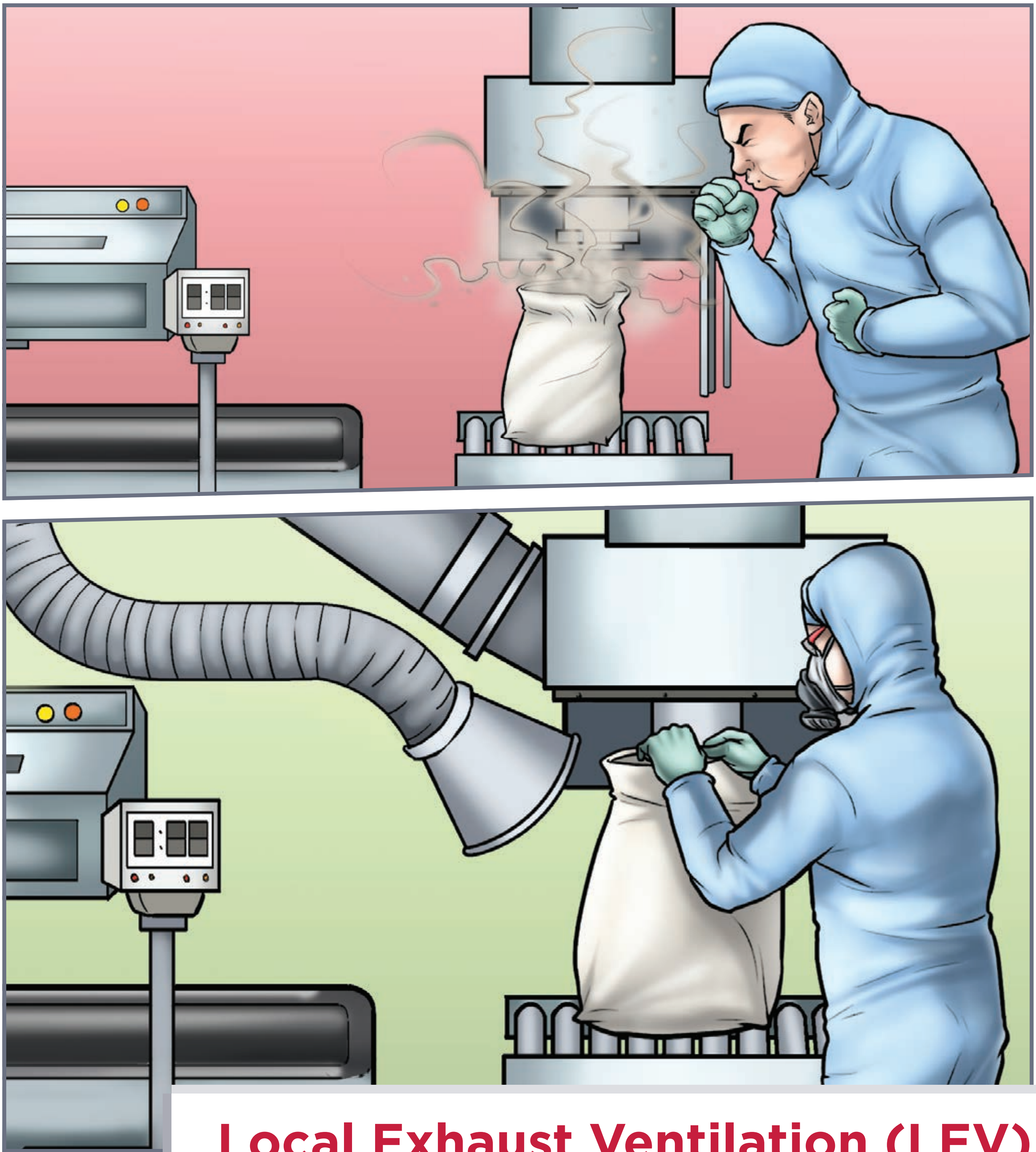


Local Exhaust Ventilation (LEV)

Good Practice Guidance on controlling exposure to chemicals that cause platinum sensitisation

IPA
INTERNATIONAL PLATINUM GROUP METALS ASSOCIATION

Content

DISCLAIMER: This guidance document has been prepared by industrial hygiene practitioners working in the platinum group metals (PGM) industry for the benefit of other professionals responsible for controlling industrial workplace exposures to chloroplatinates. The document should not be relied upon as a substitute for appropriate professional expertise. The information in this document does not constitute legal or mandatory advice; it is for information purposes only and should not be construed to be either comprehensive nor advice or recommendation of any kind. Any reader/user should consult their own local experts, scientific advisers and legal counsel or appropriate regulatory authorities to ensure compliance with applicable laws and regulations, and seek to have professionally checked by suitably qualified experts the suitability of the information within this document for the intended use. Neither the contributors to this document nor the International Platinum Group Metals Association assumes any liability for any errors or omissions or for any personal injury, physical harm and any loss or damages of whatsoever nature that have been caused by or in connection with the use of the information contained within this document.

1. Glossary

Parts of an LEV system

Air cleaner	See **Filter**.
Air mover	See **Fan**.
Baffle	A connection between two parts of an LEV system or containment system (also **Flange**).
Discharge point	The point where air leaves the LEV system through a discharge point (stack/chimney) normally after being cleaned/filtered.
Ducting	The pipework that transports the air through the LEV system.
Duct velocity	The average air velocity measured in a duct cross-sectionally.
Exhaust	See **Discharge point**.
Face velocity	The average velocity of air at the open front face of a hood or booth directly measured or calculated.
Fan	The fan creates the suction that moves the air through the LEV system. Fan types include centrifugal fans or axial flow fans. Either can be used, but they provide different pressures and flow. A variable speed drive to the fan is useful to manage pressures and air flow in the LEV system.
Filter	A device that 'cleans' the air by removing all or most of the contaminant. Many different types of filters exist (baghouse filters, wet scrubbers and precipitators), suited to different contaminants, processes and sizes of the LEV system.
Flange	A connection between two parts of an LEV system or containment system (also **Baffle**).
Hood	A device to enclose, receive or capture a contaminant, e.g. laboratory fume hood or a booth.
Inlet	The point where air containing the contaminant enters the LEV system.
Scrubber	A device that 'cleans' the air typically by injecting a liquid spray into the air. For simplicity, the term **Filter** is used in this document to describe any form of air cleaning device used in an LEV system.

