LEV LOCAL EXHAUST VENTILATION 2024

10th & 11th September 2024

Hosted by

BOHS British Occupational Hygiene Society

LEV on trial – helping your clients to understand liability

Tina Conroy (Expert Witness, at Pragma and Associates)

LEV on trial – helping your clients to understand liability

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9 September 2024

Pragma+Associates
Health & safety expertise you can trust

Content

- Legislation and guidance
- Prosecutions by HSE
- Common issues identified in civil litigation
- How providers can help their clients.

A potted history – development of LEV in the UK

1903 – reference to systems but issues identified with effectiveness and filtration of fine dust

1907 –Describes *"systems of ducts and hoods leading to exhaust fans"* with *"separate hoods for each process…avoiding elbows in ducts…effective but not economical".* Notes that *"the question of local exhaust has been prominent throughout this year's work".* Refers to LEV present in arsenic, metal grinding, asbestos, silver polishing, granite, glass bottle manufacture and cotton work including 'teazle brushing'.

1911 – notes *"the use of local exhaust ventilation is steadily developing."* with *"considerable process" being made*

1930 – First reference to any criminal prosecution relating to non-provision and/or non-maintenance of LEV. 8 shillings penalty. Also references to 'Regulations relating to shotblasting operations and grinding that provisions are made in respect to LEV and testing of such, including 6 months for grinding. Different hood designs starting to emerge, e.g., extracted cabinets, and to removal of variety of contaminants including 'injurious vapours from liquids'.

1937 – Repeated references up to this point regarding the requirements of the Factories Act and how this 'strengthens existing law on the subject of special ventilation,… in particular exhaust ventilation as near as possible to the point of origin of the dust or fume must be provided <u>where practicable</u>'.

A potted history – UK

1950 reference to down draught systems, fume cupboards, extracted booths, different filter media. A lot of emphasis on the development and use of Tindal beam technologies in evaluating effectiveness of LEV systems. Details on adverse health effects occurring due to 'lack of exhaust ventilation'. *"Progress is reported everywhere in a variety of trades, with different methods ingeniously adapted to suit widely differing types of dust and process."* Noted that constant care is necessary in maintaining systems.

1965 – Description of the development of lip extraction to control fumes from metal degreasing activities and 'push-pull systems' on pedestal grinders. Also the application of LEV to portable work tools in the form of 'low-volume, high velocity' systems.

1970 – Brief overview of historic situation with concentration on the successful use of LEV in the asbestos industry

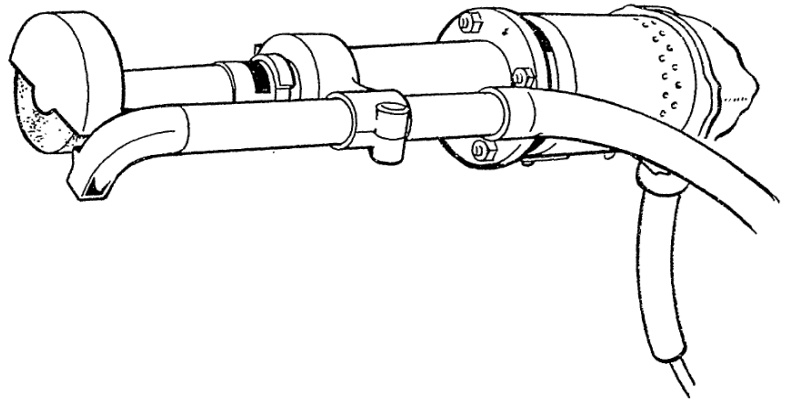

Figure 6: *Low-volume high-velocity exhaust system applied to a portable abrasive wheel.*

A potted history - legislation and guidance

1. **<u>Factories Act – 1938 and 1961</u>**

Section 47(1) states:

