

How to implement de-stratification fans

In buildings with high ceilings, warm air rises and heat is lost through the roof. De-stratification fans blow warm air back to ground level where it's needed – and could save you up to 20% on your energy bills.

The business case

In a 7m tall warehouse with an 800m² floor area, operating a single-shift, five-day week, a warm air heating system uses around 56,000kWh of gas a year.

A de-stratification system could cut energy consumption by around 20%, saving £280 a year, based on a gas price of 2.5p/kWh.

Depending on ease of access, installing the fan would be around £700, and you would recoup your costs in just over four years.

The technology

There are two main types of de-stratification fans:

- A low-velocity 'punka' fan
- A high-velocity axial fan

Both types can be thermostatically controlled so that they switch on when the temperature in the roof reaches the temperature needed at floor level. Their speed can also be controlled to vary air velocity.

Applications

De-stratification fans can be useful in most heated spaces higher than 5m. They're rarely cost-effective in areas heated by radiant systems because there is less build-up of heat in the roof. They can still be used, of course, but the payback period will be much longer.



'Punka' fan



Axial fan

'Punka' fans are best for ceiling heights of between 5m and 10m, and axial fans for heights of 10m to 20m.

Typical applications are warehouses, large retail stores and high bay manufacturing units. Low-velocity fans don't usually cause a problem, but you do need to consider the noise from high-velocity fans if operating in quiet environments such as churches or halls used for performances.

Table 1 Specification checklist

Considerations	Comments
Type of heating	Fans work well with warm air heating systems and are rarely cost-effective with radiant heating.
Ceiling height	Maximum distance above floor level – to the roof apex.
Building dimensions and volume	Calculate volume of building in m ³ .
Type of activity in the space and likely noise level of the fan	Will fan noise be a problem for people in the space?
Access to fan positions in the roof	Dictated by the building design – apex of building, lights, columns, walls and so on.
Heating controls	Options include: <ul style="list-style-type: none"> • switch on with heating only • control of fan dependent on ceiling temperature • position of control adjustment at floor level • speed control to trim local velocity • summer override for cooling effect.

Specification checklist

Table 1 outlines the points to discuss with your supplier when deciding on a fan system.

Commissioning procedure

Final commissioning should be carried out during a season when the building is heated to check that:

- the fan thermostat control reduces ceiling temperature to that at floor level throughout the area
- air velocity is acceptable at floor level
- noise level is acceptable at floor level.

Your supplier should also train staff to use the controls.

Common problems

De-stratification fans can work well in existing and new warm air heating systems. Using an experienced contractor and considering the two factors below will help you avoid problems.

- **Air velocity** – positioning fans too low for the application can cause nuisance draughts. Fitting variable speed controls can get around this problem.
- **Noise** – choose the right fan for the location to avoid excessive noise.

Finding a supplier

De-stratification fans should always be specified by a reputable heating, ventilation and air conditioning (HVAC) supplier or contractor. You may already know of a good contractor; if not, try contacting a recognised trade association.

The Heating and Ventilating Contractors' Association (HVCA)

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