

ABSTRACT

An experimental investigation has been made of an axisymmetric turbulent round jet of air impinging on and spreading out radially over a flat smooth plate.

The purpose of the experiments was to determine the mean velocity distribution and the turbulence intensity of the flow fluid between the jet and the nearby wall, and to study how the impinging jet was different from the free jet and how the wall jet developed.

The velocity distributions were measured at two jet velocities (95 and 105 fps). Three different nozzle-wall distances ($\frac{b}{D} = 6, 10, \text{ and } 16$), and one size of nozzle ($D = 1.5$ inches) have been used. Impact tube was used for the whole series of measurements, and constant temperature hot-wire anemometer was used for some measurements to check the data with impact tube and to obtain the static pressure variation and turbulence intensity.

It was found, within the experimental range and accuracy, that for free jet, the similar axial velocity profiles were quite similar to Goertler's theoretical solution, for normal impinging jet, the velocity profiles were similar to those of the free jet except in the region close to the wall and for the wall jet, the velocity profiles were similar and that the rate of change of velocity and width of the jet could be expressed by simple power laws, and as other investigators have found, that the wall jet does not grow in the manner predicted by Glauert but rather at a smaller rate.

AN EXPERIMENTAL INVESTIGATION OF AN AXISYMMETRIC
WALL JET

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CERTIFICATE OF APPROVAL OF THESIS

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