

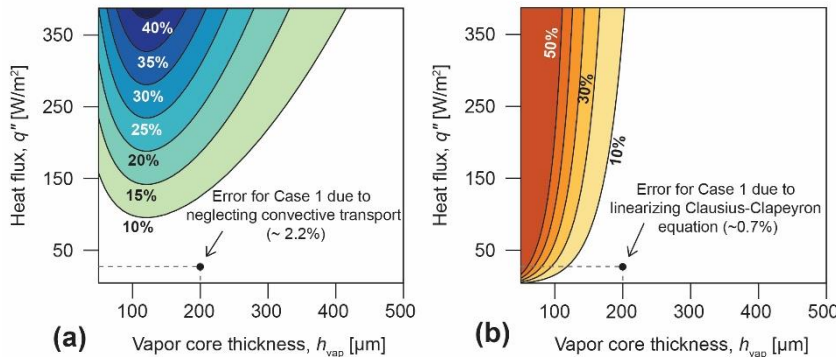
Effective Anisotropic Properties-Based Representation of Vapor Chambers

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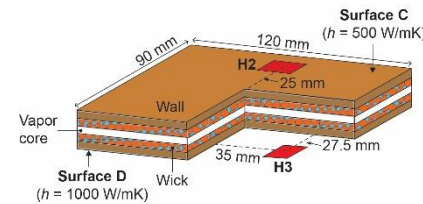
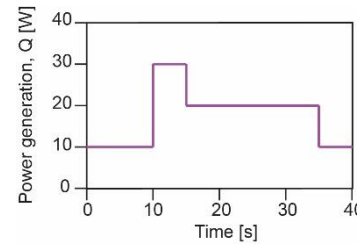
Objective

Develop an effective anisotropic properties-based representation of the vapor core, which enables simulation of a vapor chamber as a conduction block to model its transient thermal response.

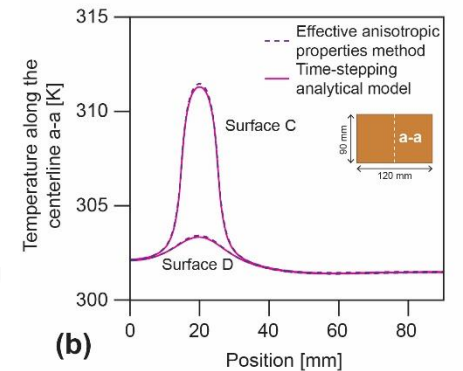
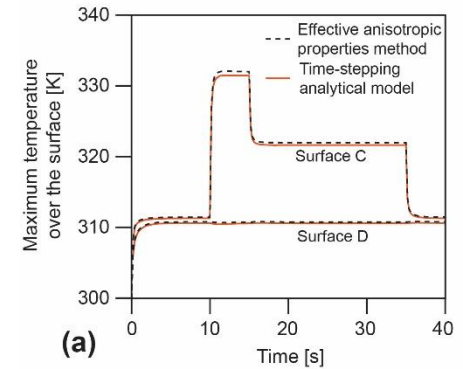


Percent errors as contour maps as a function of heat input and vapor core thickness

Effective Properties Method Verification



For the vapor chamber heating case shown above, the right plots show a comparison of effective properties method with a validated time-stepping analytical model



Conclusions and Impact

1. An effective properties based representation of the vapor core is presented, allowing engineers to simulate vapor chamber as a conduction block.
2. Expressions are formulated to estimate error associated with use of these effective properties before running a simulation, enabling a user to determine the suitability of this approach for their case of interest.

Publication

K. Baraya, J.A. Weibel, and S. V. Garimella, "Effective Anisotropic Properties-Based Representation of Vapor", *IEEE CPMT*, 2020