MANCHESTER 1824
The University of Manchester

Safety Services Guidance

Testing of Fume Cupboards by University staff.

Key word(s):	LEV, Local Exhaust Ventilation, Fume cupboards, Fume hoods, Thorough Examinations, face velocity measurements, COSHH, Chapter 32
Target audience:	Heads of School, SSAs, Technical Staff involved in testing fume cupboards.

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Introduction

1. Since January 2014, thorough examinations of local exhaust ventilation[1] are carried out through a centrally managed contract[2] and programme, as described in Chapter 32 of the University's Health & Safety Arrangements. Local safety advisors have access to the reports, and respond locally to defects as well as to users' complaints of poor performance.

2. Although the annual examinations are carried out independently, local safety advisors often need to arrange for performance checks following repairs or changes, or in response to user complaints. They may ask the independent contractor back, or they may undertake air velocity checks themselves. This guidance is for school personnel carrying out those measurements, to help them ensure that fume hoods are providing the level of control expected.

3. Where other types of LEV are used, for example, biosafety cabinets, Nederman-type trunks and capture hoods, these must also be tested and further advice can be sought from Safety Services.

Planning for testing

4. Any assessment of LEV performance should be carried out by a competent person. Whilst the testing itself is not complicated, those undertaking the testing may benefit from attending the training course entitled "Controlling airborne contaminants at work" through STDU, as it provides an insight into why the testing is critical.

5. There should be a clear written protocol (for example, in the local arrangements section of a School's policy documents) which explains:

    a) who is responsible for testing the fume hoods;

    b) what equipment should be used and how. A good quality rotating vane anemometer should be reasonably accurate for most fume cupboard tests. If the face velocity is intended to be below 0.4 m/s it is likely that a hot-wire anemometer is required.

    c) how the anemometer is calibrated. This should be undertaken every year before testing commences by a competent person (generally an external body).

[1] As required by regulation 9 of the Control of Substances Hazardous to Health Regulations 2002 (as amended)
[2] Currently with Allianz, managed through the Safety Office

d) who is responsible for making the fume hoods accessible and safe to carry out measurements.

e) what the expected average face velocity should be. Each fume cupboard would have been designed and calibrated to operate at a face velocity detailed in the commissioning certificate. If this is not available, then an average of 0.5m/s or 1.0m/s for dusty activities (HSE, 2003) should be presumed for all fume hoods, except those undertaking particularly hazardous activities. Where 0.5m/s is consistently not achieved, it may be appropriate to have the LEV tested and re-commissioned by an external contractor, who will then specify the appropriate velocity. Advice on this is available from Safety Services.

f) how results should be recorded. Ideally, data should be recorded in a spreadsheet, and include all the face velocity measurements taken, not just the average. Data should not be overwritten – if a device fails and is retested at a later date, both the original and retest data must be clearly retained within the documentation. Paper copies are acceptable if they are easy to access and understand.

g) what action should be taken in the event of a failure. If a device fails, what should the tester do? This will require judgement and in some cases, the fume cupboard must be taken out of use. It makes sense for the tester to carry pre-printed and laminated signs to indicate that a failed fume cupboard should not be used. There should also be a clear process in place for informing lab users and escalating the fault. This process should make it clear who is responsible for reporting and tracking the fault. It is also important that there is a mechanism in place to ensure that the fume cupboard is retested after repairs but before being brought back into use.

Who is a competent person?

6. The person identified to undertake the tests must be competent to do so. This includes having the technical knowledge, understanding and ability to ensure that this primary control measure is "maintained" in a satisfactory condition. Whilst the testing itself is not complicated, those undertaking the testing may benefit from attending the training course entitled "Controlling airborne contaminants at work" through STDU, as it provides an insight into why the testing is critical.

7. They should be provided with adequate resources, both in terms of time and equipment to ensure that these tests are carried out effectively.

Tests, reports and outcomes.

8. The tests should consist of the following stages:

Stage 1: Visual checks

a) Is there any visible damage, wear and tear, etc.?
b) Is the unit in the correct operating mode?
c) Do the alarm, monitor and gauge work? If you have been trained through the STDU course you will have been shown how to cause the fume cupboard to alarm.
d) Are there any indications that it is not working effectively? E.g. Build-up of dust, debris, etc.? It may be appropriate to remove any dust on the sensors using a very soft brush.
e) Are there clear and understandable markings? E.g. to inform the user: How to use the fume hood? What height the sash should be used at (including max opening)? When the last face velocity test was?
f) Is the cupboard being used appropriately? E.g. are any of the vents being blocked by large equipment or the storage of materials?

Stage 2: Measuring face velocity

g) Carry out an appropriate number of face velocity checks. See paragraph 6 for further information.
h) Consider the impact of air make up/replacement function;
i) Is the door to the lab difficult to open, or is it being sucked open by the pressure in the lab?

