# CODE OF PRACTICE

## LOCAL EXHAUST VENTILATION – General Types

**Document Information**

| | | | | | |
|---|---|---|---|---|---|
| Author | Debbie Robarts | | | | |
| Reviewed By | | | | | |
| Date | 30-10-2023 | Version | 1 | Status | Live |

## Document Change record

| Date | Change description | Person |
|---|---|---|
| July 2023 | First draft document issue for review | Debbie Robarts |
| Oct 2023 | First document live issue | Debbie Robarts |
| | | |
| | | |
| | | |
| | | |
| | | |

# Contents

## Summary

The control of exposure to hazardous substances is governed by the Control of Substances Hazardous to Health (COSHH) Regulations 2002. This sets out principles of good control practice that an employer must apply to obtain effective and reliable control to prevent or minimise exposure and therefore the impact on human health.

Local Exhaust Ventilation (LEV) is one of the most common and effective engineered controls used in work areas such as workshops and laboratories to minimise exposure to respirable hazardous substances such as dust and fumes. This document aims to provide guidance to ensure that LEV is identified correctly, used effectively, and maintained appropriately to ensure they provide the level of protection needed for users.

## Scope

This guidance document is intended for all persons who may manage, maintain, or use general LEV systems such as capture hoods, downflow benches, snorkels, etc. and provides information on the safe use, maintenance and testing of LEV in use across the University. These more general types of LEV are used in laboratories but are more commonly found in workshops, and also in animal handling facilities for allergen protection.

This guidance document does not cover the specific requirements for microbiological safety cabinets and fume cupboards. Please refer to other SHEW guidance documents.

## Introduction

Any process involving the use of hazardous substances must have been subject to risk assessment before starting the work. This must apply the hierarchy of control to prevent or minimise exposure, if possible, by elimination or substitution and the application of engineered control measures.

LEV should always be considered if a Workplace Exposure Limit (WEL) will be exceeded even with other controls in place. WELs are occupational exposure limits to hazardous substances approved by HSE and can be found in the document EH40. Exposure to substances listed in EH40 as carcinogens or sensitisers should be reduced to as low as reasonably practicable (ALARP), in these cases LEV should be considered even if WELs have not been exceeded. To find out the level of exposure to a substance in the workplace air monitoring can be used.

The absence of a substance from the list of WELs does not indicate that it is safe. For these substances, exposure should be controlled to a level to which nearly all the working population could be exposed, day after day at work, without any adverse effects on health.

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. 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 System

A typical LEV system will have (see Appendix 1):

- Hood(s) – to collect airborne contaminants at, or near, where they are created (the source).
- Ducts – to carry the airborne contaminants away from the process.
- Air cleaner – to filter and clean the extracted air.
- Fan – which must be the right size and type to deliver sufficient 'suck' to the hood.
- Discharge – for the safe release of cleaned, extracted air into the atmosphere.

An LEV hood may be tiny and built into a hand-held tool or it may be large enough to walk into.

Examples include:

- On-tool extraction, e.g., soldering iron, hand sander
- Fixed capturing hood
- Moveable capturing hood
- Small and large walk-in booths
- Downdraught tables

### Factors to consider when selecting LEV

It is important to match the type of LEV to the source that you want to control. When LEV doesn't work as well as it should, a common reason is that the LEV/hood doesn't catch or contain the contaminants effectively.

When selecting an LEV system and developing a specification the following should be considered/included:

- Understand the process, the contaminant, its hazards and the sources to be controlled, and how stringent the control needs to be. The important chemical and flammable properties of substances and products are in the safety data sheet;
- Indicators to be fitted to show that the system is working properly;
- The LEV should be easy to use, check, maintain and clean, taking account of other risks, e.g., accessibility, skin contamination and waste removal and filter changing without spreading contamination;
- Provision of training in how to use, check and maintain the LEV system;
- Provision of a user manual that describes and explains the LEV system, how to use, check, maintain and test it, along with performance benchmarks and schedules for replacing parts;
- Provision of a logbook for the system to record the results of routine checks and maintenance.

Consulting users about the work to be done and the hazardous materials to be used can provide useful information to consider when selecting the right LEV system. This will help ensure the LEV is both effective and practical.

## Installation and Commissioning

The LEV system should be installed as intended and commissioned to prove that it provides the required control. The system needs to be installed and commissioned to be effective in practice.

Commissioning should not only cover the LEV system itself but also the work practices it will be used with such as location of the work, position of the LEV hood for effective capture and correct use of the LEV to ensure it is effectively controlling exposure.

