A Brief Guide to BB101

What is BB101?

"Building Bulletin 101 - Ventilation of School Buildings" is published in support of the Building Regulations and the School Premises Regulations, and as such provides a guide to the legal requirements for ventilation and the control of overheating in school buildings.

Does BB101 apply to existing schools?

There is no requirement to bring existing school buildings up to the standard unless a change of use is planned, or anything is done that changes the "energy status" of the building, in which case the Building Regulations will apply.

In other words, if a classroom does not overheat now, there is no need to change anything even if it doesn't currently comply with BB101. But, if it does overheat, and you are considering installing a system to solve the problem, the design should comply with the current requirements.

What are the requirements of BB101?

Put simply, BB101 defines a minimum ventilation rate for classrooms, per person at maximum occupancy, of 3l/s, an average rate of 5l/s, and an available rate, to be used if the occupants require it, of at least 8l/s. Those rates, especially the upper one, are extremely difficult to achieve in many existing school buildings by passive means such as open windows.

The minimum rates above are designed to control the build up of Carbon Dioxide, not heat. BB101 states that these rates may not be enough to control overheating of rooms, and defines what is officially meant by overheating.

What are the possible solutions?

For existing buildings, there are four possible solutions to the problem of overheating in school rooms:

Passive Ventilation

Passive ventilation relies on wind or temperature difference to move fresh air through a room. This can be as simple as leaving windows open, or more complex systems such as stacks or "wind catchers" can be used.

Depending on the nature of the room, these systems can provide the minimum fresh air rates needed to control CO2, but no cooling is provided, and the upper ventilation rate required by BB101 is almost never achieved.

Mechanical Ventilation

Using fans to deliver air to the room can achieve any ventilation rate required, but can never reduce the temperature to below the outside temperature.

It is not possible, for practical reasons, to add mechanical ventilation to every existing building, though most are suitable.

Air Conditioning

Air conditioning uses a large amount of energy, and because of the resultant operating costs and environmental impact, should be considered a last resort only.

Air conditioning does not inherently provide any ventilation at all; it simply cools the air already inside the room, and so does not comply with BB101. Fresh air can be introduced into the system at the required rates, but doing so increases the work that the system must do, and so increases its energy use even further.

Natural Cooling

Natural cooling systems provide 100% fresh air, and so have no difficulty complying with BB101. They cost about the same to install and run as mechanical ventilation, but when needed they cool the air as it enters the room, without using refrigerants.

The energy use and carbon footprint of natural cooling systems is about 15% that of air conditioning, while the cooling effect is 10 to 12 degrees greater than with ventilation alone.

As with mechanical ventilation, natural cooling cannot be installed in every building, though it is practical in the vast majority of school rooms.

How do I know whether or not a room complies?

It can be very difficult to know whether or not an existing room complies with the ventilation requirements, though there is a software tool (ClassVent) that accompanies BB101, which can be used to produce an estimate.

There is a second tool available (ClassCool), which predicts whether or not a room will suffer from overheating. However, in an existing building, experience will tell you whether or not overheating occurs, and further calculations to confirm that are generally unnecessary.