"In every factory in which, in connection with any process carried on, there is given off any dust or fume or other impurity of such a character and to such an extent as to be likely to be injurious or offensive to the persons employed, or any substantial quantity of dust of any kind, all practicable measures shall be taken to protect the persons employed against inhalation of the dust or fume or other impurity and to prevent its accumulating in any workroom, **and in particular, <u>where the nature of the process makes it practicable</u>, exhaust appliances shall be <u>provided and maintained</u>, as near as possible to the point of origin of the dust or fume or other impurity, so as to prevent it entering the air of any workroom."**

The requirements of Sections 47(1) of the 1937 Act were carried forward to the Factories Act 1961 and renewed by Sections 63(1) of the 1961 Act.

Relevant legislation and guidance - 1960

Ministry of Labour published guidance booklet "*Toxic Substances in Factory Atmospheres*". The document noted the requirements of the Factories Act in relation to dust and fumes.

- *THE 'FUME CUPBOARD' Principle - Enclosure as far as practicable coupled with exhaust draught If substitution methods, or total enclosure, prove to be impracticable.*
- *LOCAL EXHAUST - If substitution methods, or total enclosure, or the use of the 'fume cupboard' principle prove impracticable, then, and only then, the question of local exhaust arises… Local exhaust should be designed to enclose the source of contamination as far as practicable. But even so, large volumes of air are necessary to control dust or fume (except in cases where the **low volume high velocity exhaust system** is used).*
- *The air velocity required increases very rapidly with the distance of the hood from the source of the dust or fume and, as factory law recognises, it is essential to provide and maintain exhaust appliances as near as possible to the point of origin of the dust or fume or other impurity.*
- *Even so the device may need constant readjustment if the source of dust moves (as in drilling a large "block of stone). Where such devices are used their design and skilled maintenance are important. The atmospheric impurity should be drawn away from the worker and so discharged that it cannot enter the air of any workroom".*

Relevant legislation and guidance

1970 Department of Employment; Asbestos: Health Precautions in Industry

ASBESTOS REGULATIONS

Dust suppression
Total enclosure
Partial enclosure with exhaust draught
Booths
Receptor and captor hoods
Filtration and dust-settling plant

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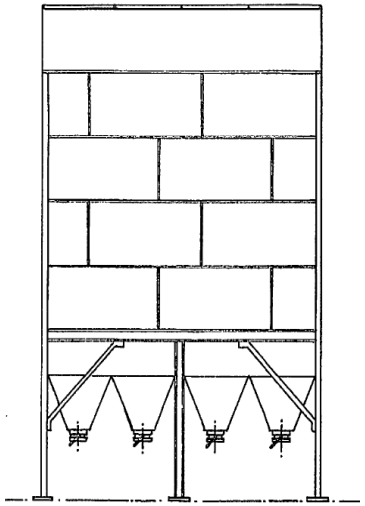


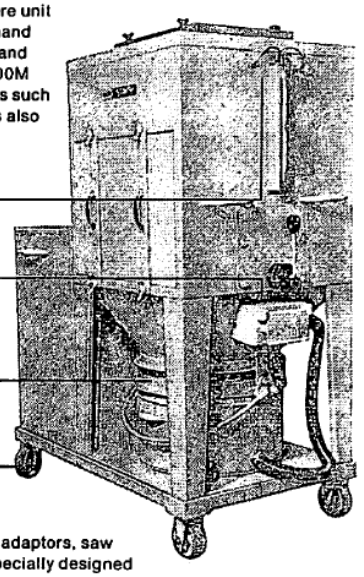
DUST COLLECTORS FOR ASBESTOS DUSTS

Send for our leaflets on our range of dust collectors and Spiralduct lockseam ducting. We design, manufacture and install complete dust removal plants.

POTTERIES VENTILATING & HEATING CO. LTD.
Redhills Road, Milton, Stoke-on-Trent, ST2 7ER
Telephone: 0782-54235

There are only two dust control units designed in the light of the new asbestos regulations. And DCE make them both.