Documentation and record-keeping terms used in this document

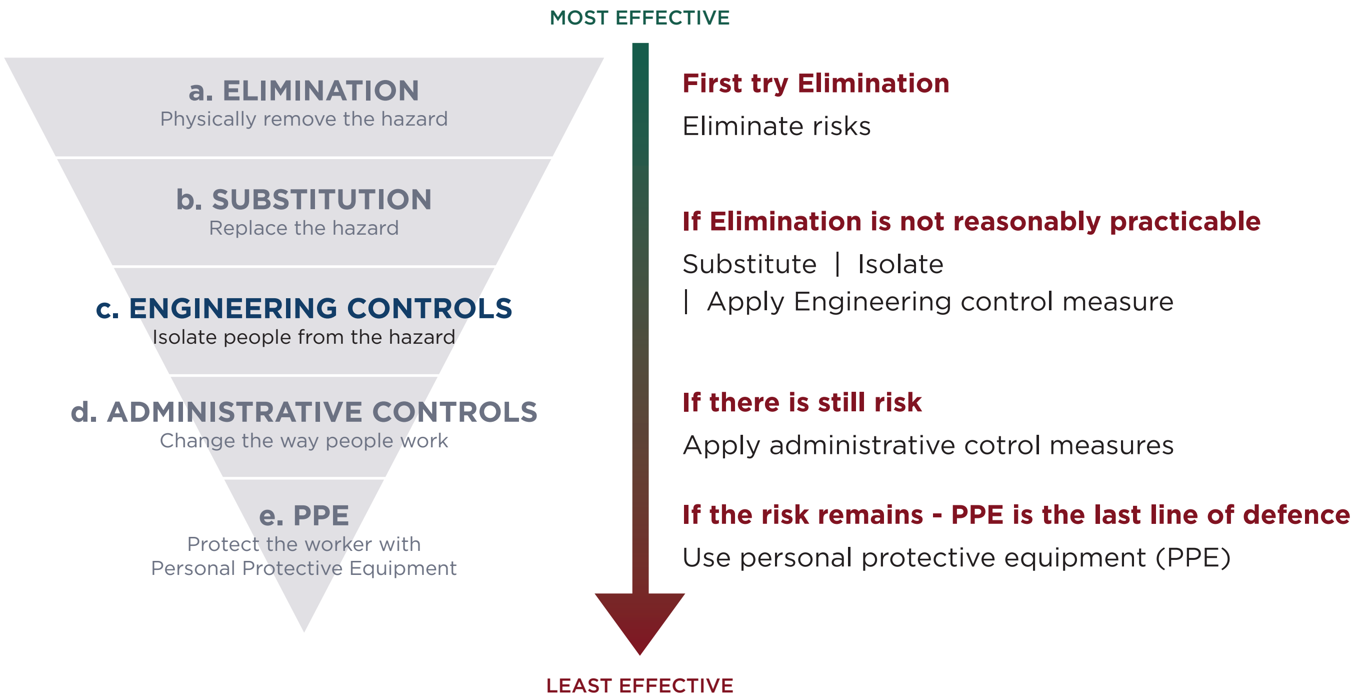
Commissioning report	After installation and inspection, this document is generated stating that the LEV system is capable of providing adequate risk control.
OEM	Original equipment manufacturer. The manufacturer of the LEV system.
OEM Specification	The technical details and performance of the LEV systems specified by the manufacturer.
Register	A record of all the LEV systems on a site.
Ventilation report	Different types of ventilation reports exist; from simple inspection reports looking at velocity and flow checks to visual checks, up to a thorough examination and test that covers all parts of the system.

Other terms used in this report

Breathing zone	The area within 30cm of a person's nose and mouth where they could breathe in a contaminant.
Contaminant	Any aerosol or gas that the LEV system is intended to capture.
Capture velocity	The air velocity at any point in front of the hood or at the hood opening necessary to overcome opposing air currents and capture the contaminated air at that point by causing it to flow into the hood.
Checks	See **Inspection**.
Dampers	A device (e.g. a valve or plate) in a flue or pipe that helps to regulate the draft inside.
Earthing	Earthing an electrical equipment protects against electric shocks by providing a path (a protective conductor) for a fault current to flow to earth or the ground. It also causes the protective device (either a circuit-breaker or fuse) to switch off the electric current. Also known as grounding.
Flow	The amount of air that travels through an LEV system at a given time point.
Industrial hygienist	Alternative name can be occupational hygienist.
Inspection	Observation to verify that a LEV component is in place and is effective. See the Binary questions with "Go"/"No Go" criteria on page 15.
Monitoring	The inspection, verification, and performance measurement activities to determine if the LEV or LEV components are achieving their intended purpose.
Performance measurement	The process of collecting, analysing and/or reporting information regarding the performance of an LEV system or LEV system components.
Recirculation	Air that enters an LEV system, is filtered, or cleaned and then discharged back into the room or building rather than to the outside.
Transport velocity	Air velocity to transport particles and prevent deposition within the duct which could be a fire or explosion hazard.
Verification	The activity or activities conducted to ensure that the implemented controls are effectively and consistently carried out.
Work execution documents (WED)	A document that defines and outlines the work to be done and how the person or team should do that work/task. Can include specific targets/goals as well as deadlines for when the work must be completed.

2. Introduction

Local Exhaust Ventilation (LEV) is an engineering control that reduces exposure to airborne contaminants in the workplace by capturing the emission at the source and transporting it to a safe emission point or to a filter/scrubber that removes the contaminant from the air. LEV systems are essentially static vacuum cleaners of contaminated air.



Companies requiring LEV systems need to work with designers, suppliers, and installers to ensure the LEV system is appropriate and fit-for-purpose. For example, will it be used to capture gas, fumes or particulates; how much contaminant is emitted; is the contaminant emitted at high or low speed?

Before designing or installing an LEV system, a good understanding of the contaminants and the process demands are necessary, as well as whether the system will be required to cope with changing materials processes and what flexibility needs to be built in for this.

Once installed, the LEV system must be used correctly and not tampered with. Companies must ensure adequate controls and elements are in place to ensure the LEV system is properly maintained and its performance is monitored and confirmed to be operating effectively, achieving the required level of protection.

Many employers and employees overestimate the effectiveness of the different types of LEV systems and have a poor understanding of the various conditions that could lead to a reduction in the LEV's effectiveness. An LEV system that is poorly designed or used can be an expensive waste and give a false impression of hazard control; while a poorly maintained system may, for example, lead to leakage of contaminants, causing concentrated local exposure. It is critical that everyone, from the designers, suppliers, and installers of the LEV system, to the end-user supervisors, operators and maintenance engineers, is appropriately trained and competent in the use of the LEV system.

3. Elements of LEV system

Most LEV systems comprise of the following five elements:

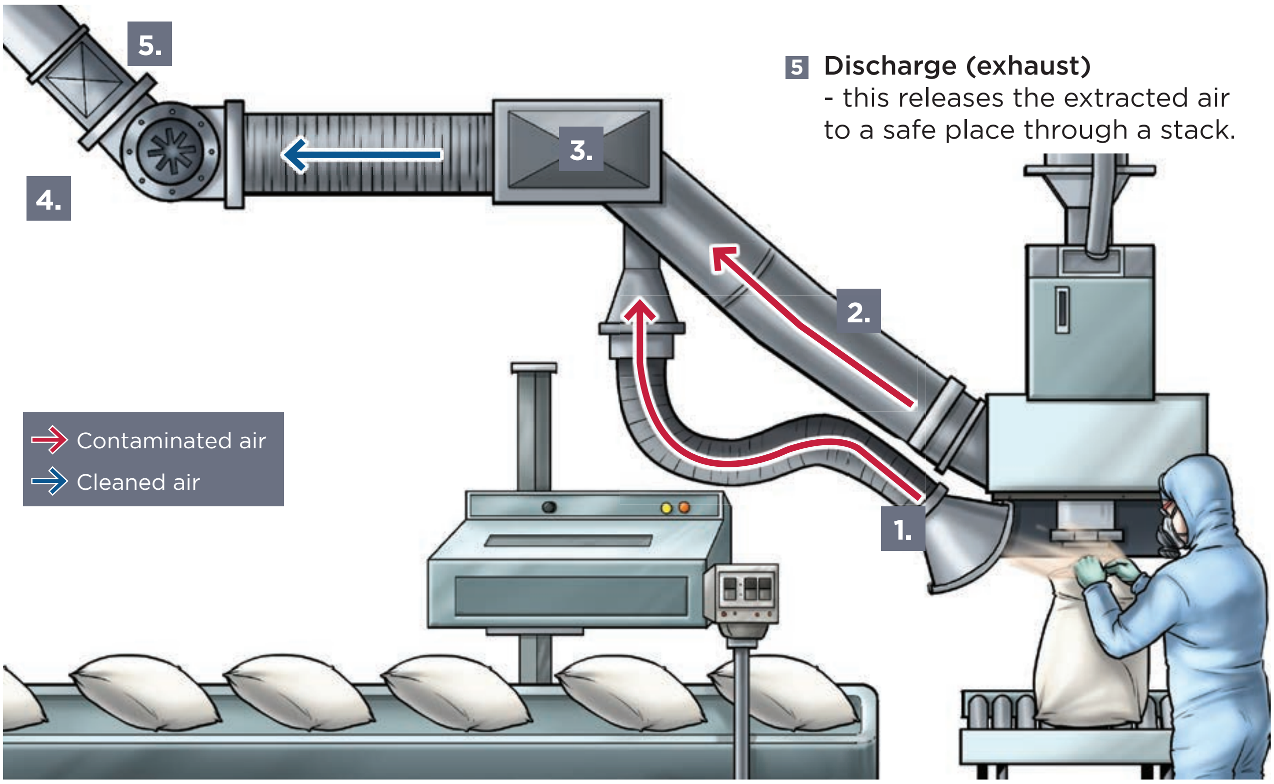
1. **Inlet (hood or enclosure)**
 - where the contaminant is captured or contained and enters the LEV system.

