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Ann Arbor, Mich., in *Industrial and Engineering Chemistry*, Vol. 23, No. 6, June, 1931, pp. 625-631, 4 figs. and brief list of references, e.)

HEAT TRANSFER OF LIQUIDS IN VISCIOUS FLOW

This paper deals with the subject of heat transfer in the case where the fluid moves at a velocity below the isothermal critical velocity. This field has not been extensively investigated in the past. The present paper reports new experimental data and correlates these and other existing data with the Nusselt and Grober theory of heat transfer to fluids in viscous flow.

In his investigation on the program, Nusselt makes two assumptions: first, the tube wall is smooth and, second, the flow is viscous and the velocity distribution over any cross-section is a paraboloid of revolution as given by a formula which he derived. Nusselt makes two other assumptions as to heat developed by friction and temperature gradient. The authors consider that the second of these assumptions is questionable.

In the present paper the experimental results are compared with the theoretical calculations of Nusselt and Grober. Among other things the authors derive equations by which turbulent-flow transfer data can be used as a general type equation for heat transfer under both viscous and turbulent-flow conditions.

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