The DCE Unimaster UMA40M is designed for use on construction and similar sites where unit mobility is required. It can be applied to hand drills, hand saws and similar small tools, and be used for vacuum cleaning. The UMA100M (not shown) is for use with small machines such as dimension saws and band saws, and is also mobile. Both have the very high filtration efficiency necessary where asbestos materials are being worked.



Secondary filter ensures discharged air is of required cleanliness, a Manometer indicates filter condition.

Multiple inlets mean several tools can be serviced simultaneously. Suction is powerful enough to use long lengths of hose.

Quick release container suitable for plastic liner to ensure hygienic removal and disposal of dust.

Compact in design and fitted with castors for greater mobility.

Accessories: drill nozzle pack with set of adaptors, saw shroud, vacuum cleaning attachments, specially designed exhaust hoods.

Relevant legislation and guidance

1970, ARC Health and Safety Guide No. 7; *"The Control of Dust by Exhaust Ventilation when working with Asbestos"*

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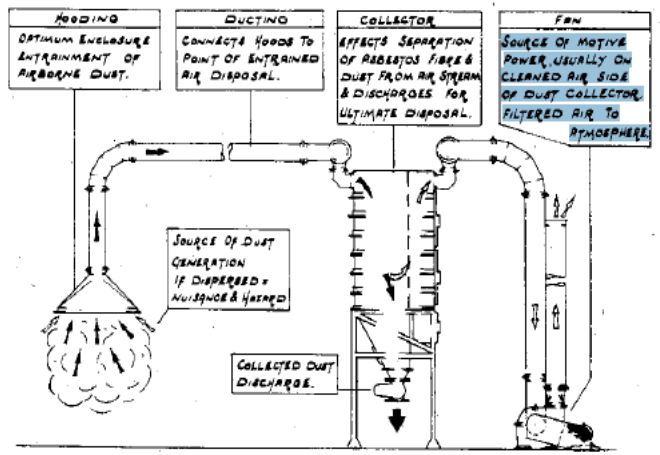


Typical Dust Control System

2.1 Dust control systems normally consist of:—

Hooding—the optimum enclosure and entrainment of airborne dust.

Ducting—connects the hood or hoods with the dust collector.

Dust Collector—effects separation of particles and dust from the air stream.

Fan—moves the dust laden air.

Type of System	*Estimated Cost on 1,000 cfm of Air Handled*	*Estimated Cost on Minimum Installations*
Small self-contained unit serving one or two machines	£800–1,000	1,000 cfm £800
Fabric filter, multiple point, intermittent operation	£500–650	2,500 cfm £1,250
Fabric filter, multiple point, continuous operation	£600–800	7,500 cfm £4,500
Wet deduster, multiple system	£350–500	2,000 cfm £1,000
Low volume/high velocity system —multiple point	n.a.	200 cfm £350

Statutory Inspection and Examination of Exhaust Ventilation Equipment

.1 Regulation 7, paragraphs (3) and (4), of the Asbestos Regulations 1969 requires that

"(3) Exhaust ventilation equipment provided in accordance with this Regulation shall be inspected at least once in every seven days and shall be thoroughly examined and tested by a competent person at least once in every period of fourteen months, and a report of the results of every such examination and test containing approved particulars and signed by the person making or responsible for the carrying out of the examination and test shall be made within fourteen days after the examination and test.

"(4) Every such report as aforesaid shall be attached to the general register and be preserved and kept available for inspection by any inspector for a period of two years after it is made."

Relevant legislation and guidance

1970, ARC Health and Safety Guide No. 7; *"The Control of Dust by Exhaust Ventilation when working with Asbestos"*

Appendix E

YEARLY (OR 14 MONTHLY) EXAMINATION AND TESTING CHECK LIST

1. All hoods and ducting are in position and in good order.
2. There are no air leaks to any part of the system.
3. The condition of all filter elements is good.
4. There is no unacceptable wear of component parts of the filter shaking or cleaning gear.
5. All lubrication points are charged.
6. The fan and drive to the fan are in good condition and correctly adjusted.
7. The air flow in each part of the system and the fan inlet pressure are to the designed specification.