2. **Ducting**
 - to transport the air and the contaminant from the inlet to the discharge point.

3. **Filter (or air cleaner)**
 - this removes the contaminant from the air. Not all systems need air cleaning.

4. **Fan (and motor)**
 - this powers the extraction system (pulls the air through it).

5. **Discharge (exhaust)**
 - this releases the extracted air to a safe place through a stack.



LEV systems must be well designed in its entirety. For example:

- The inlet must be positioned correctly so that it captures the contaminant before it reaches the operator's breathing zone.
- The flow rate of air through the system must be sufficient to achieve the initial capture/ containment and carry all contaminants through the ducting to the purifying/ filtering system (transport velocity). Dust containing pgm containing material, if not extracted properly, can deposit in the ducting. The build up of settled PGM dust can affect the overall performance of the LEV system, as well as pose a serious exposure risk to maintenance personnel.
- LEV systems need to be balanced and have sufficient supply air.
- The ducting needs to be structured to maintain laminar flow. For example, it should not have T-junctions or 90 degree turns, as this leads to dead areas with no flow.
- Leak-proof: leakage on the suction or negative pressure side (front end) of the fan will lead to inefficient extraction. Leakage on the positive pressure side (back end) may reintroduce the contaminant into the workplace.
- The construction and materials used need to be compatible with the contaminants being extracted. For example, where flammable gases or vapours are being extracted, the system should not be able to generate a source of ignition. Likely ignition sources could arise from the use of non-rated electrical equipment such as the fan, or from the accumulation of static electricity from the lack of earthing and bonding and the use of non-conductive materials. Corrosion by the contaminants is another consideration.

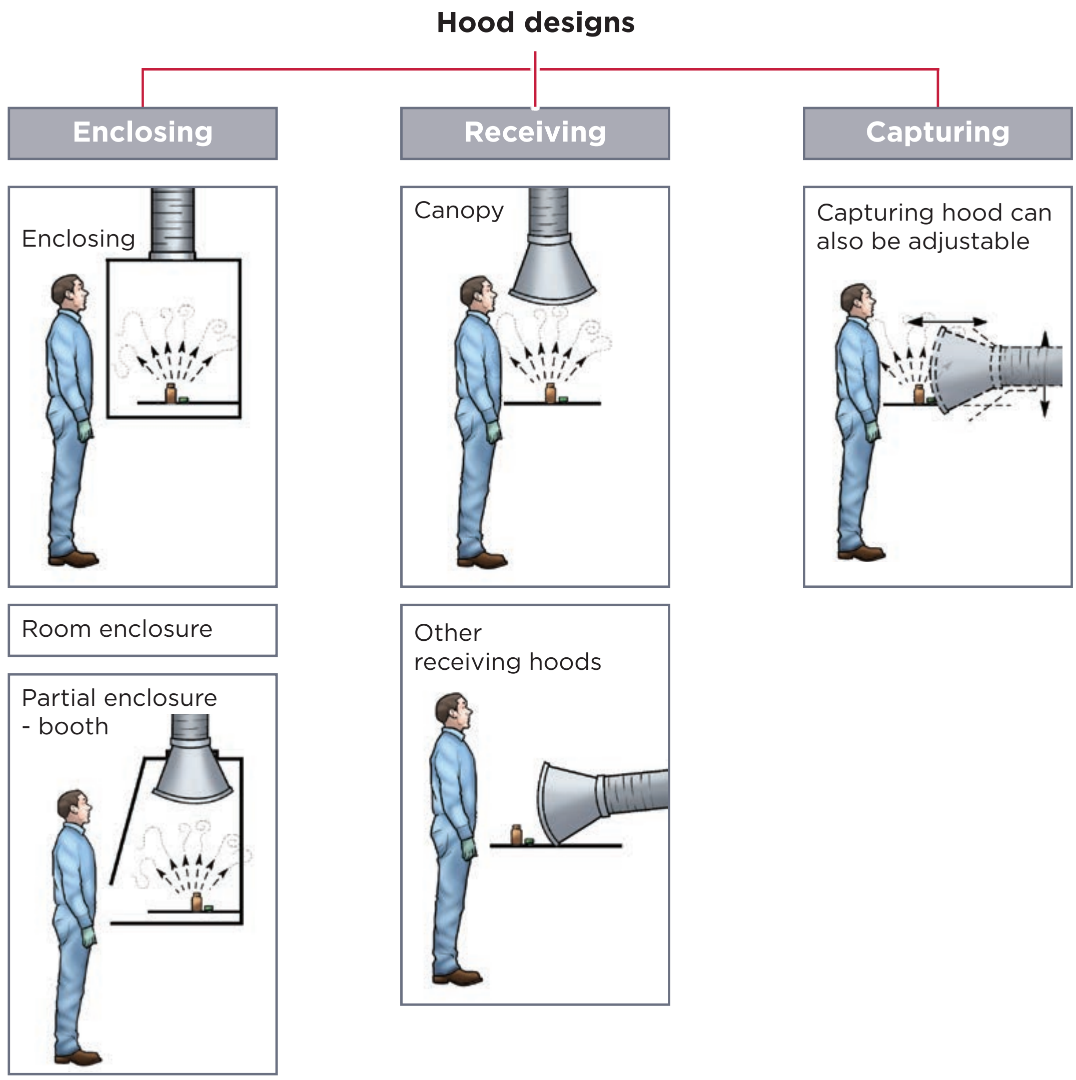
4. Managing LEV Systems or omponents as a Critical Control

