement of filters, is the responsibility of the School.



Portable and Fixed Welding Fume Extractors

Inspection of welding fume extractors is carried out by the same contractors engaged to carry out inspections of Fume Cupboards. They will test the operation and airflow and label and certify accordingly. Any equipment failing the inspection must be taken out of service until repaired and a retest undertaken.

5. Solder Fume Extraction

Rosin (colophony)-based solder flux fume is a substance that is generated and released during the soldering process. It is hazardous to health, being a common cause of occupational asthma. Contact with this solder fume and its residues can also cause skin problems such as dermatitis.

To protect your health you should (In priority order):

- Substitute rosin-based solders for rosin-free or rosin reduced solder.
- Use fume extraction when you are either:
 - Soldering using rosin-based fluxes.
 - Soldering with alternative fluxes for more than a few minutes a day.
- Keep your face out of the solder fume.
- Where necessary use personal respiratory protective equipment (RPE).
- Check for yourself to see how effective the LEV is where you work.

Anyone feeling unwell when soldering should report this to their line manager or supervisor.

6. Types of Solder Fume Extraction

There are two types of extraction commonly used in the workshops and laboratories:



The bench top fan and charcoal filter is simply a fan which draws the fumes away from your face and out through a charcoal filter. This is of very limited use and not recommended for anything other than very occasional, short duration use.

A more effective system consists of a bench top or under-bench extractor with extendable arms. These have a high suction which draw fumes away from the face then through both charcoal and HEPA filters. These should be used in areas such as electronics workshops and laboratories where soldering is a regular activity. They are required to be maintained and filters changed by the owner in accordance with manufacturers recommendations. They must be inspected, tested and certified by the same contractors engaged to carry out inspections of Fume Cupboards. Any equipment failing the inspection must be taken out of service until repaired and a retest undertaken.



7. MDF and Wood Dust Extraction

Wood dust can cause serious health problems, including asthma and hardwood dust can cause cancer, particularly of the nose. Exposure to wood dust is controlled under the COSHH regulations requiring exposure to wood dust to be as 'low as practicable'.

This generally means the use of LEV extraction at woodworking machines to capture and remove dust before it can spread. In the case of portable woodworking machine tools it may require the use of RPE.



For larger wood workshops fixed extraction systems are used which draw dust through fixed pipes to collected in dust in bags, later to be removed and uplifted by a specialist contractor.

Portable wood dust extractors are also available and in use.

In both cases inspection is carried out by the same contractors engaged to carry out inspections of Fume Cupboards. They will test the operation and airflow and label and certify accordingly. Any equipment failing the inspection must be taken out of service until repaired and a retest undertaken.



8. Maintenance of LEV

In the School, the TRO will:

- Maintain a register of all LEV.
- Ensure LEV entered into the register has appropriate certificates of test, is marked with an identifying number.
- Ensure that all LEV is inspected at required intervals by the company contracted by Estates to carry out such inspections.
- Ensure that any equipment failing inspection or not inspected by the due date is removed from use.
- Ensure that certificates of inspection are obtained and kept on file for all LEV equipment in use.
- Ensure that LEV is regularly maintained (in addition to inspection) in accordance with manufacturer's guidance.

Revision Record			
Issue	Name	Date	Reason for review
1	ES	31/5/2022	Transfer from main handbook
	ES	26/8/2022	Added alt text for images.