While the above are listed as suggested items to be checked and recorded formally in accordance with the statutory requirements, it is recommended from experience that Ite[redacted](4), (5) and (6) be also checked every three months.

3 Low Volume—High Velocity Exhaust Systems

The exhaust systems described in previous paragraphs are of the conventional High Volume—Low Velocity type, but mention must be made of Low Volume—High Velocity Exhaust Systems (LV/HV) which have found application in recent years, particularly to hand tools and machining operations. Control is achieved by exhausting the air directly from the point of dust generation, using close-fitting, custom-made hoods and nozzles. Capturing velocities are high (10,000 to 12,000 feet per minute), but the volume of air used is low (10 to 250 c.f.m.) because of close proximity of the nozzle to the dust source. For flexibility, small-bore plastic hose can be used as a connection to the tool with the remainder of the system utilising fixed steam piping and fittings. This method, wherever it can be applied, provides local exhaust ventilation with effective control at the dust source and in situations where conventional High Volume—Low Velocity systems would be too cumbersome to be practicable.

The dust is conveyed at high speed through the flexible pi[redacted]nd, with the high entering velocities involved, ex[redacted]t ne[redacted]o be

Relevant legislation and guidance - 1987

1987; Control of substances hazardous to health (COSHH) regulations 1987

Prevention or control of exposure to substances hazardous to health

Regulation 7 –

"(1) Every employer shall ensure that the exposure of his employees to substances hazardous to health is either prevented or, where this is not reasonably practicable, adequately controlled.

(2) So far as is reasonably practicable, the prevention or adequate control of exposure of employees to a substance hazardous to health shall be secured by measures other than the provision of personal protective equipment."

Relevant legislation and guidance - 1987

Regulation 9 - Maintenance, examination and test of control measures etc.

"(1) Every employer who provides any control measure to meet the requirements of regulation 7 shall ensure that it is maintained in an efficient state, in efficient working order and in good repair.

(2) Subject to regulation 17(3) (which relates to transitional provisions), where engineering controls are provided to meet the requirements of regulation 7, the employer shall ensure that thorough examinations and tests of those engineering controls are carried out—

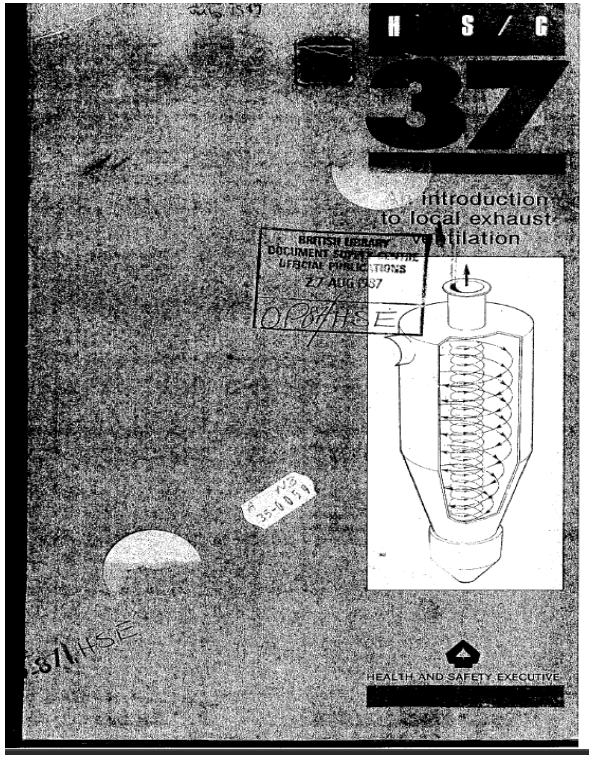
- *in the case of local exhaust ventilation plant, at least once every 14 months, or for local exhaust ventilation plant used in conjunction with a process specified in column 1of Schedule 3, at the interval specified in the corresponding entry in column 2 of that Schedule…*

