



ADIABATIC EFFECTIVENESS AND NUSSULT NUMBER DISTRIBUTION ON A FLAT SURFACE WITH AN OBLIQUE IMPINGING JET

J. W. Baughn, M. Dietzel, and J. E. Mayhew
University of California, Davis, California

These pictures show the hue values (calibrated against temperature) of thermochromic liquid crystals on a flat surface with an oblique impinging air jet.

The pictures in the left column are obtained on an insulated surface with a heated jet. For these pictures the hue values represent the adiabatic effectiveness distribution and illustrate the region of entrainment effects.

The pictures in the right column are for the same insulated surface. However, in these pictures the jet is unheated; instead a micro-thin gold coating on the surface is electrically heated to

produce a uniform surface heat flux. In this case, the hue values represent the heat transfer coefficient distribution and illustrate the region of enhanced heat transfer.

Comparing the adiabatic effectiveness distribution to the heat transfer coefficient distribution it can be seen that there is a region of strong variation in heat transfer coefficient in which entrainment effects are small (i.e., high effectiveness). Outside this region, both adiabatic effectiveness and heat transfer coefficient are needed to calculate the overall heat transfer.