

C. Topp, P. V. Nielsen and P. Heiselberg, Influence of Local Airflow on the Pollutant Emission from Indoor Building Surfaces. Indoor Air 2001; pp. 162-170.

Abstract This article reports the results of an investigation, based on fundamental fluid dynamics and mass transfer theory, carried out to obtain a general understanding of the mechanisms involved in the emissions from building materials in ventilated rooms. In addition, a generally applicable method for the prediction of surface emissions is proposed. The work focused on the emission of vapours and gases and no particulate emissions were considered. The methods used were numerical calculations by computational fluid dynamics (CFD) and full-scale laboratory experiments. It was found that the emissions are a strong function of air-change rate, local air velocity and local turbulence, as the mass transfer coefficient increases in proportion to these parameters. The findings further show that the mass transfer coefficient increases in proportion to the velocity when the emission is controlled by evaporation from the surface. With regard to diffusion-controlled emissions, the mass transfer coefficient is unaffected by the velocity.

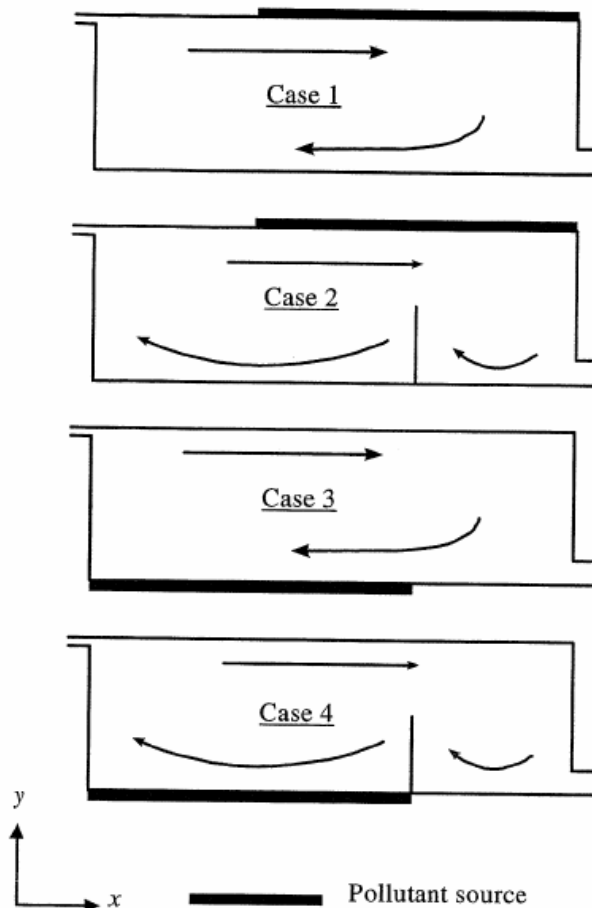


Fig. 3 Computational model of cases 1–4. The dimensions of the room are 9 m×3 m and the length of the emitting surface is 6 m. The height of the supply and return slots are 0.168 m and 0.48 m, respectively