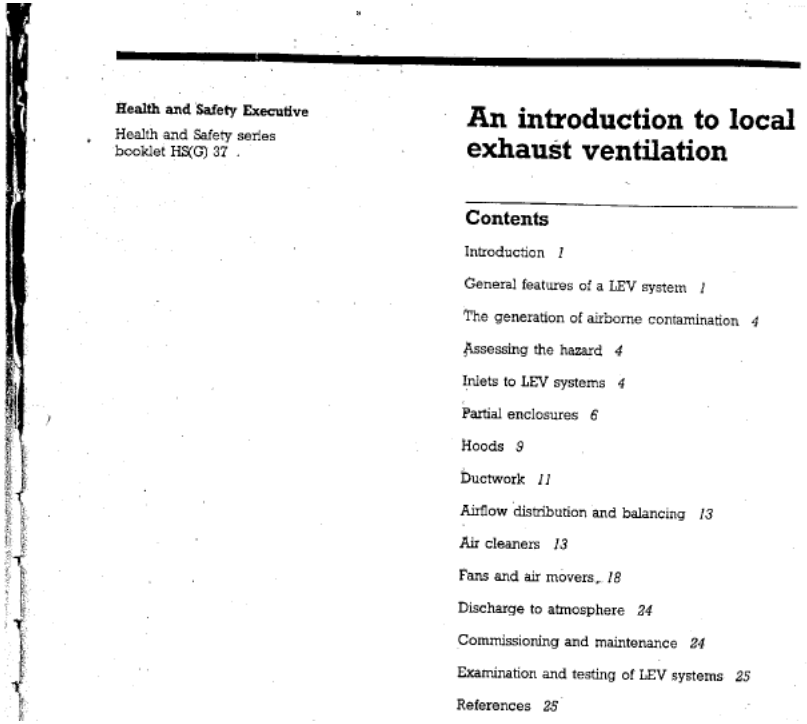
(4) Every employer shall keep a suitable record of the examinations and tests carried out in pursuance of paragraphs (2) and (3) and of any repairs carried out as a result of those examination sand tests, and that record or a suitable summary thereof shall be kept available for at least 5 years from the date on which it was made."

Relevant legislation and guidance; current

- Health and Safety at Work Act 1974
- Control of Substances Hazardous to Health (COSHH) Regulations 2002
- The Management of Health and Safety at Work Regulations 1999
- The Provision and Use of Work Equipment Regulations 1998 (PUWER)
- The Supply of Machinery (Safety) Regulations 2008 (SMSR)
- The ATEX Directive 94/9/EC (with users covered under DSEAR)
- CAW Regs; CLAW Regs, etc.

