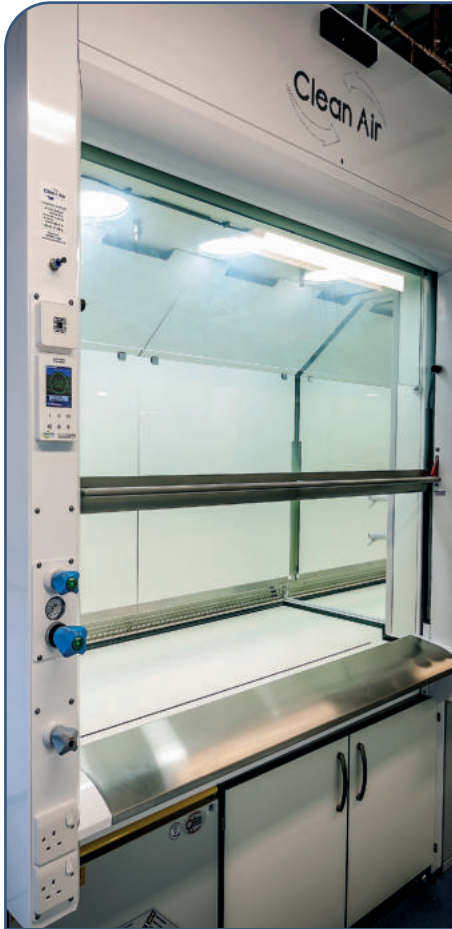




## Reduce Your Carbon Footprint and Save on Energy Costs with Intelligent Variable Air Volume (VAV) Technology Fume Cupboards



Why use VAV?

Why wouldn't you?

Any increased capital outlay is quickly recovered in energy savings. It protects your operators, makes the lab more comfortable, and it's the right thing to do for our planet.

### Constant Air Volume (CAV) Fume Cupboards

Typically, a standard fume cupboard will be a Constant Air Volume (CAV) unit unless specified otherwise. Regardless of whether the fume cupboard is in use or the sash is open or closed, CAV fume cupboards pull through a constant flow of air.

### Variable Air Volume (VAV) Fume Cupboards

A VAV system reduces the amount of conditioned air being extracted through the open sash of a fume cupboard. The sash position links to a motorised damper, typically located above the fume cupboard.

When the sash is open at 500mm (the safe working height), the fume cupboard VAV damper is also open. As the sash is lowered, the VAV system closes the VAV damper. This reduces the amount of conditioned air pulled through the fume cupboard while maintaining a constant face velocity across the face of the sash.

### Low Volume Fume Cupboards

A Low Volume fume cupboard sits between CAV and VAV. It operates at lower face velocity, typically 0.3 m/s. This can lead to a 40% energy saving in the costs of heating/cooling replacement air compared to a traditional 0.5 m/s face velocity fume cupboard.

However, Low Volume will not deliver the same energy-efficient benefits as VAV.

In laboratories featuring fume cupboards the air extracted through the fume cupboard must be replaced. This is typically achieved with heated or cooled air.

The fume cupboard's own running costs are minimal. The cost is generated by the energy required to replace the conditioned air pulled through the unit and discharged outside.

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## Why Use VAV?

- VAV systems ensure a constant face velocity regardless of sash position. This protects operators from potentially hazardous fumes and substances.
- Energy efficient VAV units are cost effective. They can reduce energy costs by up to 70% or greater.
- With the year on year energy cost savings, the payback of the fume cupboards is substantially accelerated.
- Less energy = less carbon. A VAV system can help meet carbon reduction targets and can contribute towards a building achieving a 'Very Good', 'Excellent' or 'Outstanding' BREEAM rating.
- Extracting a lower volume of air stabilises the ambient temperature within the lab, making for a more pleasant working environment with potentially less noise.

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## VAV Fume Cupboards & Auto Sash Controls

To maximise the benefits of VAV technology Clean Air recommends VAV fume cupboards are fitted with an Auto Sash controller. Without the controller, the VAV performance will still be dependent on operator behaviour.

With the controller the position of the sash is monitored and automatically closed when not in use. While there is an increased capital outlay for the control system, the two controls in combination will reduce energy costs dramatically. VAV and auto sash fume cupboards can achieve energy savings of up to 70% or greater.

## Payback Reward for Doing the Right Thing

Using the conditions in our table for reference, the energy cost saving of a VAV system on a single unit could result in achieving payback for that fume cupboard in 12 to 15 months. With a VAV and Auto Sash system, payback could be achieved in around 12 months, with enhanced ongoing savings thereafter.

## Retro-Fit VAV to Existing Fume Cupboards

Considerable energy savings can be made by upgrading existing CAV fume cupboards to VAV. Clean Air's fast, efficient service engineers can retro-fit a VAV alarm / control panel, sash position sensor and motorised dampers on site to virtually any make and model of CAV fume cupboard. These units are then more cost-effective and environmentally friendly.

## Typical potential energy savings

Calculated October 2022

Based on 2000 mm wide standard fume cupboard operating with a face velocity of 0.5 m/s, constant volume system

	Annual kWh usage	Annual energy cost	CO2 Tonnes	Potential savings per year
<b>Current operating mode</b>	84,656	£6,091	15.66	
<b>Change to VAV Extract &amp; Supply</b>	39,674	£3,067	7.34	<b>£3,024</b>
<b>Change to VAV Extract &amp; Supply with Auto Sash Closer</b>	26,695	£2,216	4.94	<b>£3,875</b>

\* 2000 mm F/C, 0.50 m/s, 0.51 m<sup>3</sup>/s | 19°C base temperature | VAV sashes open 10 hours per day, 5 days per week, 48 weeks per year, all other times @ 30% volume | Auto sash sashes open 2 hrs per day, 5 days per week, 48 weeks per year, all other times @ 30% volume | Based on gas fired boiler heater - Gas £0.06 per kWh, Electricity £0.11 per kWh | Extract and supply fans 0.55 kW, 70% efficiency | Weather station: Manchester Airport, heat degree average of last 3 years.

Contact our friendly team to discuss our energy saving technology options

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