S+B
lab furniture + fume cupboards

Mobiline

Re-circulatory Filtration Fume Cupboard

Operational & Maintenance (O&M) MANUAL

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1. Introduction

Protection

Schools fume cupboards are designed to protect operators against inhalation of fumes which may cause discomfort and which may have the potential to be harmful to health.

A fume cupboard is not a totally sealed containment unit and should never be regarded as such.

As a manufacturer, our emphasis is on supplying the safest possible fume cupboard given current design, manufacturing and testing technology.

It is very important to note that whilst every effort is made to supply a product which optimises user protection in normal environmental and operational conditions, the environment and user behaviour can impact on the efficacy of any fume cupboard. Users should apply the following operational norms at all times in order to optimize the efficacy of the fume cupboard.

- Check that the extract fan is operating properly
- Keep the sash fully closed when not accessing the chamber
- When working at the fume cupboard always work with the sash at the recommended operational height as determined by the sash stop. When overriding the sash stop for unloading and unloading purposes, always ensure that the sash stop is re engaged
- Keep the slot at the base of the back-baffle clear of obstruction
- Do not have more equipment in the fume cupboard than is necessary for the current experiment / demonstration

Misuse of the fume cupboard can have a detrimental impact on the efficacy of the unit, therefore the guidance provided in this O&M Manual should be carefully observed.

2. Starting up the fume cupboard

Turning the fume cupboard on and activating the fan and then turning off is a very simple process. The on/off button is in the control/alarm panel located on the right side upright of the fume cupboard.

However before starting to use the fume cupboard, it is important to note:

The function of all fume cupboards is based on the principle that potentially harmful fumes are being directed by a flow of air and in the case of a re circulatory unit is treated by an activated carbon filter before releasing back into a room. Therefore, it is necessary that the cupboards are always provided with a fan, filter and exhaust system. When this system is out of order or disabled the cupboard will not function as a safety cabinet.

Check before starting activities and regularly during use that the fan is operating.

The standard extraction flow rates of the Mobiline fume cupboard are based on a face velocity of 0,30 m/s with a maximum operational sash height opening, of 400 mm.

The control and alarm panel located on the right hand vertical column of the fume cupboard will signal if there is not adequate air being drawn through the cupboard which may mean that the fan is not working properly and that the pre-filter needs replacing.

3. The function of the sliding sash and the sash stop

The fume cupboard is supplied with a toughened glass sliding sash with a maximum opening height of 500 mm from the work top (when the sash stop is overridden). The sliding sash runs very smoothly in the guides and therefore needs only a slight effort to move it.

The sliding sash is provided in order to:

- Allow installation of equipment;
- Allow access during the experiments;
- Provide protection with the sash positioned at the operational height as determined by the sash stop.

The Mobiline fume cupboard provides adequate protection up to the operational height determined by the sash stop.

The fume cupboard should only be operated with a maximum sash height opening as determined by the sash stop. Always ensure that the sash stop is engaged when operating.

4. The effect of activity in and in front of a fume cupboard

The face velocity in the sash opening of a fume cupboard will vary between closed sash position and the sash in the maximum operational opening position, due to the different levels of resistance.

Over vigorous activity in front of the sash opening (arm waving, lots of people walking quickly past the fume cupboard when operational), strong cross drafts caused by open

windows, poor window seals, doors opening and closing and air input grills (velocity and positioning) can cause any fume cupboard to fail to operate to the optimum and even result in leakage back into the room of some fumes, often discernable by smell.

Therefore, in order to optimize the ability of the fume cupboard to protect users, it is important in so far as is possible to site the cupboard away from doors, from cross drafts and from busy gangways. Users should avoid excessive and unnecessary movement in and in front of the chamber.

5. Worktop fume purging

An airflow baffle is fitted to the rear wall inside the cupboard which intensifies the airflow across the worktop, away from the operator and in the direction of the back of the fume cupboard and ultimately up to the removal point.

In situations where gasses or fumes are present, which are heavier than air, it is very important to minimise any obstruction to this movement of air away from the operator.

