

## Effect of Viscous Dissipation and Axial Conduction in Thermally Developing Region of the Channel Partially Filled with a Porous Material Subjected to Constant Wall Heat Flux

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**Abstract :** The present investigation has been undertaken to assess the effect of viscous dissipation and axial conduction on forced convection heat transfer in the entrance region of a parallel plate channel with the porous insert attached to both walls of the channel. The flow field is unidirectional. Flow in the porous region corresponds to Darcy-Brinkman model and the clear fluid region to that of plane Poiseuille flow. The effects of the parameters Darcy number,  $Da$ , Peclet number,  $Pe$ , Brinkman number,  $Br$  and a porous fraction  $\gamma_p$  on the local heat transfer coefficient are analyzed graphically. Effects of viscous dissipation employing the Darcy model and the clear fluid compatible model have been studied.

**Keywords :** porous material, channel partially filled with a porous material, axial conduction, viscous dissipation

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