

The application of the ventilation and air conditioning system to stabilize the air quality parameters in hospital operating rooms

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Indoor air quality in the operating rooms of hospitals is important for the engineers of air conditioning and ventilation (HVAC) system due to the health and live of patients. Microclimate operating rooms consist of not only the right conditions for thermal comfort, but above all the creation and preservation zones controlled purity.

The most important parameters of the microclimate, which determine thermal comfort are air temperature, relative humidity and velocity. The influence of humidity, as compared to the temperature and velocity on the human sense of comfort is low because people feel well in a wide range of values. They are permissible fluctuations of humidity in the range of 30 - 70%. The specificity of the operating rooms, however, requires a narrow range of relative humidity. HVAC system should ensure values of air humidity close to 50% at internal air temperature of 20 °C.

The paper presents some aspects of application of the adsorber in the HVAC system to stabilize the air quality parameters in operating rooms. Measurements were taken with the use of Testo 435-4 Transducers.

On the basis of conducted tests without adsorber it may be stated that cyclic operation of the HVAC system does not influence the fluctuations in the value of air velocity and temperature at the measuring points. The fluctuations of air humidity are present in all points. When switching the unit followed by a decrease humidity, but when it turns off was observed increase in its value. The further away from the air supply diffuser, the smaller the fluctuation range of humidity: from 25.67% to 79.41% (supply diffuser) and from 33.67% to 40.24% (breathing zone). When using adsorber was found stability and does not exceed the value of 50% relative humidity during operation of the HVAC system.

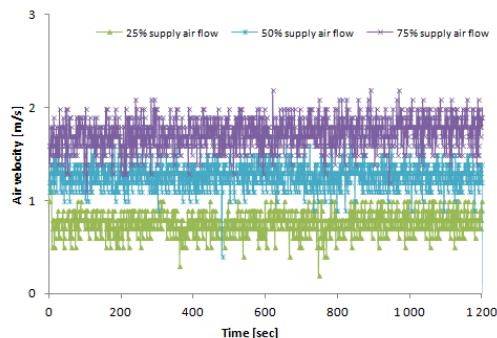


Figure 1. Changes of air velocity at operating room using various ventilation settings.

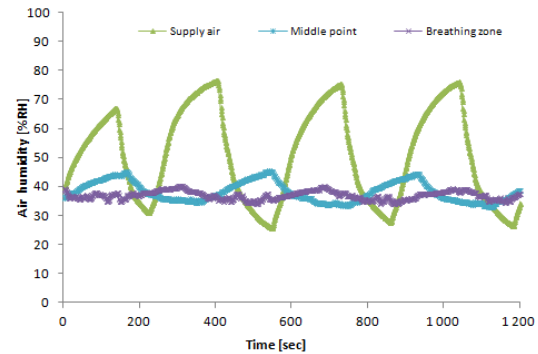


Figure 2. Changes in the relative air humidity at different distances from air supply ventilation without adsorber.

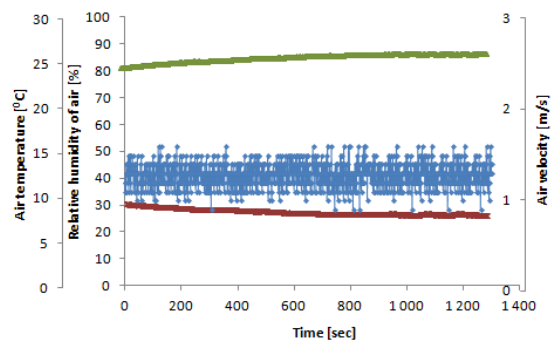


Figure 3. Changes in air humidity, temperature and velocity at operating room using air conditioning system with application the tubular adsorber.

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