Installation and commissioning should be carried out by competent persons. A commissioning report should be provided detailing the outcome of observation, testing and measurement. This sets the benchmarks and standards against which the owner/user compares the results of future statutory thorough examination and testing. It also sets the benchmarks for tests in the logbook for the system. The commissioning report confirms that the LEV system is performing as designed and that, in the commissioner's professional opinion, the system delivers adequate control of exposure.

The report should contain:

- diagrams and a description of the LEV, including test points;
- details of the LEV performance specification;
- results, such as pressures and velocities at stated points;
- calculations undertaken;
- a written description of the commissioning, the qualitative and quantitative tests undertaken, and the outcome. Where necessary, this should include air sampling results;
- a description of operator behaviour for optimum LEV effectiveness.

The manufacturer should supply suitable instructions as part of the design, installation and commissioning process. There should also be instructions on how to operate the system safely, maintain it correctly and examine it thoroughly. This will be in a user manual and a logbook. An LEV system logbook will contain schedules and forms to keep records of regular checking, maintenance and repair.

For LEV systems with no instructions or logbook, the employer should first approach the manufacturer for assistance. If this is unsuccessful, the employer may request assistance from an expert, e.g., a consultant engineer specialising in LEV to prepare suitable documentation.

## Thorough Examination and Test

All LEV used to protect users from exposure to hazardous substances must have a Thorough Examination and Test (TExT) at least every 14 months.

This must be carried out by a competent person and in accordance with the requirements of the COSHH Regulations 2002 and HSG 258 Controlling airborne contaminants at work, 2011 where applicable. Manufacturer's instructions in the user manual should also detail these requirements.

A thorough examination and test is a detailed and systematic examination sufficient to make sure that the LEV can continue to perform as intended by design and will contribute to the adequate control of exposure. The thorough examination would normally include such functional testing to provide sufficient evidence to indicate adequate control is being achieved.

The examination and test procedure and methods are similar to the original commissioning exercise, with similar qualitative and quantitative methods. Thorough examination and testing of LEV can be considered to comprise three parts:

1. A thorough visual and structural examination to verify the LEV is in efficient working order, in good repair and in a clean condition.

2. Review of the technical performance to check conformity with commissioning or other sources of relevant information.
3. Assessment of control effectiveness.

Users are responsible for ensuring LEV systems are in a safe condition for the testing to be carried out and any hazards, control measures and local rules that should be followed are communicated to those carrying out the testing.

A test label should be attached to the LEV as this is an effective way of providing information on whether or not an examination has been done or when it's due.

LEV that has failed the TexT and/or routine checks and tests and/or are awaiting repair should be taken out of service with appropriate signage and communication to users.

An examination and test report should be produced by the competent person and kept by the department for at least five years. A copy should be available at the workplace containing the LEV system. HSG258 para 349 details what should be included the LEV report.

Please refer to SHEW Safe Use of LEV Standard for more information regarding duties and responsibilities.

## Routine Checks and Maintenance

Routine checks (daily, weekly and monthly) keep the LEV system performing as required. It is a requirement of the COSHH Regulations and HSG258 that routine checks and testing are carried out between TExTs to ensure that the LEV continues to perform to the required standard and there is no variation from that reported in the TExT. The frequency of routine checks and their description should be set out in the system logbook. Users should record checks and report any defects to the appropriate person for remedial action.

### User Checks

Users, laboratory supervisors and other appointed department persons should make regular pre-use and ongoing routine checks to confirm that performance remains satisfactory and that any faults are identified and corrected. Manufacturer's instructions and supplied log books where available should be consulted for appropriate and relevant user checks. These checks should be recorded, this could be in the available log books or alternative record sheet (when logbook not provided), an example is provided in Appendix 2.

Pre-use checks should be carried out to ensure the LEV is fit for use including:

- Check that the LEV has a test label fixed to the cabinet to confirm that it has been tested/examined within the last 14 months and has passed the test. Check that the retest date has not been passed.
- Air velocity indicator, where present, is operating correctly and within safe parameters (where set)
- No visual or audible alarms (where present)
- No visible signs of damage, wear and tear or blockages
- Work area clean and tidy
- Capturing hood and working zone within the capture zone (defined in instructions/user manual)
- Noise or vibration within normal operating conditions (no significant change)

Report failure/defects promptly to your Laboratory Manager/Area Safety Co-ordinator/Technical Staff for remedial action.

