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# EFFECT OF THE DISTANCE FROM THE WALL OF A BELOW-WINDOW HOT AIR FLOOR VENT ON THE CONVECTIVE HEAT TRANSFER FROM A COLD WINDOW FITTED WITH A TOP-DOWN BOTTOM-UP PLANE BLIND SYSTEM

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In building heating systems hot air from a floor-mounted vent located below a window often flows over the cold window. The vent flow, in general, affects the rate of convective heat transfer to the window. The distance of the hot-air floor vent from the wall containing the window may affect the rate of convective heat transfer to the window and this possibility has been investigated here. The window heat transfer rate will also depend upon the type of blind system being used. A top-down bottom-up plane blind system in which the blind can both be lowered at the top and raised at the bottom has been considered here. The window has been represented by a plane isothermal section recessed into the wall. This window section is colder than the room air far from the window. The plane blind is assumed to be in the same plane as the surface of the wall in which the window is mounted. The flow is assumed to be steady and situations involving laminar, transitional, and turbulent flow have been considered. Fluid properties are assumed constant except for the density change with temperature that gives rise to the buoyancy forces; this was dealt with using the Boussinesq approach. Radiant heat transfer effects have been neglected. The governing equations have been solved using the commercial CFD code ANSYS FLUENT©. The *k*-epsilon turbulence model with buoyancy force effects fully accounted for was employed. Results have been obtained for a Prandtl number of 0.74 which is effectively the value for air. The effects of the dimensionless distance of the wall side of the hot-air vent from the wall and of the dimensionless top and bottom blind openings on the window Nusselt number have been studied for various Reynolds and Rayleigh numbers.