



*lab furniture + fume cupboards*

# Ecoline

## Fume Cupboard

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### Operational & Maintenance (O&M) MANUAL

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## 1. Introduction

### Protection

Fume cupboards are safety cabinets to protect you and your environment against harmful substances that are toxic, flammable, explosive, corrosive or radioactive.

**The protection provided by a fume cupboard is in the first place determined by the way you work with it.**

As a manufacturer our emphasis is on supplying you the safest fume cupboard that can be produced with the present state of technical knowledge.

The way the fume cupboard is used, however, determines whether it offers the best possible protection.

Below is some advice to users on working as safely as possible with this fume cupboard:

- Check that the extract system is in operation.
- A fume cupboard provides the maximum protection with the sash closed.
- An open sash provides adequate protection when not opened further than the maximum determined by the sash stop.
- Ensure good worktop level extraction by not cluttering the slot below the rear baffle.
- Do not have more equipment in the fume cupboard than is necessary for the current experiment.

**Human mistakes can be the cause of damages to the fume cupboard or equipment inside and also physical injury. Therefore it's important the user of the fume cupboard is aware with this O&M manual.**

## 2. Starting up the fume cupboard

The function of all fume cupboards is based on the principle that hazardous substances are being removed by an airflow. Therefore it is necessary that the cupboards are always provided with an extraction system. When this system is out of order or disabled the cupboard is useless as a safety cabinet.

**Therefore check before starting activities and regularly during operation that the extraction system is operating.**

Unless otherwise stated, the S+B fume cupboard is equipped with an electronic air flow alarm by Schneider Elektronik, which warns both acoustically and visually when the extraction rate is too low (see for further information chapter 3.0)

When several fume cupboards are installed, they can be supplied with a common switch for the extraction system. In this case some laboratories prefer a separate alarm light located with this switch.

When the installed fume cupboards vary from the S+B standard, your own organisation is the best adviser regarding the system that is to be used.

For the nomenclature of fume cupboard parts see attachment 1.

The standard extraction flow rates of the Ecoline fume are based on a face velocity of 0,30 m/s with a maximum operational sash opening, of 500 mm. The chart below shows the related extract volumes.

	1200 mm wide	1500 mm wide	1800 mm wide
Q = cap. In m <sup>3</sup> /h	Q	Q	Q
Standard	618	780	942

There are also test results available at face velocities of 0,40 and 0,50 m/s.

Argument for lower or higher face velocities can be:

- Too high or too low air exchanges in the room
- High internal heat loads in the fume cupboard in which case higher extract flow rates are desirable
- Internal regulations.

## 3. Brief manual of the Schneider Airflow Monitor



### The Schneider air flow monitor TYPE FM 500 ( acc. to. EN14175)

The installer of the extract system is responsible for the correct design and installation of the system and will assure it is set to the required extract volume flow rates.

S+B will measure the extract volume flow rate and will set the airflow alarm such that when the extract volume flow rate is too low or too high it will go into alarm.

When the extract volume flow rate is correct a green LED (OK) will be on.

#### ALARM

At too low extract volume flow rate (20% below advised rate)

- Acoustic alarm ( 60 seconds )
- Control LED red ( LOW ) will be on

At too high extract volume flow rate (20% above advised rate)

- Control LED yellow ( HIGH ) will be on

When the extract volume flow rates is available again the green (OK) will turn on automatically without resetting the system. During an alarm the acoustic alarm can be muted.

## Remaining operational buttons and signals:



- control switch to mute alarm



- control switch yellow for optional sash high alarm.

**Vmin**

- to set alarm (low) by service engineer

(can be used for DAY/NIGHT setting as well see \*)



- ON / OFF lighting



- ON / OFF switch air flow monitor of extract fan if connected



- to connect service module

## POWER FAILURE.

At power failure the RED LED will switch on/off twice and the acoustic alarm will go on.

**FOR DAY/NIGHT SWITCH FUNCTION IN FM500, see extended manual of the FM 500.**

## 4. The function of the sliding sash and the sash stop

The fume cupboards are constructed with an explosion proof toughened glass sliding sash providing a maximum sash opening of 817mm from the work top. The sliding sash runs very smoothly in the guides and therefore needs only a slight effort to move it.

The sliding sash construction is applied in order to:

- 1) allow installation of equipment;
- 2) allow access during the experiments;
- 3) offer protection with the sash closed as far as possible.

**It is therefore important to know that the fume cupboard offers the highest possible protection with a closed sash, i.e. with the yellow airfoil situated just above the worktop.**

**A fume cupboard with a bypass system offers adequate protection up to the maximum sash allowed by the sash stop.**

**If the sliding sash is opened past the stop position (for access), the fume cupboard offers you little or no protection.**

## **5. The effect of movements in and in front of a fume cupboard**

The face velocities in the sash opening of a fume cupboard vary between closed sash position and the sash in the maximum operational opening position, between 0,60 – 0,30m/s. Based on the standard extract volume flow rate.