## Routine Testing

Routine testing should be carried out by trained persons. The user manual and log book should be consulted for the testing requirements and frequency. Where frequency is not stated it is recommended that it be carried out monthly. Appendix 3 contains example log sheets. Routine testing should include where applicable:

- Airflow measurements, a calibrated anemometer should be used to take measurements. Measurements should be accurate to 10% and an average velocity calculated in m/s.
- Pressure measurements with suitable calibrated equipment.
- Air flow visualisation – this should be done with a visible tracer such as smoke or dust (smoke pen or dust lamp) to check if any disturbance. Any observations/disturbances should be recorded. Frequency of checks depends on use and whether any concerns have been raised regarding performance.
- Inspections – regular inspections should include checking that LEV systems are being used in accordance with manufacturer's instructions and training, that user checks are being carried out and whether there is any damage/corrosion etc. These could be included within routine inspections and findings recorded.

## Documentation and Record Keeping

All LEV systems must have the following documents:

**A user manual**: that describes and explains the LEV system, and how to use, check, maintain and test it, along with performance benchmarks and the spares available with schedules for replacement of parts. It should contain a list of things that can go wrong and an exploded diagram naming key components of the LEV.

A user manual for LEV should contain simple 'getting started' instructions (to be read by most people); and detailed technical information for service providers and maintenance/repair engineers. Further details are outlined in HSG258.

**An LEV logbook**: An LEV system logbook will contain schedules and forms to keep records of regular checking, maintenance and repair. The logbook should contain:

- schedules for regular checks and maintenance;
- records of regular checks, maintenance, replacements and repairs;
- checks of compliance with the correct way of working with the LEV system;
- the name of the person who made the checks.

Both documents must be readily available for reference by users or maintainers and kept up to date.

In addition, documentation relating to the installation and commissioning of the LEV system must be obtained. Such documentation includes but is not necessarily limited to system schematics including test points, details of the performance specification, description of the commissioning, commissioning test results, and a description of how operators should use the system, so it works effectively.

### Undocumented existing systems

For LEV systems with no instructions or logbook, the manufacturer should be asked for assistance. If this is unsuccessful, then an expert should be consulted, e.g., a consultant engineer or occupational hygienist specialising in LEV to prepare suitable documentation. The methods used to judge whether the LEV

continues to achieve the original performance and provides adequate control will depend on the assessment of the system but would normally include visual checks, pressure measurements, airflow measurements, dust lamp and air sampling tests, as appropriate.

## Information, Instruction and Training

Users of LEV must be trained in correct use, not only in order to understand how the LEV works but also because poor technique can compromise the protection it provides to the user. Manufacturer's instructions should be utilised in preparing this training.

Training should cover the basics of:

- the harmful nature of the substances you use;
- how exposure may occur;
- how the LEV system works;
- methods of working that get the best out of the LEV;
- how to check the LEV is working correctly, e.g., user checks;
- the consequences of the LEV failing;
- what to do if something goes wrong.

Keep training records for everyone. This includes refresher training which it is recommended should be carried out every 3 years. Changes to the work process mean that the LEV may also need to change, and users may need retraining.

### REFERENCES

Controlling airborne contaminants at work: A guide to local exhaust ventilation (LEV) HSG258 (Second edition) HSE Books 2011 www.hse.gov.uk/pubns/books/hsg258.htm

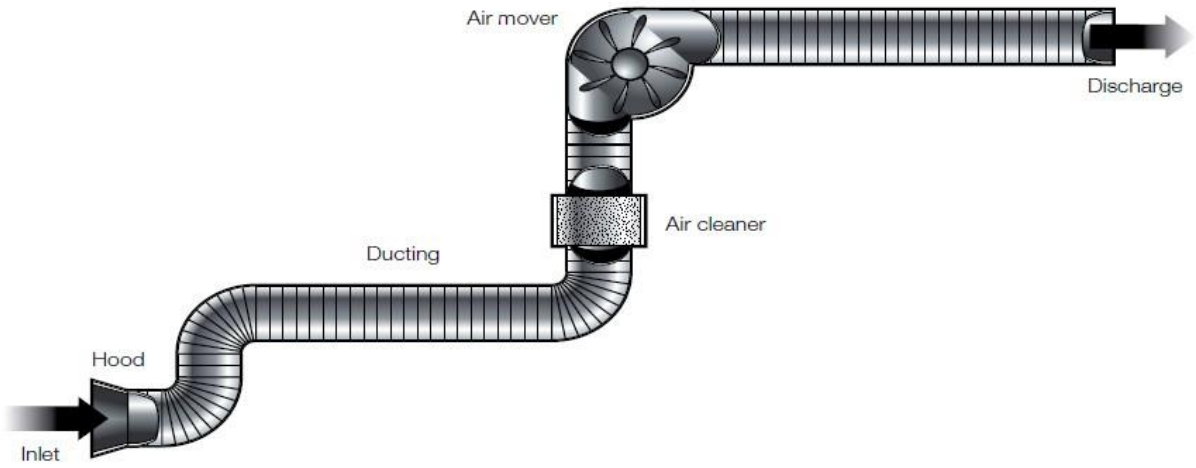
Time to clear the air! A workers' pocket guide to local exhaust ventilation (LEV) INDG409 HSE 2008 www.hse.gov.uk/pubns/indg409.htm