A few guidelines:

- The worktop, towards the rear of the cupboard, near the airflow baffle, must be kept clear. Do not place obstacles which will disrupt the airflow, within 10cm of the baffle.
- When using large instruments, try to keep 1 or 2 cm under the objects free in order not to disturb the worktop extraction. Large objects should be placed on blocks.
- Measurement and control equipment should be placed outside the cupboard, to minimise any disruption to the air flow.

6. Apparatus and installations inside a fume cupboard

Avoid installing equipment inside a fume cupboard which may obstruct the plane of the sash.

7. Noise rates

Due to air movement and fan activity, noise is generated. The noise level is determined by a number of factors such as the characteristics of the fan, the resistance of the filter and the acoustics of the room,

In general, the noise level at a distance of 1 meter in front of the fume cupboard is in the range of 50 to 63 dB(A).

8. Services

Unless otherwise specified all Mobiline Fume Cupboards are supplied with the following:

- 1 No. gas tap
- 1 No. cold water tap
- 1 No. drip cup
- 1 No. Bottle trap
- 1 No. twin 13amp switched socket outlet

The controls for the gas and water services are mounted on the fascia below the worktop outside the chamber and the outlets are mounted on the worktop inside the chamber.

The 13amp switched socket outlet is mounted on the facia below the worktop outside the chamber.

9. Control Panel

The control panel is mounted on the right side vertical upright and includes the following:

- Fan start button
- Fan stop button
- Fan ok indicator
- Light on button
- Light off button
- Air flow fail indicator
- Low air flow mute button
- Airflow safe indicator

The control panel is the means for activating the fan and the light. The alarm system provides a simple audible and visual indication to confirm that the unit is operating properly or if there is a fault in the system

10. Service Supply Lines

For connection to the mains supply. The Mobiline is fitted with flexible re enforced hoses for gas and water, which terminate with self closing quick release female couplings for connection to the mains. The electrical supply lead fitted terminates with a standard 240 volt 13amp plug for connection to a 240 volt 13amp switched socket

outlet. The waste pipe connected to the bottle trap terminates with a screw on connector for linking to the mains waste line.

The unit is fitted with a stainless-steel restraining anchor to prevent the fume cupboard being pulled out beyond the length of the service supply lines. This anchor should be connected to the restraining hook fitted to the Docking Station.

11. Docking Stations

They are supplied for either panel mounting (e.g. for mounting on a teacher's workstation or bench within the lab) or for wall mounting. Both are fitted with self closing quick release male couplings for gas and water (both are clearly marked) and a 240 volt 13 amp switched socket outlet.

The panel mounted version also includes a spigot for connecting the waste pipe line. The wall mounted version does not include the spigot, so waste should be connected directly to the mains waste pipe.

The unit is fitted with a restraining hook for connecting to the restraining anchor fitted to the fume cupboard.

12. Connecting the Services to Supply Lines

Electrical – insert the 240 volt 13 amp plug fitted to the fume cupboard into the 240 volt 13 amp switched socket outlet fitted to the Docking Station (to release unplug).

Gas and Water – push the self closing quick release female coupling fitted to the fume cupboard onto the male coupling (clearly marked for both services and non-interchangeable) fitted to the Docking Station and ensure that it is firmly engaged (to release, pull the collar back on the female coupling fitted the hose).

Waste – screw the flexible waste pipe fitted to the fume cupboard onto the male spigot fitted to the Docking Station (panel mounted version) until hand tight (to release, unscrew). For the wall mounted version, screw directly to mains waste pipe.

13. Changing the pre-filter

Isolate all mechanical and electrical services before carrying out any maintenance work.

The pre-filter is fitted to the fume cupboard to collect dust and to prevent the carbon filter from becoming clogged.

Remove the bypass grill using an Allen Key to unfasten the retaining screws.

Remove the pre-filter retaining screws on the under side of the roof using an Allen Key.

Slide out pre-filter

Replace the filter by reversing the process (pre-filters can be obtained from S+B).

S+B recommends the replacement of the pre-filter every 12 months and can supply replacements on request.

