

ENTRAINMENT LIMIT OF POROUS-WICK
HEAT PIPES

BY

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ABSTRACT.

Of all the various operating limits of a heat pipe, entrainment limit has received the least attention, despite its undoubted importance in the design of heat pipes. Entrainment limit has its origin in the interaction between the gaseous phase and the liquid phase flows in a heat pipe.

A theoretical analysis of the phenomenon of liquid entrainment from porous surfaces is presented, supplemented by experimental data on wire-screen wicks collected in a specially designed and fabricated set-up. Based on this, it is concluded that an induced capillary limit is the real entrainment limit of a heat pipe. The proposed mathematical model is compared with experimental data reported in literature. Also, an optimization procedure is proposed for the least-cost design of a heat pipe for given application.

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