1. Design

1.1 Hood design

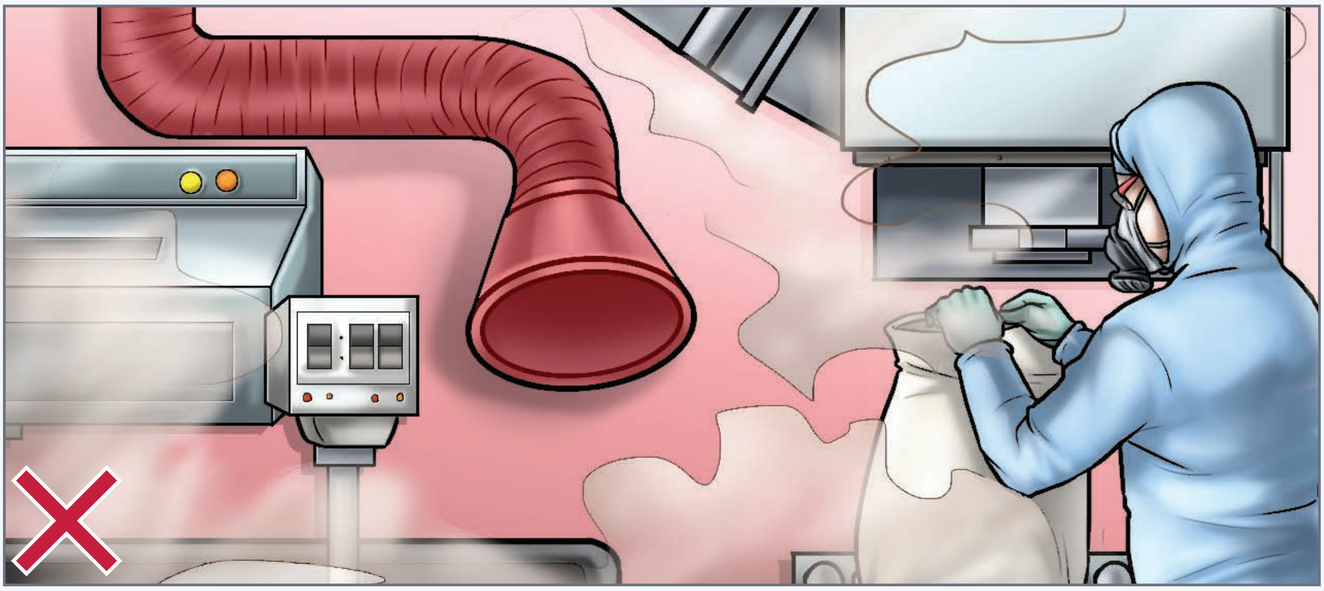
The type of hood or enclosure used will depend on the work being done. The hood or enclosure should not obstruct workers from performing their duties or cause ergonomic difficulties (e.g. manual-handling limitations or overreaching). Dust can increase if something is dropped and causes an impact, which can temporarily overburden the LEV system.

The degree of containment around the emission point is crucial. The hood should be structured and placed at the emission point so it can contain the emission. As the distance of the emission point from the hood increases, the LEV effectiveness decreases dramatically For example, the air-flow rate to a circular extraction duct with no hood attached will fall to about 10% of the in-duct flow rate at one diameter distance from the duct opening.



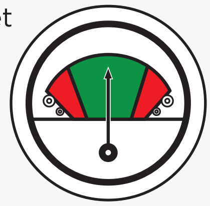
Images referenced from:
Controlling airborne contaminants at work: A guide to local exhaust ventilation (LEV) Page 29 of 111

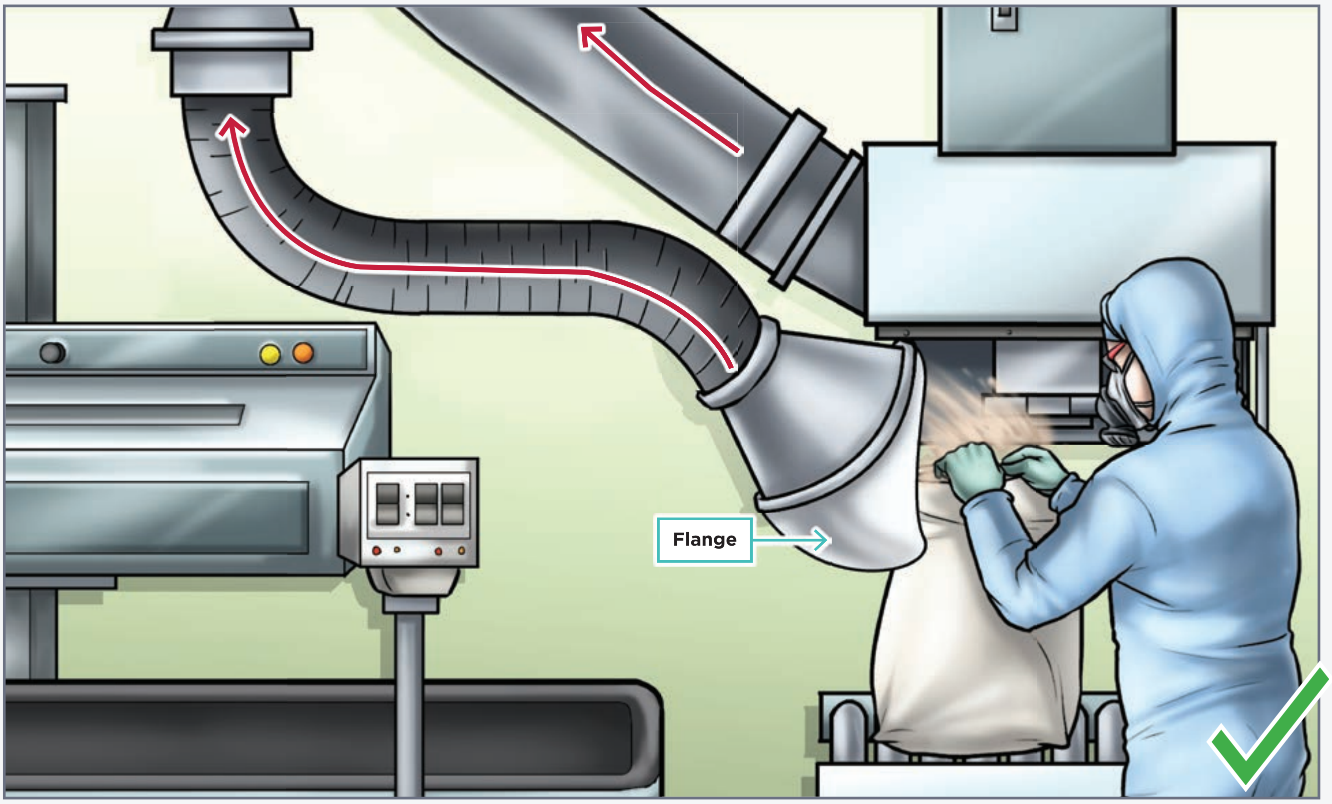
Place the capture hood as close as possible to the contamination source - if possible, enclosing it. The air should travel from the capture zone (where the contaminant is) and into the hood with enough speed to capture the airborne contaminant (but the suction should not be so strong that it sucks up contaminant that is not airborne). A flange or baffle around the hood will make it more effective.



The hood/enclosure must be positioned so it does not draw contaminants into the breathing zone of the operator(s). Neither should it be positioned so that in performing their tasks the operator causes an air-flow obstruction.

There should be an indicator at the inlet to show that the system is performing correctly. These indicators can have numbers such as flow rate or negative pressure or colour-coded bands for acceptable ranges.