Control of substances hazardous to health (Sixth edition). The Control of Substances Hazardous to Health Regulations 2002. Approved Code of Practice and guidance L5 (Sixth edition) HSE Books 2013 www.hse.gov.uk/pubns/books/l5.htm

Clearing the air A simple guide to buying and using local exhaust ventilation (LEV) INDG408(rev1) - Clear the air: A simple guide to buying and using local exhaust ventilation (LEV) (hse.gov.uk)

SHEW LEV Safety Standard

## Appendix 1 Diagram of typical LEV features



## Appendix 2 User Checks and Log

| Check | Frequency |
|---|---|
| Air velocity indicator operating correctly (within safe parameters where appropriate) | Daily or pre-use |
| No visual or audible alarms | Daily or pre-use |
| Capturing hood and working zone within the capture zone | Daily or pre-use |
| Work area clean and tidy | Daily or pre-use |
| Items not blocking inflow | Daily or pre-use |
| Audible noise/vibration (of the system) | Daily or pre-use |
| Visual check for damage, wear and tear | Weekly |
| Filters (where present) in good condition | Weekly |
| In-date and 'Passed' statutory test label | Monthly |
| Anemometer check record for airflow (authorised/trained persons carry out the check) | Monthly |

| User Check Record Log | | | | | |
|---|---|---|---|---|---|
| Department | | | | | |
| Lab/Room No. | | | | | |
| LEV No. | | | | | |
| Month/Year | | | | | |
| Day | Checked | Issue Y/N | Day | Checked | Issue Y/N |
| 1 | | | 17 | | |
| 2 | | | 18 | | |
| 3 | | | 19 | | |
| 4 | | | 20 | | |
| 5 | | | 21 | | |
| 6 | | | 22 | | |
| 7 | | | 23 | | |
| 8 | | | 24 | | |
| 9 | | | 25 | | |
| 10 | | | 26 | | |
| 11 | | | 27 | | |
| 12 | | | 28 | | |
| 13 | | | 29 | | |
| 14 | | | 30 | | |
| 15 | | | 31 | | |
| 16 | | | | | |
| Week | Checked | Issue Y/N | Week | Checked | Issue Y/N |
| 1 | | | 4 | | |
| 2 | | | 5 | | |
| 3 | | | | | |
| All issues to be reported and recorded | | | | | |

## Appendix 3 Routine Checks example log sheets

Monthly Anemometer Readings Log

| | |
|---|---|
| Department | |
| Lab/room No. | |
| LEV No. | |

**Test Description:**

*Insert description of how test to be carried out and picture of LEV with test points if appropriate*

| Month-year | Person testing | Anemometer readings | | | | | Mean | Av. Volume Inflow m/s |
|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | | |
| **Jan-xx** | | | | | | | | |
| **Feb-xx** | | | | | | | | |
| **Mar-xx** | | | | | | | | |
| **Apr-xx** | | | | | | | | |
| **May-xx** | | | | | | | | |
| **Jun-xx** | | | | | | | | |
| **Jul-xx** | | | | | | | | |
| **Aug-xx** | | | | | | | | |
| **Sept-xx** | | | | | | | | |
| **Oct-xx** | | | | | | | | |
| **Nov-xx** | | | | | | | | |
| **Dec-xx** | | | | | | | | |

Test failure: If the calculated average airflow volume is not within required parameters, do not use the equipment and notify appropriate person.

Smoke Test/Dust Lamp Test Observations Log

| | |
|---|---|
| Department | |
| Lab/room No. | |
| LEV No. | |

| Date: | Name/Initials: |
|---|---|
| Observations: | |
| Pass/Fail | |

Note: It is recommended that the smoke test/dust lamp test is performed periodically to provide continued assurance that contaminants are captured, or as an additional check if the air flow does not seem to be satisfactory.