Relevant legislation and guidance - 1987





Health and Safety Executive

Health and Safety series
booklet HS(G) 37

An introduction to local exhaust ventilation

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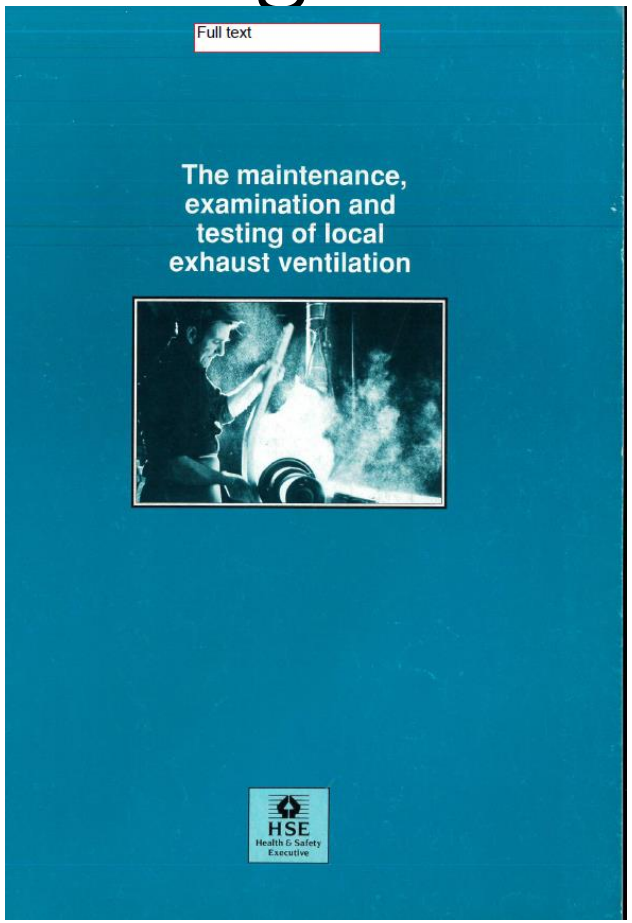
Relevant legislation and guidance; 1990



The maintenance, examination and testing of local exhaust ventilation

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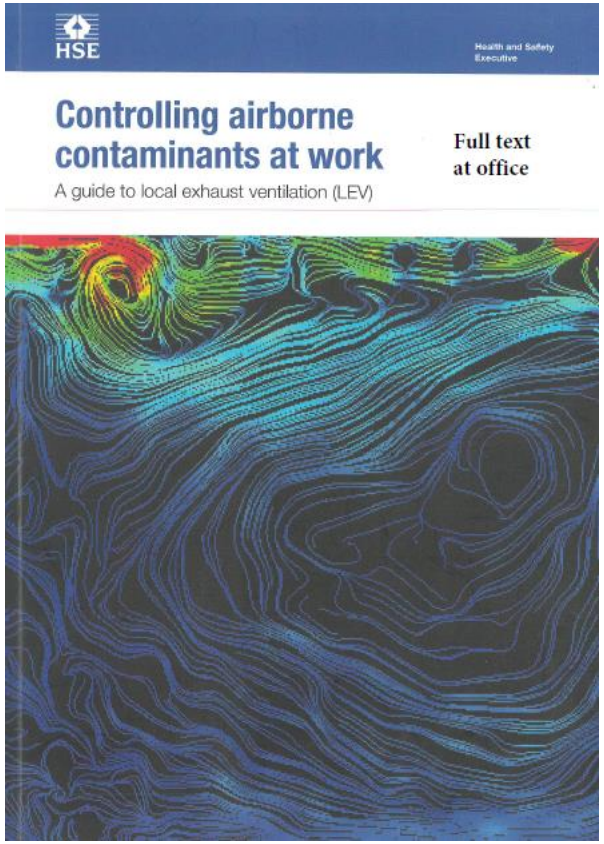
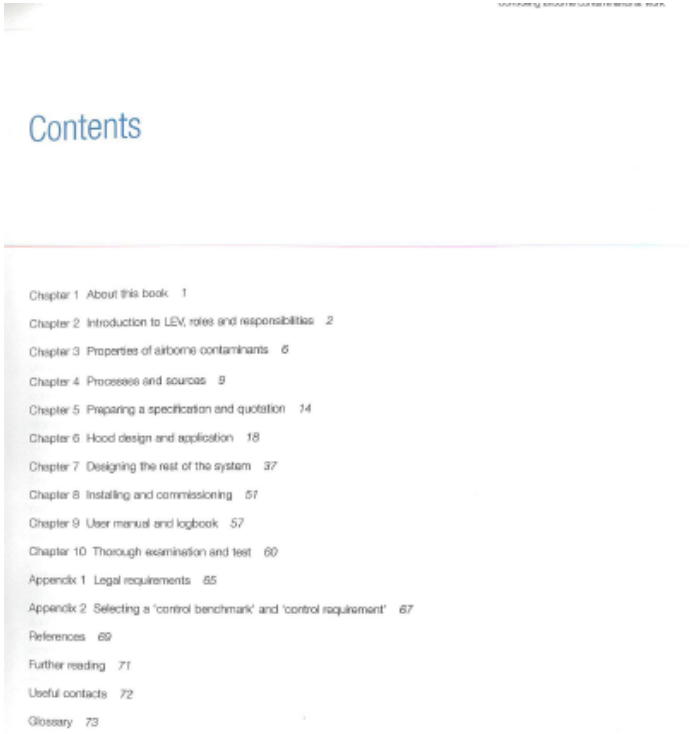
London: Her Majesty's Stationery Office

