**SOP-10101 - Safe Use of a Ducted Fume Cupboard**

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| **Introduction:** Fume cupboards are a type of local exhaust ventilation which provide protection for both users and co-workers from the inhalation of hazardous gases, vapours, aerosols and particulates. Ducted fume cupboards are by far the most common type of fume cupboard at the University. The velocity of the intake of air from the laboratory into the opening at the face of the fume cupboard prevents the contents escaping. The contaminants are then discharged into the environment above roof level.  There are three main types of ducted fume cupboards in use:   |  |  | | --- | --- | | Diagram of fume cupboard showing air flow | **Constant Air Volume**  These units maintain a constant air extract volume so that the face velocity varies depending on where the height of the sash and consequently the size of the opening. The minimum face velocity of this type of cupboard is 0.5 m/s.  Face velocities above 1 m/s can cause turbulence which may reduce the effectiveness of containment. | | **Variable Air Volume**  The face velocity of these fume cupboards remain constant irrespective of sash height. This is either achieved through variable speed motors or bypass valves which alter the volume of air pulled into the front of the cupboard. The fume cupboard extract may be linked to building ventilation systems to enable extract and supply air to be balanced.  The minimum face velocity of this type of cupboard is 0.5 m/s. | | **Low Flow High Performance**  These are specific fume cupboards which have been designed to provide containment of hazardous substances at much lower face velocities than conventional models (between 0.3 and 0.4 m/s). These units are more energy efficient however they can be more at susceptible from loss of containment due to poor use or set up. |   Many factors can influence how effectively a fume cupboard will contain contaminants:   * Large, bulky items and overcrowding with equipment & reagents can cause turbulence within the fume cupboard and may block the air flow to the rear baffles and result in a reduction in fume cupboard efficiency. * Containment may be significantly reduced by operator movements at the front of the fume hood. * Air flows within the laboratory can interfere with the laminar air flow into a fume cupboard. * Hotplates and Bunsen burners can affect the air dynamics within the cupboard.   Users should be aware of these and ensure the fume cupboard is set up to minimise these effects. |

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| **Pre-use checks** |
| * Ensure the fume cupboard is the correct type for the activity. * Check the label on the font of the cupboard that the cupboard has passed a thorough examination and test within the last 14 months. Do not use the cupboard if it is outside the 14-month period – contact technical staff to arrange testing. * Confirm that the fume cupboard is working satisfactorily by a visual check of function lights, and that the air-flow gauge is showing that face-velocity is at safe levels. * If the indicators show that the airflow is not satisfactory, do not use the fume cupboard, and report it to local technical staff. * Check for obvious surface contamination and clean if necessary, to avoid adverse reactions with the chemicals you intend to use. * Ensure that you have enough space to conduct your work safely and that all unnecessary items of equipment and chemicals not required in the process are removed. * Equipment should be sited at least 15 cm inside the plane of the sash to ensure efficient containment and the rear baffle is not obstructed. * Avoid placing large pieces of equipment in the cabinet where possible, as they may reduce the effectiveness of the containment. If their use cannot be avoided they should be raised up about 10cm using lab jacks, in order to allow air to pass unimpeded across the work surface. * If practical, place electrical equipment where it will not be splashed from a spill. * Keep items away from the sash opening to allow instant closure in an emergency. |
| **During use** |
| * The maximum height when working at the fume cupboard should be 0.5m, and where possible lower as this gives the best containment of fume/ vapour and helps contain any fire, explosion or splash that may occur. * Sashes should be lowered when your intervention is no longer required, including when stepping away for any period of time. * Keep the work area clean and tidy. * Perform operations as close to the middle of the cupboard as possible. * Try to avoid sudden rapid movements in front of the cupboard, these can cause turbulence that may draw the airborne hazardous material out of the cupboard. * Fume cupboards are designed for single users only – multiple bodies in front of the cabinet can affect containment. If another person is observing work, ensure they stand a little away from the cabinet opening. * Do not use naked flames in the cupboard as they will have a serious adverse effect on the air flow. * Hotplates must be kept to a minimum and be aware that they might adversely affect the airflow. * If an experiment is left running out of hours, a contact name and telephone number must be prominently displayed. Do not leave potentially hazardous work unattended. |
| **After use** |
| * At the end of your experiment remove equipment and clean the surfaces. Leave the fume cupboard in a clean, tidy and safe state. * Chemicals must not be stored in a fume cupboard used for experimental work - they could escalate an accident. * Dispose of waste in a safe appropriate manner as identified by the risk assessment and in accordance with waste management guidance notes. * If permitted by local rules/ lab risk assessment, switch off the fume cupboard. |
| **Emergencies** |
| * If the ventilation system fails:   + Immediately stop working. If safe to do so, replace lids on containers and terminate any ongoing processes.   + Pull the sash as low as possible and move away from the fume cupboard.   + Warn other workers there is a problem. * Deal with any spillages immediately, using the correct absorption materials. Dispose of as hazardous waste. * Treat fires with extreme caution. The use of high pressure CO2 may spread flames and eject items out of the fume cupboard. Only tackle fires if you have the correct firefighting equipment and have been trained to use it. Otherwise, close the sash and if possible turn off the fume cupboard. Activate the fire alarm by pressing the nearest red manual call point. Evacuate the building and contact security on 333. Make contact with the incident controller at the main entrance to the building and provide details of the incident. |

# Document Control

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