14. Replacing the Activated Carbon Filter

The extent to which the fume cupboard is used will determine the life span of the filter. The filter can operate satisfactorily for up to five years in some situations, but S+B recommends that the filter be replaced every 3 years.

CLEAPSS recommend replacing a filter used regularly in a science classroom once every 3 years and used regularly in a prep room once every 12 months. CLEAPSS also recommend filter saturation testing every 12 months and this is a service which S+B can provide.

Note - some chemicals (such as ammonia and hydrogen sulphide) may give off a smell even when passed through a fully operational filter. This does not signal a hazard, but any significant increased incidence of smell could indicate that the filter needs replacing.

Remove the fascia panel mounted above the chamber using the key provided.

Insert the key and turn both locks through 90deg, which will then release the panel.

Turn both levers located on the front of the filter casing clockwise until released.

Using the handle on the front of the filter casing, pull the filter outwards away from its housing. **Important – the filter is heavy and two people will be needed to take the weight and lower the filter.**

To replace the filter – reverse the process. S+B can provide replacement filters and can also carry out the removal and disposal of the old filter and fitting the new filter if required.

15. Legal Requirements (UK)

COSHH Regulation 9 requires that the fume cupboard is tested at least every 14 months. The test is to ensure that the fan is operating to a level consistent with the design face velocity.
CLEAPSS Building Bulletin 88 (attached) provides information on the requisite tests and record forms.
Although not a legal requirement, CLEAPSS recommends filter saturation testing every 12 months

These tests can be carried out by a suitably trained member of staff (lab technician would be the norm).

S+B can provide this service if preferred.

Please note – if the test reveals that the fume cupboard is not operating to the requisite standard as detailed in BB88, the unit must be labelled as out of use and must not be used until the unit is repaired or upgraded.

16. Substances which can be used in the Mobiline

In normal school use concentrations and release levels:

Organic Compounds –

Acid amides
Acid anhydrides
Acid Chlorides
Alcohols
Aldehydes
Aliphatic amines and their salts
Aromatic amines and their salts
Aromatic nitro compounds
Carboxylic acids
Esters
Ethers
Ketones
Nitriles
Organohalogens
Phenols
Pyridine.

Inorganic Compounds –

Aluminium chloride and bromide
Ammonia
Ammonia chloride fumes
Bromine
Chlorine
Chromium (VI) dichloride
Dioxide (chromyl chloride)
Hydrochloric acid vapour

Hydrogen Chloride
Hydrogen Sulphide
Iodine
Iodine chlorides
Lead fumes
Lead bromide fumes
Nitric acid vapour
Nitrogen oxides
Phosphine
Phosphorous (white)
Phosphorous chlorides and bromines
Phosphorous oxides
Silicon tetrachloride
Sulphur tetrachloride
Sulphur chlorides
Sulphur dioxide
Thionyl chloride
Tin (VI) chloride
Titanium tetrachloride
Zinc Chloride fumes.

Others –

Dyes
Enzymes
Smoke

17. Not to be used in the Mobiline

Neutral molecules such as hydrogen, carbon monoxide, methane, elemental mercury vapour.

18. Cleaning the Mobiline

Ensure all services are isolated before the commencement of any cleaning and maintenance activities.

External Cleaning – apply a mild detergent to a damp cloth and clean down as necessary. Wipe down all surfaces with a clean dry cloth.

Internal Cleaning – the person carrying out this work should wear protective gloves and goggles.

All equipment and substances should be removed from the chamber.

The chamber internal surfaces can be wiped down with a damp cloth treated with a mild detergent and a suitable neutralising agent to address the most commonly used reagents.

Periodically it is recommended that the back baffle be removed for cleaning the glass wall behind and the rear of the baffle.

A light hosing with water will help with any build up of particles in corners and at high level. Wipe down all surfaces with a clean dry cloth.

19. Storage

A storage cabinet is provided below the chamber which can be used for storing equipment and apparatus, but should not be used for storage of chemicals.

20. Routine Maintenance

Other than cleaning and changing of filters, the Mobiline requires little or no maintenance. Electrical socket outlets should be checked and certified in accordance with local regulations. Gas and water connections should be checked for integrity as and when required but at least every 12 months.