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Dynamic test method for determining the thermal performances of heat pipes. (English)

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Summary: With a view toward shortening the necessary time to examine the thermal performances of heat pipes, a novel dynamic test method is originated and compared to the conventional steady-states test. A set of dynamic parameters of thermal performances of heat pipes is ideated from the observed transient phenomenon. Bending angles, fill ratios, and shapes of heat pipes are investigated in order to study their influences on the thermal performances of heat pipes for both steady-state and dynamic tests. A model based on the investigated dynamic test is established to explain the experimental results. Experimental results demonstrate that deformation of heat pipes would damage the thermal performances of heat pipes most significantly. Larger fill ratios would increase the operation limitations but also lead to less sensitive temperature responses of heat pipes. The parameters and the influences of factors between the steady-state test and the dynamic test are found to be remarkably analogous. As a consequence, the dynamic test can be adopted instead of the steady-state test to determine the thermal performance of heat pipes when high efficiency is of prior concern.

MSC:

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Keywords:

heat pipes; thermal performance; dynamic test

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