Stage 3: Checking actual use

j) Is the cupboard fit for purpose: Is there a risk assessment available for the processes/substances in use in the hood? Does the assessment indicate that the fume cupboard is suitable? Is it being used for something particularly corrosive or energetic (e.g. HF)
k) Does the fume cupboard contain the substance: Does the fume cupboard actually provide operator protection i.e. contain the substance? Smoke tests (for example, using Dräger Air Flow Tester tubes) can often help with this.

9. To establish the correct number of test points, the method should be followed (taken from BS14175-4: 2003).

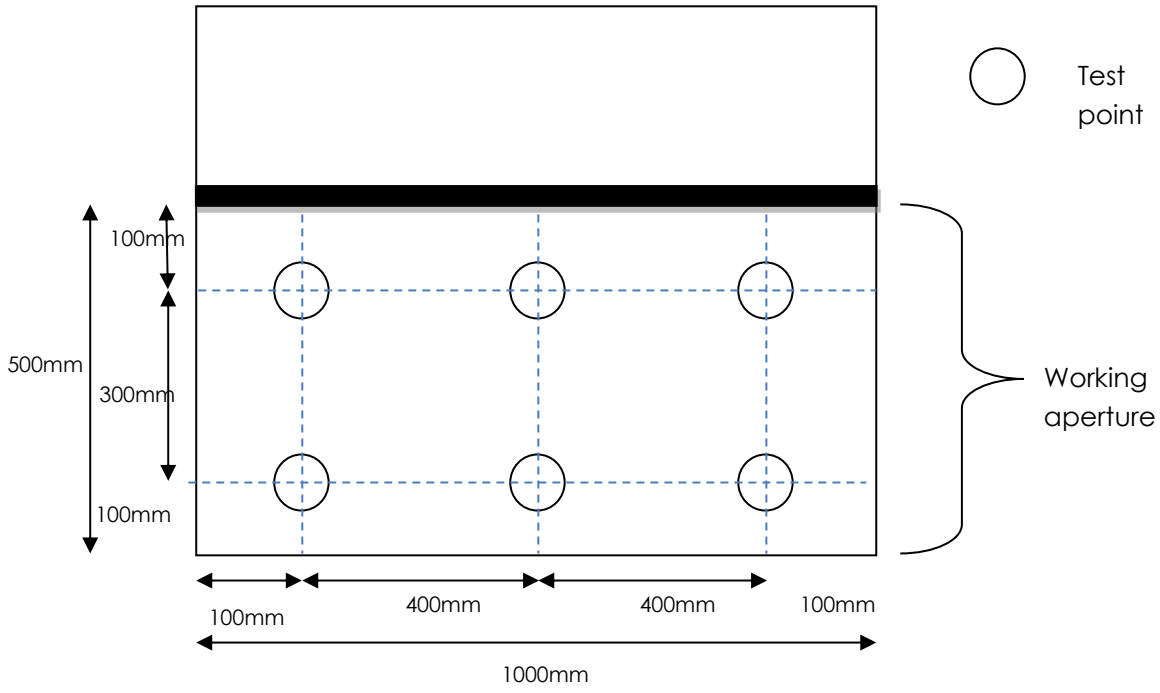
a) "The anemometer probe shall be positioned at points formed by the intersection of lines on the inner measurement plane (see examples in Figure 1) as follows:
b) a series of at least three equally spaced lines between the side boundaries of the inner measurement plane with the two outermost lines (100 ± 5mm) from the side boundaries. The lines in between

shall be at a distance of 400 mm or less from the outermost lines and to each other.

c) a series of at least three equally spaced lines between the horizontal boundaries of the inner measurement plane with the two outermost lines (100 ± 5) mm from the horizontal boundaries. The lines in between shall be at a distance of 400 mm or less from the outermost lines and to each other.

d) The sash shall be set to the height of 500mm. If the maximum height is less than 500mm, the maximum operational sash opening shall be used and noted." So, for example: A 1m wide fume cupboard with a sash set at a height of 50cm, should be tested in 6 locations, as shown in Figure 1. Each point should be monitored for 30 seconds.

Figure 1 Air velocity test positions



e) The average velocity (based on 6 or more readings) in m/s should be calculated to the second decimal place. There should also not be more than a 20% variation between the readings.

f) Once you have calculated the number required per fume cupboard, it makes sense to record this as a separate column on the records (for future reference).

10. A record of the test (whether pass or fail) should be posted on the fume cupboard.

11. Full records of the tests and calibrations should be kept for 5 years. An example format is provided on the Safety Services webpage http://www.healthandsafety.manchester.ac.uk/toolkits/chemicals/lev/ .

Monitoring

12. Thorough examination results are recorded electronically and available to local safety advisors. Measurements carried out between examinations should also be recorded, and reported to the local safety committee so that patterns of failure can be identified and corrected.

Review

13. Part of the monitoring process should include checks on whether there have been any significant changes to the face velocities, so that schools can respond to discrepancies or trends identified in the data.

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