Monmouth Scientific

Operating & Maintenance Manual

Circulaire ®

Fume Cupboard

C550/C650/C900

THE MARKET LEADER IN *CLEAN AIR SOLUTIONS*

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Warning

This cabinet must be used in compliance with these instructions and any repairs or maintenance carried out by qualified personnel.

For parts or service information please contact Monmouth Scientific.

SECTION 1

DESCRIPTION OF THE CABINET

The Circulaire range of filtration fume cabinets have been designed to provide operator and environmental protection.

The cabinet provides an inflow air velocity of >0.5m/sec through the working aperture to provide containment and operator protection.

The standard C550H, C650H and C900H units have a three-stage filter system. The contaminated air is passed through an electro-statically charged pre-filter to remove coarse particulate, then through a deep bed activated carbon main filter to remove chemical contaminates, and finally through a Grade H13 HEPA filter for fine particulate. The clean air is re-circulated back to the laboratory.

When installed correctly the cabinet complies fully with international standards including BS7989: 2001 for filtration fume cupboards.

S P E C I F I C A T I O N S			
Model	**C550**	**C650**	**C900**
Dimensions			
External	550mm wide 600mm deep 1120mm high	650mm wide 600mm deep 1120mm high	900mm wide 600mm deep 1120mm high
Internal	530mm wide 550mm deep 740mm high	630mm wide 550mm deep 740mm high	880mm wide 550mm deep 740mm high
Aperture	425mm wide (mid) 300mm high	525mm wide (mid) 300mm high	625mm wide 250mm high
Weight			
Packed	60 kg	65 kg	70kg
Airflow			
Aperture Face velocity (Nominal)	0.55m/sec		
Air volume	264m³ / hr	318m³ / hr	333m³ / hr
Electrical			
Voltage Input	115v/230V, 50-60 Hz (Factory configured ONLY)		
Power (Max)	<150 Watt		
Lighting	> 800 Lux (600mm LED X1)		> 800 Lux (900mm LED X 1)
Fan	Centrifugal digital		
Controls	Power on/off / Alarm mute		
Monitoring systems			
Airflow	Visual and audible low airflow alarm		
Filter condition (option)	Visual and audible Filter condition alarm – (Suitable for Organic compounds)		
Sound level (SPL)			
Front @ 1m	< 60 dB (A)	< 60 dB (A)	< 60 dB (A)
Filters **(for full details of available filters, refer to Section 3)**			
Pre-filter	Electrostatic - G4 grade		
Main filter	12kg Carbon or HEPA (H13)	14kg Carbon or HEPA (H13)	16kg Carbon or HEPA (H13)
Exhaust Filter (Optional)	4kg Carbon or HEPA (H13)	5kg Carbon or HEPA (H13)	6kg Carbon or HEPA (H13)
Construction			
Filtration Head	Epoxy painted Zinc coated steel		
Enclosure	Clear acrylic Epoxy painted, Zinc coated steel frame		
Optional Spillage tray	GRP/Polypropylene/Stainless Steel		

The cabinet must be positioned and used on a bench.
An optional stand or under-cupboard and GRP/Polypropylene/Stainless steel spillage tray can be supplied.

The cabinet may be fitted with Activated Carbon filters suitable for use with a wide range of pollutants including hydrocarbons. Activated carbon can be impregnated with chemicals to neutralise many types of contaminants.
See the section on Filter Selection for further information.

Alternatively, the cabinet may be fitted with a Grade H13 HEPA main filter (99.997% eff. @ 0.3 micron particle size) if particulate only filtration is required.
Please contact Monmouth Scientific for further information.

SECTION 2

INSTALLATION

- The cabinet should be sited in a draught free position
- The cabinet is re-circulating and requires no connection to ductwork
- The cabinet is supplied with the main filter fitted.
- Check the pre-filter is in place by loosening the black locking knobs and rotating the small catches located inside the fume enclosure, which will allow the pre-filter retaining grille to be lowered.
- Connect the cabinet to a 13A outlet socket.

