Human Response to Ductless Personalized Ventilation with Local Air Cleaning: Air Quality and Prevalence of SBS Symptoms - DTU Orbit (12/12/2018)

The impact of local air cleaning and cooling of the head region by ductless personalized ventilation (DPV) on perceived air quality (PAQ) and Sick Building Syndrome (SBS) symptoms was studied. Thirty subjects participated in experiments performed in a test room with displacement ventilation (DV) and six workstations, three of which had DPV. The DV kept air temperature in the occupied zone (1.1 m above the floor). Pollution load was simulated by PVC floor covering and the bioeffluents generated by the subjects (60% recirculated room air). DPV sucked the air distributed over the floor by the DV and supplied it to the breathing zone of the subjects. The subjects were allowed to control the position of the DPV supply diffuser and the personalized flow rate. Each subject participated in five 4-hour experiments: 23 °C with DV only, 23 °C with DPV with air filter, 29 °C with DV only, 29 °C with DPV with air filter and 29 °C with DPV without filter. During the experiments the subjects simulated office work and answered on computerized questionnaires. At warm environment PAQ and air freshness significantly improved when DPV was used. Eye dryness increased significantly with time but was not influenced by air temperature and filtering. At 29 °C the facially applied air movement from DPV increased the eye dryness. The SBS symptoms increased with time and were higher (not significantly) at the warm conditions. Air movement did not have profound impact on the SBS symptoms, while filtering had only at 23 °C.

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