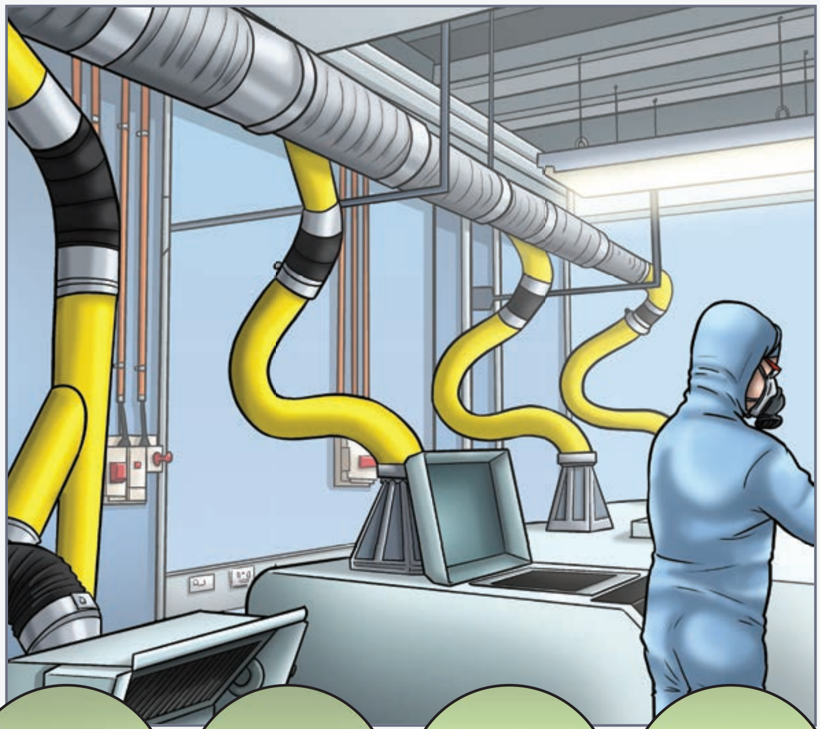
1. Design (continued)

1.2 Duct design

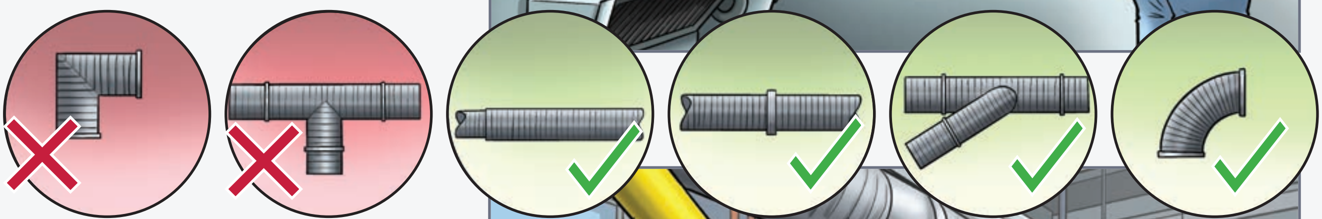
The hood or inlet devices must be connected to a duct or ducting system, depending on the complexity of the system, which will effectively contain contaminants transported from the inlet and efficiently, with proper flow control, deliver the exhaust flow to the discharge.

a. The ducting has to be sized and oriented so that the flow within it is efficient, e.g. approaching laminar flow rather than turbulence. The flow rates within the ducting should be sufficient to transport the contaminant to the outlet or filtering system. Flow rate requirements can vary greatly, depending on the nature of the contaminant. The rate should be sufficient to allow the contaminant to be transported and not deposited on the walls of the ducting.

Duct branches should enter where the duct expands gradually and should also enter at an angle of <30° to 45° rather than right angles (90 degrees).



b. Ducting should be of sound and solid construction so that it does not allow inward or outward leakage and will not be corroded by the contaminants being extracted. Leakage at joints or flanges results in the system not operating as designed. It may lead to employee exposure or to uncontrolled release to the environment.

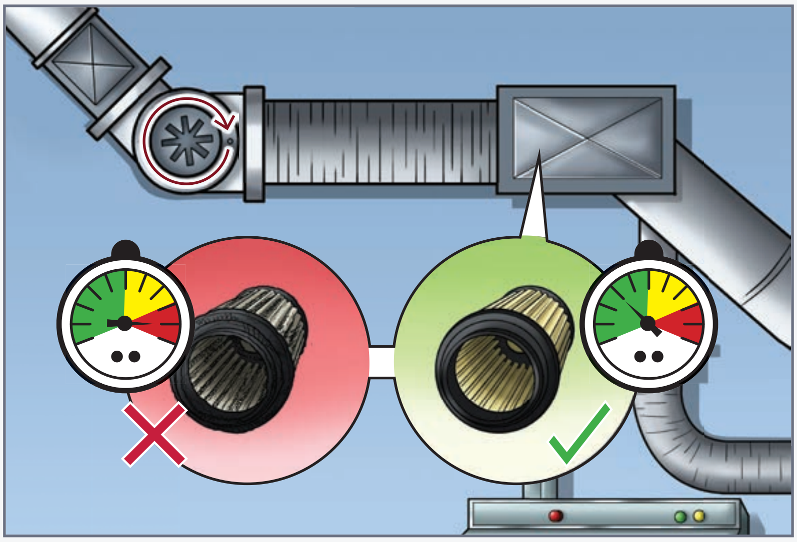


c. All internal ducting in the workplace should be under negative pressure so that in the event of any leakage, employees in the workplace are not exposed. In the event of an outward leakage into the workplace, employees could be inadvertently exposed and, where ducting is extensive, non-involved employees in other areas may be unknowingly exposed.

1.3 Filter design

The contamination removal/filtering system should be fit for purpose. The type of system used will be dictated by the type of contaminant being extracted and can vary from a simple filter system to a multi-component system with pre-filters and scrubbers, for example.

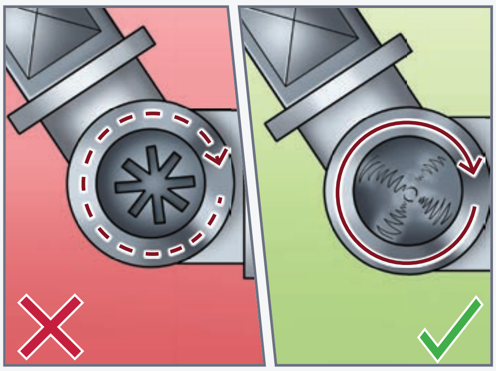
Whatever the filtering system, it should be designed so that it can cope with the contaminant load and and remove it from the air effectively it without affecting flow performance. It should be easily changed, cleaned and maintained without causing exposure to operations or maintenance staff.



It is good practice to install an indicator across the filtering system that shows when there is a pressure change indicative of a dirty filter that needs replacing.

If entry into the filter housing is necessary to change, clean or perform maintenance on filters, a procedure for safe entry should be drawn up following a risk assessment that includes consideration of the increased potential for exposure.

Contaminants captured in filters must be appropriately disposed of.

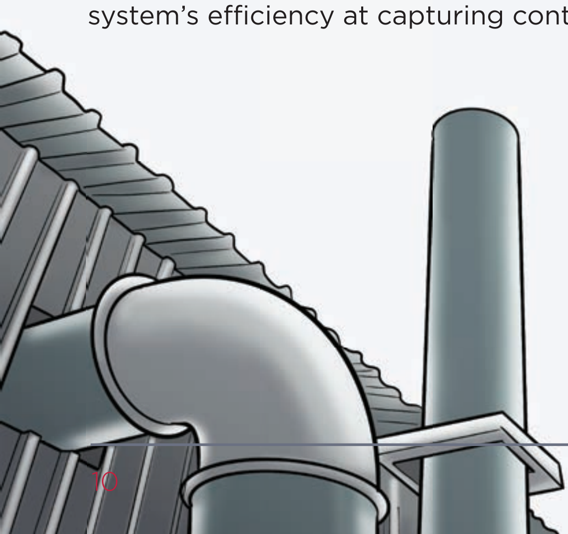


1.4 Fan design

The fan moves air through the hood and ducting system to the exhaust stack. The fan needs to be suitable for use and must provide sufficient airflow to effectively extract the contaminant. The fan should also be able to cope with increased pressure as the filtering element becomes loaded.

