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EXPERIMENTAL INVESTIGATION OF LAMINAR MIXED CONVECTION HEAT TRANSFER IN THE ENTRANCE REGION OF HORIZONTAL RECTANGULAR DUCT- A REVIEW

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Abstract

In this paper, a review of mixed convection heat transfer at the entrance region of laminar flow through duct has been provided .Experimental set up and heat transfer results for variety of boundary conditions are studied .It is observed that at the entrance region thermally developing flow takes place therefore temperature profiles are not fully developed. These thermal profiles are affected by forced convection and secondary buoyancy forces. It is observed that effect of increase in buoyancy force is to shift entrance length upstream. Nu values follow the pure forced convection curve and after some distance along axial direction separates and rise in Nu is observed This effect is due to secondary buoyancy forces being predominant over forced convection. Richardson numbers used by various researchers are determined from the available papers. An experimental result compared with forced convection limit is also included in this paper.

Keyword : Mixed convection, entrance region, Richardson number, duct.