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Performance of Turbulence Models in the Prediction of Heat Transfer from a Hemispherical Surface Due to Turbulent Jet Impingement[1] NICHOLE RAMIREZ, MUHAMMAD SHARIF, University of Alabama — Impinging jet configurations are encountered in numerous industrial and engineering applications. Among these include cooling of a hot surface, turbine blade cooling, and airplane wing leading edge de-icing. In the design and operation of these applications, the knowledge of the heat transfer coefficient distribution along the cooling surface is important. We evaluated the performance of several turbulence models in the prediction of convective heat transfer due to round jet impingement onto convex spherical surfaces against available experimental data. The jet exit Reynolds number, the jet diameter, and the jet exit to the spherical surface distance were varied according to the experimental values. Based on calculated errors, the superiority of one model over the others cannot be established conclusively. However, the realizable k-epsilon model generally predicted the Nusselt number distribution more accurately than the other models for most cases.

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