The fan should be positioned so that it can be easily maintained, but does not create a noise hazard for nearby workers. It is good practice to show the direction of airflow or fan curve direction on the outside of the fan casing.

The air flow within the LEV system needs to remain balanced, which must be considered during the design phase. For example, consider how adding additional ventilation may affect the overall system's efficiency at capturing contaminants.



1.5 Discharge system

The discharge ducting should be placed so that it does not affect any air-supply system. The air being exhausted should not be entrained and recirculated into the workplace through the fresh air supply system. It should be positioned on the outside wall of the building or through the roof to a point that's 1.5 times the height of the highest point of the roof.

2. Maintenance and testing of LEV systems

LEV testing should involve three principal stages:

- an initial appraisal of the system
- regular maintenance, including frequent visual inspections
- thorough examination and testing

Maintenance requirements

LEV systems should be subject to proper and routine maintenance. The type of procedure and its frequency depends on the nature of the system, but typical routine maintenance will involve:

- inspecting the integrity of hoods, ductwork, tubing, etc.
- lubrication of fans, motors, etc. as recommended by the supplier
- inspecting and replacing, where necessary, fan belts, fan bearings, seals, gaskets and other components that can wear out quickly
- changing filters before they become blocked, or if they are torn or damaged during use
- emptying collection bins, normally on a weekly or daily basis

Initial appraisal

An initial appraisal of a LEV system has two objectives:

- to demonstrate that the LEV works and achieves adequate control of the contaminants
- to establish operating criteria (velocities, static pressures) that can be used during subsequent thorough examinations and tests, to confirm that the system is operating effectively.

Ideally, the appraisal should be undertaken during commissioning of a competently designed LEV system, to check that it conforms to the design specification and is achieving adequate control of the contaminants in practice. The system supplier should be asked to provide this information as a condition of purchase. With an existing system, the appraisal should be undertaken after it has been ensured that it is performing adequately as per design specifications.

Regular inspections and maintenance

Simple checks should be carried out by supervisors, or process operators, at frequent intervals to identify potential problems with an LEV system so that they can be rectified quickly. If the LEV controls a particularly hazardous substance, then more frequent checks may be necessary.

The type of checks needed depends on the complexity of the LEV system, but may include:

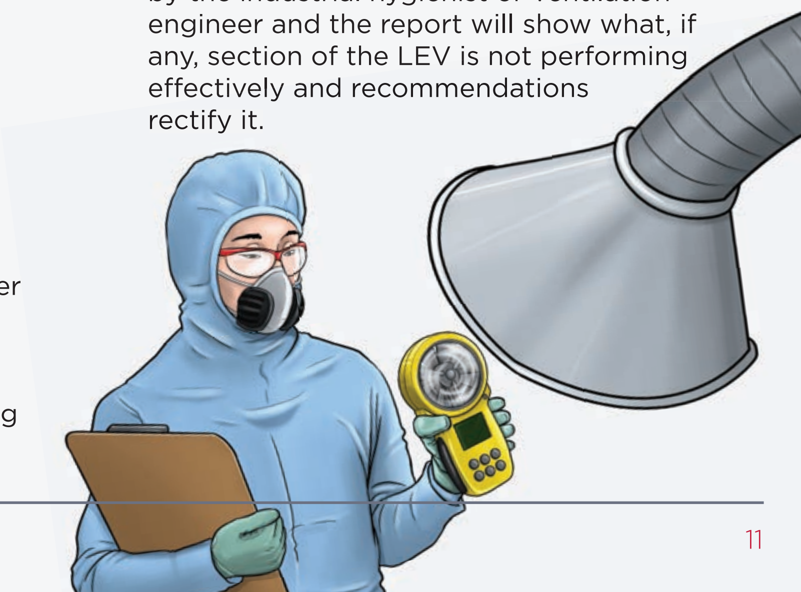
- looking for any obvious faults by simple observation of the hoods and ductwork
- taking readings from any pressure gauges, airflow indicators or other instruments fitted to the hoods, air cleaners, etc.
- using a dust-lamp or smoke tracer to provide visual evidence that the system is capturing contaminants
- checking the positions of any dampers
- undertaking minor servicing, such as emptying filter bins

Thorough examination and test

A thorough examination and test will normally comprise:

- a visual check
- Pitot tubes with flow manometers can be used to quantitatively measure the system
- a measurement of LEV performance and an assessment of control
- an assessment of the performance of the air cleaner or filter where air is recirculated

Thorough examination and tests are done by the industrial hygienist or ventilation engineer and the report will show what, if any, section of the LEV is not performing effectively and recommendations rectify it.

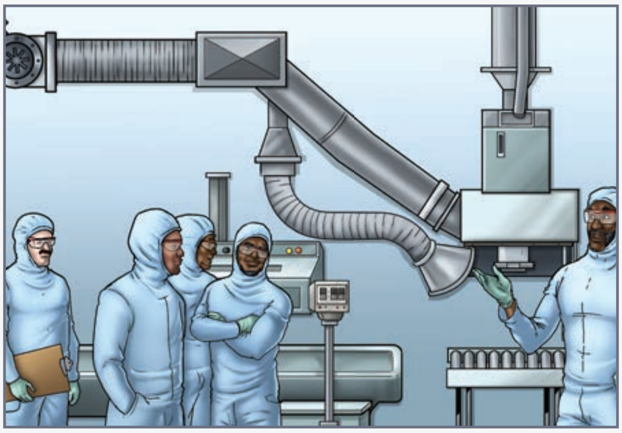


3. Record keeping

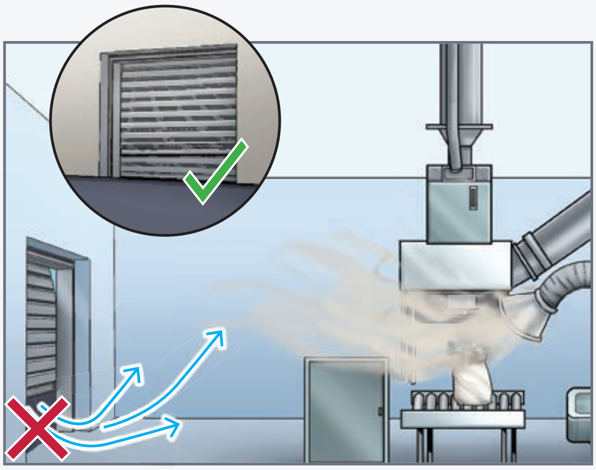
A record should be kept that indicates the initial design criteria and required monitoring checks, actual records and dates of performance monitoring, maintenance, parts replacement or any modification to the system.