Release of containment can occur due to strong arm or body movements close to the sash opening. Open windows and doors can have similar effect as well as walking closely by a fume cupboard. Here we have to take into account that a walking speed of 4 km/h is over 1 m/s whereas the face velocity is 0,30m/s.

Heat sources in a fume cupboard cause an upwards air movement which can affect the intended flow pattern and jeopardise containment.

## **6. Worktop extraction**

An airflow baffle is fitted to the rear wall inside the cupboard which intensifies the airflow over the worktop.

In situations where gasses or fumes are present, which are heavier than air, it is very important not to disturb the worktop extraction.

A few guidelines:

- The worktop, towards the rear of the cupboard, near the airflow baffle, must be kept free. 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, so that the extraction system is not deranged.

## 7. Under bench extraction

When the fume cupboard is equipped with an under bench cupboard it is ventilated by a separate PVC extraction channel that is connected to the PVC duct connector of the cupboard.

The ventilation of this under bench cupboard offers limited storage for non aggressive though possibly volatile materials.

**Note that at any time the main extraction is off there is no ventilation of the storage cupboard.**

## 8. Apparatus and installations inside a fume cupboard

Avoid installing equipment inside a fume that part sticks out of the sash opening. There is a risk of bumping apparatus as well as preventing the correct closing of the sash.

## 9. Noise rates

Due to air movements noise is generated. The noise level is determined by a number of factors such as the characteristics of the extract fan, the acoustics of the room, the amount of air extracted and the construction of the duct system.

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). If lower levels are required special precautions should be made.

## 10. The fume cupboard in an explosive environment

The majority of the Ecoline fume cupboards are provided with an electrical installation having socket outlets, switches and lighting. These installations are **not fire/explosion proof** as standard. All electrical equipment is, if not stated otherwise in the quotation, mounted outside the fume cupboards working chamber.



## **11. Access to under bench services**

If service connections have to be made after installation of the cupboard, connections can be accessed by removing the service panel in the rear wall of the under bench cupboard. If a separate cupboard is provided, the whole cupboard may be pulled out.

## **12. Type of activities**

### **12.1 GENERAL**

When working with fume cupboards the operator must use the means of personal protection appropriate to the entire laboratory. Observing guidelines for radiation prevention and any local regulations are obviously a prerequisite.

### **12.2 STANDARD FUME CUPBOARD**

Most experiments can safely be executed in a standard cupboard in which the panels are coated with a chemical resistant plastic laminate surface. The worktop material is selected based on the information provided during the buying process. The selection takes into account the applications and the chemicals to be used.

**It is important to that the planned applications can be executed in a standard fume cupboard.**

The standard fume cupboard is not suitable for use with aggressive acids, such as perchloric or Kjeldahl work. The inside of the standard cupboard is not acid-proof.

A specially developed destruction fume cupboard is suitable for this kind of work (see 12.4).

### **12.3 High and movable equipment**

High or movable equipment can be installed in Walk-in or Drive-in fume cupboards. The activities performed in these fume cupboard are similar to those performed in a standard fume cupboard (see 12.2)

Drive-in fume cupboards are constructed without a worktop.

## **12.4 DESTRUCTION FUME CUPBOARD**

In order to protect the inside against acids, this fume cupboard is completely covered with one-piece PVC. Because PVC is not high-temperature proof, the side panels are covered with toughened glass heat shields. The airflow baffles, the rear and the roof also have toughened glass surfaces. In order to protect the PVC worktop, a toughened glass worktop is placed on feet.

## **12.5 ACTIVITIES WITH RADIOACTIVE AND EXTREMELY TOXIC SUBSTANCES**

Special fume cupboards are available for working with above mentioned substances. Carrying out experiments with radioactive substances in a standard fume cupboard is not advisable because of decontamination problems with radioactive substances and heavy toxic substances. Also, the necessary lead protection for activities that are registered under Class B and A, is not fitted.

## **13. Installation and maintenance**

The installation of a Ecoline fume cupboard, as well as maintenance should be carried out by specialised installers. For that reason we advise against doing these activities yourself.

Maintenance work by other than S+B employees can affect the three year warranty on the fume cupboard.

Before dismantlement of a fume cupboard it is important that the fume cupboard be properly decontaminated, special attention being given to chemical residues in drains and traps.

## **14. Maintenance**

It is important for the operational life of the cupboard and the protection it can offer, that the cupboard is cleaned regularly and properly.

During cleaning it is advisable to remove the rear airflow baffles and the glass panel in top of the fume cupboard. It is essential for the correct functioning of the fume cupboard these panels are mounted correctly after the cleaning.(see attachment 3)

To ensure that the fume cupboard continuously offers good protection, it is possible to have it tested periodically (once every two years) and also to enter into a service contract for routine maintenance.

**The S+B fume cupboard is a professional piece of safety equipment, provided that it is being used in a proper way. We hope that our operating instruction can contribute to this.**

