

ABSTRACT

Experimental measurements were made to determine the mean velocity distribution and turbulence intensity of a subsonic, incompressible, turbulent, plane air jet. Measurements were made in free, impinging, and wall jets to determine the difference between impinging jets and free jets, and to determine how the plane wall jet developed.

An impact tube was used for measuring high speed (150 feet per second) and low speed (99 feet per second) jets. A constant temperature hot-wire anemometer was employed for measuring low speed jets to compare the results by using impact tube and obtain the static pressure variation in impinging region. Turbulence intensities were obtained using the hot-wire anemometer.

Experimental data concerning velocity profiles, velocity decay, and jet thickness agree well with previous investigators, in these regions where conditions were comparable. Under the experimental conditions the momentum rates were nearly conserved along the wall.

DEVELOPMENT OF A PLANE WALL JET FROM AN IMPINGING
PLANE FREE JET

A Thesis
Presented to
the Faculty of the Graduate School
Tennessee Technological University

In Partial Fulfillment
of the Requirements for the Degree
MASTER OF SCIENCE
CHEMICAL ENGINEERING

by
Hsin-Ying Li
November, 1967

CERTIFICATE OF APPROVAL OF THESIS

DEVELOPMENT OF A PLANE WALL JET FROM AN
IMPINGING PLANE FREE JET

by

Hsin-Ying Li

Stydie Campbell

Chairman, Graduate Advisory Committee

W.D. Hill

John P. Wallace

Approved for the Faculty

W.S. Burnett
Dean, Graduate School