4. Training

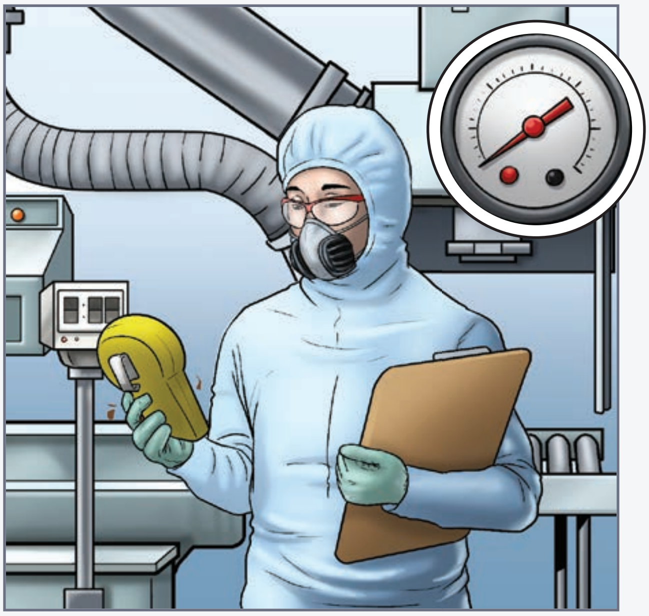
The employee using the LEV system should receive sufficient training so that they can use the system effectively. Training should be specific and deal with the actual system in place. The employee should:



- Understand the elements of the system and how they work
- Understand how to use the system effectively (for example, how to correctly place an extraction hood)



- Appreciate the limitations of the system and how they might render it ineffective. Often, employers/employees overestimate the robustness of the LEV system and do not appreciate that the system can easily be rendered ineffective by:
  - environmental changes outside the design specifications (for example, changes in general ventilation, draughts)
  - misuse or misplacement of equipment (for example, misuse of a fume cupboard or failure to maintain and monitor performance)



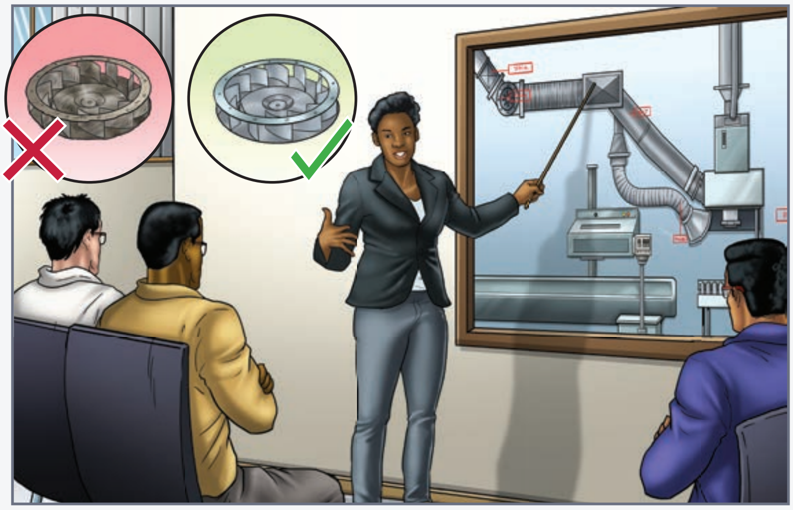
- Know how to check that the LEV system is working (reading flow indicators, pressure differential meters)

- Know what actions to take in the event of a system failure

4. Training (continued)

Maintenance staff will need the above training and relevant specific training relating to the maintenance of the system and hazards arising, such as potential exposure to contaminants and the hazards of possible entry into a confined space. The risk assessment should highlight possible risks that need action.

The employer should keep training records for each concerned employee. Changes to the work process and LEV mean that staff may need retraining.



Managers, superintendents, operators, engineers and industrial hygienists all have duties to perform to ensure LEVs work as they should (capture, carry and collect harmful particulates). This document includes lists of inspection and verification questions for each of these job roles that will help to ensure LEV systems are appropriately selected, designed, installed, operated, and maintained.

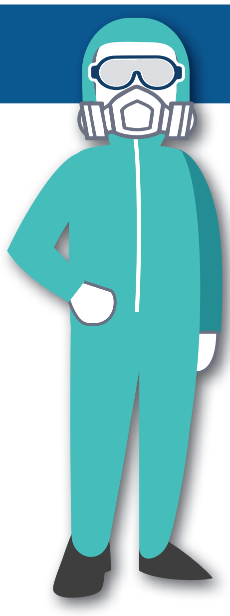
Managing LEV systems as a Critical Control

5. Audit Questions

This section provides example lists of 'Go/No Go' questions that could be implemented as part of job risk assessments and operational documents to help manage LEV as a critical control for controlling exposure to chemicals that cause platinum sensitisation. Example lists of 'Go/No Go' questions are provided for Operators, Superintendents, Managers, Maintenance/Engineering and Industrial/Occupational Hygienists responsible for installing new equipment and processes. Please refer to the list of questions for the role that most aligns with your role and responsibilities. The question lists are intended to verify that appropriate systems, processes and checks are in place to ensure LEV, as a critical control, is effective. This includes empowering workers to stop work or not begin a task if a problem is identified.

These question lists are provided as examples. Implementation of such a scheme and the specific questions that would be most appropriate may differ between different companies and sites. Questions should be appropriate and understandable to their target audience and ideally be binary ('Go/No Go'). In implementing such a scheme, consideration should be given to when and how often it is appropriate to ask and answer individual questions. For some questions, such as those relating to checks performed by Operators, it may be appropriate to ask and answer the question each time before commencing a task that uses the critical control to help control exposure to chemicals that cause platinum sensitisation. For other questions, it may be more appropriate to schedule them for daily or weekly checks, while others, such as most of the questions intended for Managers, would be more suitable for attention perhaps quarterly or annually.

* Some images have been illustrated based on visual references from Controlling Airborne Contaminants at Work: A guide to local exhaust ventilation (LEV)



Operators

How to use this guide:

- Review each critical control's effectiveness, at their specified frequency, using the questions below.
- If you answer NO to any of the questions, immediate action must be taken to inform your line management to find a suitable temporary fix or permanent solution.

Managing LEV systems or components as a Critical Control

Have I been trained on LEVs and can I use the system effectively?	YES	NO
Does the indicator (pressure/flow) show the LEV is working properly?	YES	NO
Is the LEV system taking all the harmful dust, mist, fumes and gas away? Remember, some of these may be invisible.	YES	NO
Is the ductwork in good condition and not damaged?	YES	NO
Is the LEV system free of any signs (e.g. smells or settled dust) that it is not working properly?	YES	NO
Is the LEV system running without any unusual noises or vibration?	YES	NO
Has the LEV been thoroughly tested, with a 'tested' label that is within date?	YES	NO
Can I do my job/task properly with the LEV system in the correct place?	YES	NO
Have i told my supervisor about anything i think may be wrong?	YES	NO

Superintendents

How to use this guide:

- Review each critical control's effectiveness, at their specified frequency, using the questions below.
- If you answer NO to any of the questions, immediate action must be taken to inform your line management to find a suitable temporary fix or permanent solution.
- Communicate this Good Practice Guidance and Audit Questions to Operators and other relevant staff and contractors.

