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**Operation of Air Handling Units used to supply ventilation to operating theatres –
advice on troubleshooting in a heatwave**

Our Ventilation AE's have been fielding a number of questions about the effect the hot weather is having on their Operating theatre environments

These topics have come up a number of times over the past couple of weeks and I thought it would be useful if I put together this brief FAQ:

Q1: The operating theatres are too hot and you cannot reduce the temperature that people have to work in – what can we do?

A1: Many Trusts and healthcare providers are switching off the air handling units (AHU's) or putting them on half speed (also known as "set back") during periods when the theatre is not being used. For the duration of the heatwave we recommend that the Theatre ventilation is left running at full speed from 10pm until the start of the next days list. This takes advantage of the cooler overnight air to reduce the temperature and humidity in the theatre

Q2: The operating theatre is ok to start with but by mid-afternoon it is too hot

A2: As above plus schedule operations to start earlier in the day and finish earlier

Q3: The operating theatre is so humid that there is condensation running down the walls and this makes the theatre unfit to be used for operations.

A3: The high humidity with high temperatures recently has been the main driver for this to happen. It is important to check that the surgeon's panel is not set at 18°C but have a set point of 20°C. The relative humidity of the air at 20°C would be 18% less than saturated air at 18°C. (82% RH) Any lower than this temperature could cause the humid air to form condensation.



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Q4: The theatre is still getting too hot and the humidity is too high.

A4: Investigate the recuperator/thermal wheel/runaround coil control strategy for cooling.

Interrogate the Building Management Control strategy to ensure maximum cooling with optimum disunification is in place for the heat recovery device - run around coil / recuperator/ thermal wheel to be most effective for cooling

Most control strategies are temperature-led, with de-humidification control following.

When the outside air temperature is higher than the extract air temperature from the theatre, ensure the recuperator / thermal wheel does not have the bypass damper open. This is to gain an additional cooling effect from the extract air to the supply air. Supply Air Inlet Damper is open. The exhaust damper is open. The Bypass Damper on the recuperator is to be closed (Recup damper for heat exchanger side should be opened while Recup damper for by-pass side should be closed)

Heating valve on the reheat coil will modulate to keep the reheat coil entering air from getting too low.

To assist in dehumidification, set the chilled water valve to modulate to maintain off cooling coil set point, ideally to 13 °C to provide the optimum dehumidification

Q5: The operating theatre is so humid that there is condensation running down the walls and this makes the theatre unfit to be used for operations. The temperature on the surgeon's panel is set to 20C. What else can we do?

A5: In this case it would be useful to check the Building Management System (BMS) and find the Relative Humidity setting for the relevant Air Handling Unit. The usual setting for the UK is to start dehumidifying at 55%. In this hot and humid weather we advise this to be reduced to 50% during a heatwave.

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