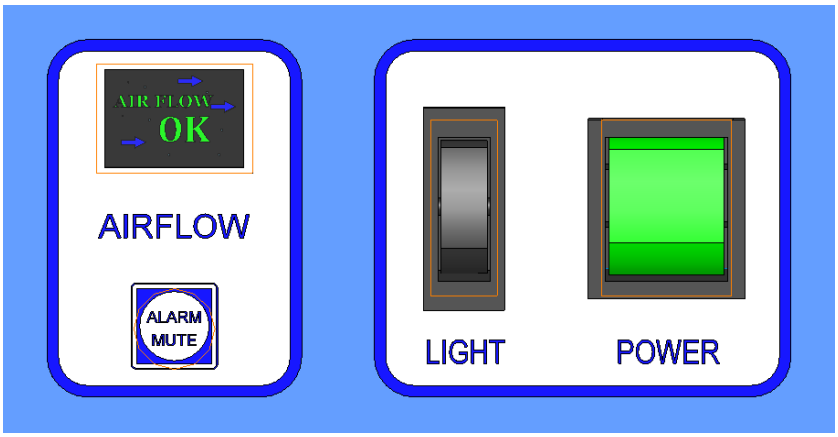
TESTING / COMMISSIONING

An airflow test certificate will be supplied for conformity to CE marking, and electrical test.

THE CABINET MUST BE TESTED EVERY 14 MONTHS TO COMPLY WITH C.O.S.H.H REGULATIONS.

OPERATION

The cabinet is started using the illuminated rocker switch on the control panel. The inflow air velocity at the working aperture is continuously monitored by an airflow monitoring system. If the airflow drops below a safe level, there will be an audible alarm and the LCD screen on the control panel will flash red.



CONTROL PANEL
with Airflow Monitoring

For models fitted with an optional carbon filter condition monitor, the exhaust air is also continuously monitored.
An audible and visual alarm will be provided if filter breakthrough is detected.

CONTROL PANEL
with Airflow Monitoring and Filter Condition Monitoring

SECTION 3

FILTERS

Filters concentrate dust, pollutants etc
Care must be taken when changing filters.

IMPORTANT: Personal Protective Equipment must be worn when changing filters including gloves and particulate facemask.

PRE-FILTER – CHANGING

This may be carried out with the cabinet running to provide additional protection to the operator.

- Loosen the black locking knobs and rotate the catches inside the fume enclosure, which will allow the pre-filter retaining grille to be lowered giving access to the pre-filter.

MAIN CARBON FILTER – CHANGING

Check filters to be fitted are the correct grade for intended use.
Contact Monmouth Scientific for information if required.

- The cabinet should be turned off whilst changing the main carbon filter and the mains cable un-plugged.
- Remove the pre-filter (see pre-filter changing procedure above).
- On the back of the fume enclosure, rotate the airflow sensor housing anti-clockwise slightly to release it and remove it from the enclosure.
- From inside the fume enclosure, remove the four M5 nuts securing the fan / filter module.
- Lift the fan / filter module off the fume enclosure to expose the carbon filter.
- Remove the filter and seal in a marked bag for disposal.
- Fit the new filter checking the seals for integrity.
- Re-assemble the cabinet.

EXHAUST HEPA FILTER – CHANGING

- Carry out safety hazard assessment for safe changing
- Remove the screws holding the exhaust filter metal clamp frame on top of the fan / filter module, taking extra care with operator protection. (A dropped filter can release particulate)
- Dispose of filter as hazardous waste.
- Fit the new filter, checking the seals for integrity.
- Re-assemble the filter clamp frame.

FILTER SELECTION

It is most important that filters fitted are correct for the particular application.

A guide to filter selection is as follows:

Particulates – HEPA filters.
Monmouth Circulaire HEPA filters are 99.997% efficient for particulates greater than 0.3 microns. Typical applications – Asbestos / powders

Gaseous fumes – Activated Carbon filters.
Standard activated carbon is suitable for a wide range of pollutants including hydrocarbons. Activated carbon can be impregnated with various chemicals to produce a range of filter types capable of neutralizing other contaminants. Monmouth Circulaire Carbon Filters are available in the variant types listed below, which offer improved efficiency and extended filter life.

Filter Type	Application	Typical Chemicals
AC (Activated Carbon)	Hydrocarbons	Alcohols, Hydrocarbons, General use
ACID	Acid gasses	So_2, HCL, H_2So_4
FORM	Aldehydes	Formalin Glutaraldehyde
SUL	Sulphur compounds	H_2S, mercaptans
AMM	Ammonia	NH_3, NH_4
ETHER	Ethers	
SCHOOLS	Educational, Animal odours	SO_2, H_2SO_4, BR_2, H_2S, NH_3, CCL_4, hydrocarbons

- All types of activated carbon have general use capability for hydrocarbons.
- Other types are available for applications not listed above.