Managing LEV systems or components as a Critical Control

1. Design

1.1 Hood design

Am I happy the hood is fit-for-purpose and meets best practice?	YES	NO
Have I inspected all hoods for compliance against design?	YES	NO

1.2 Ducting

Have I reviewed duct design against original design?	YES	NO
Have I audited all ducts for compliance against the original design?	YES	NO
Have I assessed ducts against the latest LEV survey reports for transport velocities and leakage identification?	YES	NO
Have I inspected all ductwork for damage and deterioration?	YES	NO

1.3 Filter

Have I reviewed the filter replacement against the schedule?	YES	NO
Have I assessed pressure trends across filters for replacement?	YES	NO
Are the ventilation flow conditions optimal for filtering?	YES	NO

2. Monitoring of LEV systems

2.1 Fan

Have I checked fan performance against fan design, with identification of early warning indicators?	YES	NO
Have I complied with pre-work system checks to identify optimal performance?	YES	NO

3. Checking and maintaining existing LEV systems

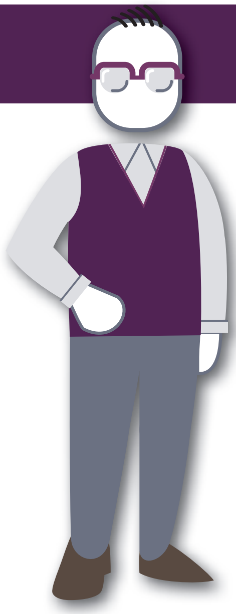
Have I reviewed the latest LEV performance against actuals and followed-up on recommendations?	YES	NO
Have I confirmed flow gauges and/or manometers (pressure gauges) are in place across the system to indicate a failure in each part of the system?	YES	NO

3.1 Register

Have I assessed the recommendations from inspections, OEM requirements and actual observations against the commissioning report?	YES	NO

4. Training

Have I evaluated training records against identified individuals to ensure training on LEVs is planned and executed?	YES	NO
Have I been trained on LEVs and can I use the system effectively?	YES	NO



Managers

How to use this guide:

- Review each critical control's effectiveness, at their specified frequency, using the questions below.
- If you answer NO to any of the questions, immediate action must be taken to find a suitable temporary fix or permanent solution.
- Communicate this Good Practice Guidance and Audit Questions to Superintendents, Operators, Maintenance/Engineering, and Industrial/Occupational Hygienists and/or EHS team members.

Managing LEV systems or components as a Critical Control

1. Design

1.1 Hood design

Have I compared the actual and planned-hood design against OEM specifications, best practice guidance and LEV survey reports when budget plans are considered for exposure reduction targets?	YES	NO
Am I comfortable that the LEV hoods are fit-for-purpose and meets best practice?	YES	NO
Have I scrutinised compliance to hood failures (reports/observations)?	YES	NO

1.2 Ducting

Have I reviewed the latest LEV survey reports, commissioning reports and recommendations to identify and enhance duct design?	YES	NO

1.3 Filter

Have I approved and allowed recommendations to improve filtering devices?		
Are LEV units fitted with pressure indicators?	YES	NO

1.4 Discharge

Are discharge systems/stacks positioned in such a manner as to not contaminate fresh air supplies? YES NO

2. Monitoring of LEV systems

2.1 Fan

Do I understand the criticality of substandard fan performance when exposure reduction targets are not achieved? YES NO

Are any ventilation simulations scheduled to assess LEV performance and enhancements? YES NO

3. Checking and maintaining existing LEV systems

Do management reports include the effectiveness of LEV systems? YES NO

Are checks aligned with an overall risk programme assessing control effectiveness which warrants planned maintenance accordingly? YES NO

3.1 Register

Have I reviewed the LEV system inspection register as part of the hierarchy of controls optimising overall LEV systems? YES NO

4. Training

Have I approved employee (i.e. supervisors and operators) training to enhance the understanding of LEV effectiveness? YES NO

Is there a training module in place? YES NO

How to use this guide:

- Review each critical control's effectiveness, at their specified frequency, using the questions below.
- If you answer NO to any of the questions, immediate action must be taken to inform your line management to find a suitable temporary fix or permanent solution.

Managing LEV systems or components as a Critical Control

1. Design

1.1 Hood design

Have I evaluated design parameters against planned and actual hoods?	YES	NO
Have I made a recommendation for hood position and dimensions?	YES	NO
Did I assess or test the capture and/or face velocities against the company standard?	YES	NO

1.2 Ducting

Did I compare the actual/planned design against the engineering standard/specifications?	YES	NO
Have I checked to see if any ducts need to be retrofitted to allow planned volumetric and pressure requirements?	YES	NO

1.3 Filter

Did I assess design effectiveness with early indicators of filter replacement?	YES	NO
Did I assess filtering effectiveness against fan pressure and duct work?	YES	NO

MAINTENANCE/ENGINEERING

2. Monitoring of LEV systems

2.1 Fan

Did I perform fan pressure volume tests to assess fan capability?	YES	NO
Did I assess maintenance frequency on fan volume requirements against OEM specifications and the commissioning report?	YES	NO

3. Checking and maintaining existing LEV systems

Did I review ventilation reports for trends and analyses of key parameters: • transport velocity/duct design • hood design • capture hood velocity or face velocity • fan pressure against fan design	YES	NO
Did I review and promptly report any deficiencies in performance to the responsible manager?	YES	NO
Did I establish an LEV maintenance and servicing schedule and are these works carried out regularly?	YES	NO
Have I ensured that the LEV system is regularly cleaned?	YES	NO

3.1 Register

Did I review records and trends against design specifications and the commissioning report?	YES	NO

4. Training

Am I up to date with ventilation flow design and key parameters?	YES	NO
Am I competent to assess LEV systems and carry out thorough examinations and tests, and hold suitable certifications?	YES	NO

Industrial/Occupational Hygienists

How to use this guide:

- Review each critical control's effectiveness, at their specified frequency, using the questions below.
- If you answer NO to any of the questions, immediate action must be taken to find a suitable temporary fix or permanent solution.
- Communicate this Good Practice Guidance and Audit Questions to all relevant staff, including Managers, Superintendents, Operators, and Maintenance/Engineering

Managing LEV systems or components as a Critical Control

1. Design

1.1 Hood design

Have I measured face velocities against the specification listed in the commissioning report?	YES	NO
Have I measured capture hood velocities against the specification listed in the commissioning report?	YES	NO
Did I assess or test the capture and/or face velocities against the company standard?	YES	NO

1.2 Ducting

Have I measured transport velocity against the specification listed in the commissioning report?	YES	NO
Have I measured static pressure to assess build up of restriction/assessment of duct sizes (too small or too big)?	YES	NO
Have I measured static pressure to assess leakage points in ducting?	YES	NO

1.3 Filter

Have I measured/monitored differential pressure across the system to identify optimal performance?	YES	NO

2. Monitoring of LEV systems

2.1 Fan

Have I measured/monitored fan volume and intake pressure against rated fan power?	YES	NO
Did I compare fan pressure volume against fan curve to assess whether the fan is running in stall?	YES	NO

3. Checking and maintaining existing LEV systems

Did I assess ventilation readings and compare actuals to the standard?	YES	NO
Did I review and promptly report any deficiencies in performance to the responsible manager?	YES	NO
Did I carry out visual inspections across the whole LEV system?	YES	NO
Did I follow up and close out all identified actions to correct or improve the LEV system?	YES	NO

3.1 Register

Did I assess the commissioning report and then latest ventilation inspection report with recommendations to achieve desired flow and pressure conditions?	YES	NO

4. Training

Am I trained in LEV principles and design, flow measurement and identification of substandard ventilation conditions of hoods, ducts, filters and fan units?	YES	NO
Am I competent and hold relevant certifications from a suitable and recognised training provider to perform the above tasks?	YES	NO

Notes

IPA

INTERNATIONAL PLATINUM
GROUP METALS ASSOCIATION