Relevant legislation and guidance; 2008

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LEV - Current situations re: regulatory enforcement

1. Employers

Over the last 5 years, there have been 5513 enforcement notices (718 prohibition notices and 4795 improvement notices) issued by the HSE that include reference to LEV. Issues raised included:

- No provision of LEV.
- Failure to undertaken TExT within 14 months.
- Use of unsuitable portable LEV systems with no identifying markings.

Current situations re: regulatory enforcement

2. LEV examiners

"In the last 12 months a number of enforcement notices have been served on companies testing LEV systems. The test companies were providing false assurances to their clients, who were incorrectly led to believe that their LEV was capable of providing adequate control of exposures.

In addition, appropriate enforcement was also taken by HSE against the employer for the LEV tested.

Improvement Notices were served because each company had failed to appoint a competent person to thoroughly examine and test the LEV plant." [HSE, 2 August 2023]

Current situations re: regulatory enforcement

- **The LEV Man Ltd (Improvement notice)** – 'Failure to demonstrate that you are competent to carry out TExT of LEV because the reports you are providing, contain inadequate information relating to the hazardous substances and incorrect information relating to velocity…"

- **HSE Testing Ltd (no relation to HSE) (improvement notice)** – N issued as you have failed to appoint one or more competent persons to assist you in undertaking the measures you need to take to comply with the requirements of Section 3(1) of the Health & Safety at Work etc. Act 1974 to ensure that you conduct your undertaking, namely, the Thorough Examination and Testing of local exhaust ventilation (LEV) systems and exposure measurement by air sampling, in such a way as to ensure, so far as is reasonably practicable,….

Current situations re: regulatory enforcement

- **Quality Air Extraction Ltd (improvement notice)** - N issued as you have failed to appoint one or more competent persons to assist you in undertaking the measures you need to take to comply with the requirements of Section 3(1) of the Health & Safety at Work etc. Act 1974 to ensure that you conduct your undertaking, namely, the Thorough Examination and Testing of local exhaust ventilation (LEV) systems and exposure measurement by air sampling, in such a way as to ensure, so far as is reasonably practicable, that persons not in your employment who may be affected thereby, are not exposed to health risks.
- **Air Plants Dust Extraction Ltd (prohibition notice)** - Air Plants Dust Extraction Limited-PN case-20/04/2023 Failure to provide adequate advice and information in your thorough examination and test reports for LEV plant resulting in the risk that your clients, as part of their undertakings, do not adequately control occupational exposures to substances hazardous to health.

7. Lack of user manual or logbook

1. No LEV system

6. No routine checks

Common issues in civil litigation

2. LEV system unsuitable for contaminant process

5. TExT – provision and content

4. No reduction in exposure

3. Lack of commissioning data/ documents

In conclusion…

- Regulatory requirement dating back in some industries pre-Factories Act (1938).
- Design and inspection requirements have been around for decades.
- Suppliers need to be competent and able to demonstrate competency.
- Don’t presume your client is an expert!!
- Provision of documentation and training are key. Don’t underestimate the importance of suitable and sufficient documentation.

Questions?

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