

## Transport of gaseous pollutants by convective boundary layer around a human body - DTU Orbit (08/11/2017)

### Transport of gaseous pollutants by convective boundary layer around a human body

This study investigates the ability of the human convective boundary layer to transport pollution in a quiescent indoor environment. The impact of the source location in the vicinity of a human body is examined in relation to pollution distribution in the breathing zone and the thickness of the pollution boundary layer. The study, in addition, evaluates the effects of the room air temperature, table positioning, and seated body inclination. The human body is represented by a thermal manikin that has a body shape, size, and surface temperature that resemble those of a real person. The results show that the source location has a considerable influence on the breathing zone pollution concentrations and on the thickness of the pollution boundary layer. The highest breathing zone concentrations are achieved when the pollution is located at the chest, while there is negligible exposure for the pollution emitted at the upper back or behind the chair. The results also indicate that a decrease in personal exposure to pollutants released from or around the human body increases the extent to which the pollution spreads to the surroundings. Reducing the room air temperature or backward body inclination intensifies the transport of the pollution to the breathing zone and increases personal exposure. The front edge of a table positioned at zero distance from the human body can reduce the pollution transport to the breathing zone, or it can increase transport of the clean air from beneath if positioned at a 10-cm (0.33-ft) distance.

### General information

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