Filters can be manufactured in layers suitable for more than one application.

To determine correct filter type please contact Monmouth Scientific with details of your application, volumes, concentrations and temperatures etc.

MAXIMISING FILTER LIFE

- Handle minimum volumes of chemicals
- Minimise surface area of exposed chemicals to reduce evaporation rates
- Cover containers as far as practical
- Do not boil off large volumes of chemicals
- Minimise use of heat
- Acids should be at room temperature and covered as far as practical

CARBON FILTER EFFICIENCIES

Typical filter efficiencies are >99% and this efficiency is maintained for most of the filter life.

Filters should be changed when efficiency has reduced to below 90%.

ABSORPTION CAPACITIES

Monmouth Circulaire cabinets are fitted with very large capacity filters, with a typical value of >30% for hydrocarbons.
The cabinet main filter has the following nominal absorption capacities:

Model	Carbon Weight	Typical Hydrocarbon capacity at 30% absorption
C550	1 X 12Kg	3.6kg
C650	1 X 14Kg	4.2kg
C900	1 X 16Kg	4.9kg

The given weight is approximate to standard activated carbon.
Impregnated carbons have higher densities and will increase filter weight.

Contact Monmouth Scientific for absorption capacities for different applications.

SECTION 4

MAINTENANCE

The cabinet should be isolated from the electricity supply before carrying out any maintenance procedures.

CLEANING

Main enclosure / head section: Mild detergent/Damp cloth/alcohol wipes.
Glazing/Plastic parts: Mild detergent/Damp cloth/alcohol wipes or specialist cleaners suitable for Acrylic.
Do not use abrasive or strong chemical/solvent cleaners as these may attack/distort or damage the material.

FUSES

The two Type T main fuses are located in the mains inlet socket on the back of the cabinet. To access these, remove the mains lead and pull the tap using a small screwdriver.

Always replace fuses with the correct type and rating.

LIGHTING

The cabinet is fitted with long-life LED lighting tubes
If tubes need replacing, access is gained by removing the fan / filter module.
To remove module, follow instructions for main carbon filter replacement in Section 3.

CALIBRATION OF THE LOW AIRFLOW ALARM

This requires the use of a calibrated Ø100mm rotating vane anemometer and should be carried out by a trained service engineer.

1) Place the head of the anemometer in the centre of the aperture supported by a laboratory stand.
2) Remove the black plastic hole-plug located on top centre front of the fan / filter module to gain access to the speed controller. Reduce the fan speed to achieve a face velocity of 0.35m/sec by rotating the potentiometer.

3) Turn off the cabinet and restart whilst pressing the 

key.
4) Yellow colour “SET LOW AIR SPEED AND PRESS MUTE” message will display showing the alarm is in calibration mode. When the airflow has stabilised to around 0.35m/sec. Press the 

key to store the set point.
5) Reset the fan speed to achieve a face velocity of 0.55m/sec.
6) Check operation of the low airflow alarm by raising the lower glazing panel. The alarm should sound when the panel is raised and stop when the panel is lowered.

CALIBRATION OF OPTIONAL FILTER CONDITION ALARM

New carbon filters must be fitted before calibrating the alarm.

1) Whilst pressing and holding the ‘Mute’ button, turn on the cabinet. When an audio beep is heard release the button.
2) The red and green indicators will flash alternately showing that the alarm is in calibration mode.
3) Leave the cabinet running for 15 minutes to allow the sensor to stabilise.
4) Press the ‘Mute’ button once. The indicators will stop flashing with the green remaining on.
5) The filter condition alarm is now calibrated.

SECTION 5

SERVICING

An annual service is recommended and testing is mandatory under C.O.S.H.H regulations and will include the following points:

- Check / replace pre-filter

- Check and record face velocity readings
- Check airflow monitor and re-calibrate if necessary
- Check condition of glazing, hinges etc.
- Inspect electrical components, lighting, cables etc.
- Issue test report and airflow certificate.

For parts or service information please contact Monmouth Scientific.

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